I D E N T I F I C A T I O N

PRODUCT CODE:	MAINDEC-11-DQKUB-B-D VERSION /101/
PRODUCT NAME:	KD11-K Microdiagnostic
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1.0 ABSTRACT

The 'DCS' (Diagnostic Control Store) Module is a diagnostic tool specifically designed for the PDP-11/60 [KD11-K] Central Processor. Functioning as an alternate 2048 word control store, microcoded tests are executed to detect and isolate errors within the internals of the processor control and datapath hardware. Error indication information is provided by the DCS module; coupled with an indexed FAULT DIRECTORY, errors are resolved to the module level, when possible. Additional information is also provided resolving the error to a specific functional logic block. Significant benefits of this micro diagnostic approach are seen to be:

- Memory/I-O Device/UNIBUS independence
- Direct hardware microcontrol and visibility
- Extremely fast load and execution times
- Excellent coverage and resolution

2.0 REQUIREMENTS

A preliminary note:

Throughout this DCS User's Guide, the two terms "FAULT" and "ERROR" have been used interchangably. They both are to indicate "malfunctioning logic elements" (eg, busted IC's) and open/shorted ETCH runs, etc., in the unit under test. No distinction between the two terms is implied.

2.1 Hardware

To use the DCS, the following hardware is required:

1. DCS (Diagnostic Control Store) Module M7871 (KU116-BB)
2. PDP-11/60 [KD11-K] Central Processor
3. DL11-W Line Clock (required)
4. First 4k memory bank (required minimum)

2.2 Documentation / Listings

The available documentation for the DCS module user comprises the following items:

- DCS User's Guide (this document)
- FAULT DIRECTORY Listing; for module replacement information
- DCS Microcode Listing; when IC level debug is necessary
- DCS Maintenance Manual, Print Set; for detailed information on DCS hardware operation
- KD11-K Processor Maintenance Manual, Print Set; for IC level debug, base machine hardware specific information

Specific MAYNDEC component part numbers for the DCS documentation are as follows:

MD-11-DQKUB-*-D;
User's Guide, FAULT DIRECTORY (PAPER, 80 pages)

MD-11-DQKUB-*-LA;
DCS Microcode Listing (PAPER, 450 pages)

MD-11-DQKUB-*-FA;
User's Guide, FAULT DIRECTORY, DCS Microcode Listing (FICHE, 4 cards)

3.0 LOADING PROCEDURE

The DCS occupies slot 1 in the KD11-K processor backplane; thus if an ECS or UCS option is present, it must be removed. To load the DCS, the following sequence should be employed:

1. Power down the CPU
2. Remove the ECS/UCS option from processor slot #1, if present
3. Insert the DCS module into slot #1. Use caution while inserting the DCS module, as a slightly bowed board may require some gentle maneuvering to seat it in place.
4. Orient the DCS 'RUN/STOP' switch to 'STOP', and the 'NORMAL/VERIFY' switch to 'NORMAL'
5. Now power up the CPU

4.0 STARTING PROCEDURE

DCS execution can be initiated by two distinct methods:

4.1 Startup via the Operator's Console (KY11-P)

With the KD11-K CPU in "CONSOLE" ("HALTed") mode, simultaneously depress the KY11-P operator's console "CNTRL/DIAG" keys to start the DCS. (If no DCS/ECS/UCS happens to be present, there should be no effect). Section 5.1 (below) interprets the display on the operator's console while the DCS is executing, and after it stops. If this method fails to start the DCS, proceed to the next paragraph.

4.2 Startup via the DCS Switches

If it is desired for some reason to bypass use of the KY11-P operator's console to initiate the DCS, an alternative means is provided. This method would be used, for example, in the event that starting from the operator's console was not possible (using "CNTRL/DIAG") due to some hardware malfunction. The procedure is:

1. On the DCS module, set the 'NORMAL/VERIFY' switch to 'NORMAL'

2. Now set the 'RUN/STOP' switch (on DCS module also) to the 'RUN' position, or flip it from 'RUN'->'STOP'->'RUN'

The DCS should now assume control of the KD11-K CPU, irregardless of the previous state of the CPU ("CONSOLE", "RUN", or whatever).

NOTE

If the DCS 'RUN/STOP' switch was already in the 'RUN' position, then it is expected that the operator's console keys have no effect - the DCS is already enabled to execute, and is controlling the CPU. The DCS microcode does not monitor the console keypad for operator input.

If neither of the above methods produce a 'RUNNING' indication of the DCS (as per Section 5.1), then proceed to the next paragraph.

4.3 Using Console "INIT"

Set the DCS switches as detailed in Section 4.2 (ie, 'NORMAL' and 'RUN'). Now generate a processor "INIT" signal by simultaneously depressing the "HALT" and "START" keys on the operator's console. This should now initialize the CPU logic and restart the DCS, producing a 'RUNNING' indication (see Section 5.1).

If no 'RUNNING' indication is now present, then a problem exists in the power supply, system clocks, DCS module, or ???.

5.0 OPERATING PROCEDURE

5.1 DCS Indications While Executing

5.1.1 On the KD11-K Operator's Console

While the DCS is executing, the operator's console display should be approximately as follows:

"RUN" - ON Continuously
"PROC" - BLINKing
"USER" - BLINKing
"CONSOLE" - OFF Continuously
"BATTERY" - <indeterminate>

The 6 digit octal display should read:

(0 0 0 0 0 0) - In DCS pass 1;

(.0.0.0.0.0.0.) - In DCS passes 2-64.

If any of the above conditions are not met, then either:

1. The console hardware is inoperable, or

2. The DCS is hung in an 'error/scope loop'

[Not necessarily in that order]

5.1.2 On the DCS Module

On the DCS module, the two important indicators to watch at this time are the 'ERROR' and 'EOP' LEDs:

-----LEDS-----			
'ERROR'	'EOP'	State	Comment
OFF	OFF	Probable ERROR	DCS and/or processor HUNG
OFF	ON	* EOP *	Successful EOP
ON	OFF	* ERROR *	Genuine ERROR
ON	ON	Probable ERROR	DCS 'VERIFY MODE' indication

Note the 'Probable ---' notation. Either 'EOP' or 'ERROR' on the DCS should be lit; both OFF or both ON indicate non-standard conditions that require further investigation. Neither 'ERROR' nor 'EOP' indicates that the DCS and/or processor are in a HUNG condition (eg, clocks suppressed); see section 8 (Error Handling). Both 'ERROR' and 'EOP' is the standard DCS 'VERIFY MODE' indication. Make sure the DCS 'NORMAL/VERIFY' switch is set to 'NORMAL' (if this is intended), and then restart the DCS. See section 10 (Verify Mode) for further information.

5.2 DCS Execution Time

The execution time of the DCS will vary depending upon its mode of initiation.

5.2.1 "CNTRL/DIAG" Start From Operator's Console

When started via "CNTRL/DIAG" from the operator's console, and assuming no errors, DCS will execute with console display as detailed above for approximately 6 seconds (64. passes at 100 milliseconds/pass, about 350,000 microcycles/pass). After this time has elapsed, control should return to the KD11-K microcode, as if the CPU had just been powered up with the slide switch set to "HALT". Note that the machine will end up in console mode irregardless of the actual slide switch settings (RUN/BOOT/HALT). Section 5.3 interprets the console and DCS displays after this delay time, for successful 'END-OF-PASS' and 'ERROR' indications.

5.2.2 Start From DCS Switches

When started via setting 'RUN/STOP' to 'RUN' on the DCS module, the DCS will execute continuously, not returning to the KD11-K microcode until the 'RUN/STOP' switch is reset to the 'STOP' position. Throughout this time, the execution indications will be as previously detailed. When the switch is returned to 'STOP', the DCS may execute for a maximum of

approximately 6 more seconds; and then proceed as described directly above, entering "CONSOLE" mode.

5.3 DCS 'END-OF-PASS' and 'ERROR' Indications

5.3.1 On The DCS Module

Successful 'END-OF-PASS' and 'ERROR' conditions detected by the DCS are indicated most directly on the DCS module by the two LEDs labeled 'EOP' and 'ERROR'. 'EOP' is turned on at the end of each successful pass thru the DCS code - assuming 'ERROR' has not yet been turned on. In an error-free running situation, 'EOP' will be on; 'ERROR' off. Note that 'EOP' comes on at the end of the first pass (assuming no errors), and thus will appear to be on continuously.

In the event the DCS detects an error, the 'ERROR' LED will be turned on, and the 'EOP' LED turned off. The 'ERROR' LED will be latched in such a way that it cannot be turned off if the error disappears (i.e., a 'flaky' timing error), thus retaining the indication of an error. See section 8 (Error Handling) for a full treatment of the various error conditions: Detection, Indication, Scope-looping.

5.3.2 On the Operator's Console

Successful 'END-OF-PASS' and 'ERROR' conditions are indicated on the operator's console as follows:

1. A successful 64. passes and return to KD11-K processor microcode control, by a

   (.1.2.3.3.2.1.)

   in the console display, and the KD11-K processor "HALTed" in "CONSOLE" mode.

2. An error in pass 1 will usually (but not always) be indicated by a

   (0 0 0 0 0 0)

   in the console display.

3. An error in pass 2 thru -- will usually (but not always) be indicated by a

   (.0.0.0.0.0.0.)

   in the console display.

Note the qualifications in the previous statements:

For a successful 'END-OF-PASS' and exit back to KD11-K microcode control, only one display is valid:

(.1.2.3.3.2.1.)

For any other display except "(.1.2.3.3.2.1.)", check the DCS module 'EOP' and 'ERROR' LEDs for the most reliable indication of the result of execution.

See Section 8 for a full explanation of error processing.

6.0 RESTRICTIONS

6.1 Hardware

6.1.1 Cache and Memory Management (KT)

The DCS executes with both Cache and KT disabled:

1. Cache, by setting both the "Force Miss" bits
2. KT, by clearing the "Enable" bit

The DCS checks the most basic path from the UNIBUS to/from internal data paths. Further macro diagnostic programs are available for Cache (MD-11-DQKKA-*) and Memory Management (MD-11-DQKTA-*) fault diagnosis.

6.1.2 MOS Memory Battery Backup

The MOS memory battery backup (if present) must either be "Good", or else disabled. Otherwise, the micro diagnostic code WILL NOT execute without detecting an error.

Indications are: ERCD=5621/TNUA=7400, in TEST620C.

6.2 Software

6.2.1 Return To Console / DCS End-of-pass Processing

Console "HALT" mode is the ONLY exit provided from DCS back to base machine microcontrol. This action is due to:

1) The DCS, upon detecting an error, locks itself (and the processor) up in such a way that manual intervention by the operator is required for return to base machine microcontrol.

2) The DCS completely alters the internal microstate of the processor, destroying its previous contents, and leaving "garbage" in its place. Thus the full base machine power-up "INIT" sequence is generated by DCS to "clean-up" the processor prior to returning control.

7.0 TEST DESCRIPTION

7.1 Test Structure

7.1.1 Philosophy

The testing philosophy used in the design of the DCS microcode centers around two major points:

1. Start with as minimal a HARDCORE as possible.

2. Use only TESTED and VERIFIED logic elements to diagnose UNTESTED elements; add TESTED elements to the arsenal of logic available for further testing.

This method of test organization and construction presents the best approach for building a high resolution and high coverage diagnostic program. Section 7.4 (below) summarizes the actual testing order present in the DCS microcode, as designed using the above philosophy. Section 8.1 presents more specific details on the actual method of ERROR detection employed by the DCS microcode and hardware.

7.1.2 Mechanics

The manner in which DCS tests are setup is depicted in the following diagram:

```
          \ /
           .
  <setup ENUA/DCS-CNTR as test requires>
           .
           .
  <perform the actual test function>
      -may be inline microcode
      -may call subroutine
           .
           .
  <jump to BUT area, perform BUT(test) into TARGET>
           .
           .
  <enter TARGET area from BUT, ENUA::TNUA compare>
      -the DCS-CNTR was loaded above to enable compare here
      -the ENUA was setup at correct TARGET point
      -exit via BUTA(RETURN)
           .
          \ /
  <...next test now begins...>
```

7.2 DCS Microcode Conventions

7.2.1 Microdiagnostic Code Listing Organization

The format of the DCS microcode listing is presented in the following table, along with a brief description of each section (when necessary):

pages	contents
1-5	IDENTIFICATION, TABLE-OF-CONTENTS
6-9	DCS REGISTER LAYOUTS, MICROWORD BIT TABLE a number of graphic tables
10-24	MICROWORD FIELD DEFINITIONS, BASE MACHINE defines U<47:00> and their functions
25-26	DCS FIELD DEFINITIONS defines U<54:48> and their functions
27-37	"SIMPLE" MACROS these macros are combinations of FIELD definitions only
38-52	"ADVANCED" MACROS these macros are combinations of SIMPLE macros
53-380	---DCS-MICRODIAGNOSTIC-TESTS---
381-384	EOP/VERIFY-MODE MICROCODE microcode used in END-OF-PASS and VERIFY-MODE processing
385-393	GENERAL SUBROUTINES, COMMON CODE this section contains some VERY commonly used subroutines
394-395	JAMUPP MICROCODE all JAMUPP conditions enter here ...
396-402	BUT(---) TAKEOFF MICROWORDS most all DCS tests start their microbranch from this list of BUT's
403-417	BUT(---) TARGET MICROWORDS and most all DCS tests end up here, where they compare their ENUA::TNUA in this 256. word table
418	BIT MAP OF DCS ADDRESS SPACE

a BIT MAP of the entire DCS address space, 1=USED, 0=FREE

X1-X10 SYMBOL/LINE-NUMBER/LOCATION CROSS REFERENCE
a very useful reference to find the location in the DCS listing of a particular symbolic label

X11-X18 LOCATION/SYMBOL CROSS REFERENCE
an expansion of the above BIT MAP, substituting the symbolic label for the 1/0's present in the above

X19 FREE/USED LOCATION SUMMARY
a quantitative summary of FREE/USED microlocations, by PAGE and TOTAL

7.3 What is/is-not tested

The DCS micro diagnostic code has been designed to detect and isolate errors within the "internals" of the KD11-K processor hardware. As such, it does not attempt (nor is it possible) to detect certain errors, which are processor related, but require devices external to the processor. Errors related to NPR/BR arbitration sequences, multiple BR priority level interrupt sequences, POWER FAIL / RESTART, etc., are a few of the elements of this general class. The following sections enumerate both classes of logic: TESTED by DCS, and UNTESTABLE by DCS.

7.3.1 TESTED by DCS

Essentially, the DCS is designed to test the "heart" of the KD11-K processor - those elements that must be functional to "bring up" the processor to a level whereupon further macro diagnostic programs could then be loaded and started (ie, M9301-YH boot/diagnostic, processor and peripheral diagnostics, etc.) to successfully isolate more complex processor and system related errors. Processor operation with either KT/KJ or CACHE enabled was not considered as part of this "heart" - as the processor will run perfectly fine without either of these facilities (albeit at a degraded performance level). Thus the DCS is able to concentrate on more thorough coverage and resolution in those portions of the hardware that are least "visible and testable" from a macro diagnostic, and very suitable to micro diagnosis.

Rather than present a full module by module list of which logic the DCS tests, refer to section 7.4 (below), which is an itemized "execution-time" summary of the DCS micro diagnostic tests. The following section lists those areas that the DCS cannot test (ie, uncontrollable or unobservable logic) or

would have required a prohibitive number of microwords to test effectively.

7.3.2 UNTESTABLE by DCS

From a functional point of view, the DCS operates on the KD11-K processor from the "inside out". Both the CACHE and KT/KJ are turned off (disabled); there is no FP11-E HFP unit assumed to be present; likewise no ECS/WCS options. No external I/O options are assumed on the UNIBUS, except the standard DL11-W console interface / line clock. The lowest 4K memory bank is assumed to be present. These restrictions impose constraints on the logic that can be exercised by DCS. The following list attempts to detail as specifically as possible, on a module by module basis, those functional areas of the processor that the DCS cannot fully diagnose:

-K2 UWORD-
- -full effects of processor "INIT"
- -NUA<11> (DCS can't "see" it)
- -CROM contents and address drivers
- -FP11-E related (FLPGO, HFP[CC], etc.)
- -UCON's HFP/KT/WCS
- -HFP FLAG-ROM contents

-K3 IR-DECODE-
- -CROM contents and address drivers
- -CROM extension roms
- -full effects of processor "INIT"
- -full rom contents (location by location) of:
  - -BYTE/CC, INSTR-5, FLTPT, CC[V/C], PS[CC]-BRANCH,
  - -BYTE-DFCODE, KT-DECODE roms
- -KT/KJ enable/select logic

-K4 DATAPATH-
- -full processor "INIT" effects
- -data I/O validity in some A/B/C-SPAD locations
- -SP/BY/KT selection
- -CACHE INVALIDATE logic

-K5 CACHE/KT-
- -processor UNIBUS operation with CACHE enabled
- -processor UNIBUS operation with KT/KJ enabled
- -status conditions of above, including
  - -RED/YELLOW ZONE, MM-ABORT, CACHE errors, etc.

-K6 TIMING-
- -ECL clock logic (must be "clocking" ...)
- -74S37 etc CLOCK DRIVERS - mostly HARDCORE
- -MAINTENANCE clock
- -some JAMUPP/PULSE-SUPPRESS conditions (see K7)
- -UNIBUS master arbitration, NPR/BR/PROCESSOR
- -CACHE control (NPR track, HIT, etc.)
  - -remember DCS turns CACHE O

-UNIBUS address drivers - full test of same
-full check of INTRNL-ADDR rom contents
-full processor "INIT" effects

-K7 STATUS-
-full processor "INIT" generation/effects
-POWER FAIL/RESTART logic
-BR-4/5/7 requests, BG arbitration
-SACK timeout (BG/NPR)
-NPR/NPG logic
-SERVICE conditions:
-FP11-E/YELLOW-ZONE/CONSOLE/PWRFAIL/CACHE
-JAMUPP conditions:
-KT-ABORT/RED-ZONE/CACHE+MEMORY+WCS-parity-error
-CONSOLE interface:
-KEYCODE input/DISPLAY output/LOCAL and REMOTE
-[see 11/60 microcode listing for "CONSOLE MICRO TEST", which tests these functions]
-STATUS mux bits:
-bits related to above conditions not asserted
-BATTERY BACKUP for MOS MEMORY OK

7.4 Global Test Order

The following list provides a summary of the major functional blocks of the DCS micro diagnostic code, presented in execution-time order. Note the progression from the innermost portions of the processor logic (microsequencing, IR decode); through the intermediate areas (ALU, SHIFT TREE, etc.); out to the external interface logic (UNIBUS cycles, INTR sequences).

NOTE

Most of the capitalized terms refer to specific hardware elements in the KD11-K processor. No attempt is made to explain their meaning - the unfamiliarized reader is referred to the processor logic block diagrams, print set, maintenance manual, and the micro diagnostic code listing for their definition.

The notation "[xxx/yyy]" signifies the micro tests in the range "TESTxxx" to "TESTyyy". All DCS tests are numbered octally, and are executed in ascending order. Some test numbers are further broken down into "TESTxxxA", "TESTxxxB", etc., when their functions are logically similar. Certain test numbers are non-existent (eg, there are no tests with numbers in the range 200-277).

[001/007] - NUA sequencing logic
-UPF sequencing, page changing

[010/011] - microsubroutine operation
  -RETURN register, BUTA(SUBR-B)/BUTA(RETURN) decode

[012A/050B] - IR decode logic and microbranch
  -INSTR -1, -5, -FLTPT decode
  -microbranch selection / execution
  -misc IR decode related microbranch logic
  -processor UCON IR load, EMIT constant generation

[101] - D-REGISTER/DBUF/BUSDIN/IR datapath
  -D-REGISTER load, ALU control (zeroes)
  -DBUF load, BUSDIN enable (UCON)

[102A/104B] - C-SCRATCHPAD
  -address modes (2-bit/4-bit), address lines
  -BUSDIN/CSP/ALU-B/D-REGISTER/DBUF/IR datapath, [1s/0s]

[105A/105E] - SR load/store
  -SR load/store/XMUX-enable
  -BUT(SR<3:0>) microbranch
  -SR/ALU-A/D-REGISTER/DBUF/IR datapath, [1s/0s]

[114A/122A4] - ALU logic functions, D[C] sources
  -ALU function/mode decode
  -ALU logic function execution
  -D[C] sources (ALUxx, CIN, save); D[C] microbranch

[130A1/136B2] - ALU arithmetic functions
  -ALU arithmetic function/mode decode
  -ALU arithmetic function execution
  -ALU carry logic (in, out, lookahead)
  -D[C] sources (COUTxx, CIN)

[320A/320F] - D[C] select logic, D=ZERO logic
  -D[C] 1/8 addressing
  -BUT(D=ZERO) decode logic

[350A/352D] - A/B-SCRATCHPADS
  -addressing, lines and mode (SF, DF, RIF)
  -data patterns [1s/0s]

[361A/371B] - SR/GUARD/XMUX, RES control
  -SR shift (left, right, nop)
  -GUARD register (shift, enable/disable, test)
  -RES/SR control

  -FLTPT assemble port

[372A/372B] - CUA(PROC mux) / BUTA(SUBR-A)
  -BUTA(SUBR-A) decode/execution, RETURN register

[373A/373B] - JAMUPP and BUTA(DIAGNOSE)
  -active BUTA(DIAGNOSE) decode
  -JAMUPP clock suppress logic via external JAM

[374A1/376A] - A/B-SCRATCHPADS
  -rewrite modes test (A/B, HI/LO, etc.)
  -BYTE WRITE, DAD control
  -R-IOR-1 / FLTPT-INHIBIT addressing

[410A/410E] - BYTE / BYTE-CONSTANT / D=ZERO (loop)
  -BYTE/WORD rom decode, microbranch
  -BYTE-CONSTANT CSP addressing, DAD control
  -BUTR(D=ZERO) decode (full test)

[500C/500F] - PREFETCH / OVERLAP / SP-DEFEAT (loop)
  -PREFETCH rom decode, microbranch
  -OVERLAP rom decode
  -SP-WRITE-DEFEAT decode/control

[503A/510F] - processor UCON registers / control
  -FLAGS/EXFLAGS - read/write/microbranch
  -FPS - read/write/microbranch
  -PS - read/write/microbranch
  -MULTIPLE BUT - input/select/output
  -SERVICE/INTR decode logic, microbranch

[511A1/511B4] - MOVE FROM SAME STACK (MFSS) logic
  -decode / microbranch

[512A1/512E2] - KT SRC/DST addressing logic for ASP/BSP
  -rom decode / control

[520A/520E] - INSTR BRANCH rom
  -IR/PS inputs, microbranch output

[533A/537] - SHIFT TREE (AMUX/BMUX/CMUX/SENDMUX)
  -data path (1s/0s)
  -function decode / mux select
  -RES control / select
  -COUNTER load / read

[551A/551C] - base machine COUNTER
  -active BUTA(COUNT) decode/microbranch
  -COUNTER count execution

[610A1/610D2] - PS condition code NZVC generation
  -INSTR CLASS decode
  -BYTE/WORD CC mux select
  -CC rom addressing/data

[620A/624D] - microbreak and JAMUPP
  -MICROBREAK REGISTER load/enable/compare
  -JAMUPP via microbreak, JAM register & STATUS
  -CUA TRACKING, lock/unlock
  -JAMUPP inhibit micro-operation logic
  -JAMUPP CLEAR

[701A/701D] - BA register

-18. BIT load/read via STATUS mux
-microbranch conditions

[710A/722C] - UNIBUS function decode, error conditions
-ODD ADDR/INTERNAL ADDR/SSYN TIMEOUT errors
-18./16. bit BA modes, I/O PAGE decode, CONSOLE mode
-SERVICE/JAM register inputs (STATUS mux)
-bus function decode (DATI, DATO, etc.)

[730A/731E] - UNIBUS cycles to/from memory
-DATI(B)(P)/DATO(B) execution, side effects
-UNIBUS data lines, control lines C0, C1
-ALLOW ODD ADDR, BYTE/WORD operations
-DBUF, UNIBUS data latches load/enable
-DATI-CLKIR decode/execution
-DATIP/PROC-BBSY/BUTA(LAST) logic
-clock suppress / restart logic

[740A/740D] - UNIBUS cycle function modification
-BUTA(INSTR-1)/PREFETCH alteration of BUS CODE
-bus cycle YANK (SP DEFEAT) decode

[761A/763D] - UNIBUS interrupt (BR INTR) logic
-bus reset, microbranch on status
-line clock INTR enable, at BR6
-PS PRIORITY level/INTR PRIORITY level interaction
-SERVICE port conditions
-ALLOW BUS GRANT / VECTOR LOAD logic

8.0 ERROR HANDLING

8.1 What is an 'ERROR' ?

The concept of an 'ERROR' in DCS terms is very simple. It involves the use of the ENUA (Expected NUA), TNUA (Tracking NUA), and DCS COUNTER registers; all of which are local to the DCS module. The 11/60 processor itself has no control over the setting/clearing of 'ERROR'; in fact, it cannot directly determine whether 'ERROR' is set or clear.

The ENUA register (12 bits) is loaded from the EMIT field of the microword, under control of a DCS rom extension bit. It is setup at the beginning of a test to reflect the "EXPECTED" micro address after the test microbranch ("BUT") is executed.

The TNUA register (12 bits) is loaded continuously as the DCS microcode executes, TRACKING the progress of the microaddress field. This register contains the value of the "RECEIVED" micro address after the test microbranch is executed.

The DCS-CNTR is loaded with a value from (00)-(17) (octal), from the EMIT field of the microword, under DCS rom extension control. This register continuously counts up every microcycle. When the contents of this register is (17), the DCS hardware compares ENUA and TNUA, and does the following:

Set 'ERROR'="1" if DCS-CNTR=(17) and ENUA<>TNUA
else leave 'ERROR' unchanged from its previous value.

This is the manner by which DCS is able to set 'ERROR'. All DCS tests use this method.

Note also that the DCS hardware "locks up" the loading of the ENUA and TNUA registers after 'ERROR' is set, preserving their contents. Thus only the FIRST 'ERROR' will be recorded. There is no provision to detect subsequent errors until the previous ones are eliminated. See the DCS Maintenance Manual and Print Set for more detailed information.

8.2 FAULT DIRECTORY Format and Use

8.2.1 Basic Structure

The FAULT DIRECTORY is essentially a tabular summary of all ERROR codes the DCS is able to generate - a total of 432 entries occupying 52 pages. Each individual ERROR code entry in the FAULT DIRECTORY contains a short description of the test, and the module replacement information pertaining to that test. For ease of reference, the ERROR codes have been organized into ascending numerical order, in the range 4000(8)-6777(8).

8.2.2 Basic Use - with an example

This section describes how to use the FAULT DIRECTORY after the DCS has been run, and has indicated an error is present in the KD11-K processor.

Assume for the purpose of explanation that the DCS was started, and has returned the following values:

ERCD = 4616 (ERror CoDe)
TNUA = 7405 (Tracking NUA)

with EOP=<OFF>, and ERROR=<ON>

1. Going to the FAULT DIRECTORY, we find the entry for ERROR code 4616 to be on page 9, entry number 73.

2. Some general information about the failing test is first obtained:

   a) 'Symbolic label' - A reference to the DCS microtest which failed, in this instance TEST-115-A2.

   b) 'Line number' - A reference to the line number in the DCS microcode listing where the failing test is located (here, line number 5983).

   c) 'ENUA' - The Expected NUA of this test, in this case 7412. Note that the obtained TNUA (7405) is not the same as the test's ENUA (7412); thus the ERROR.

   d) The remainder of the line contains a short description of the function performed by this test; in this instance we note the test was diagnosing the ALU portion of the DATA-PATH module.

3. We now note that the TNUA we obtained was 7405. Scanning downward in the column of TNUA entries for this test, we find it listed as the fourth entry. More information, specific to this particular error, can now be obtained:

   a) 'Module sequence' - These 3+ columns contain (scanning left to right) the top 3+ choices of processor modules to inspect/replace, in order to locate and correct the fault(s). The module choices are listed using "slot"

      notation (ie, K#, where #=the slot), and a "confidence factor" to indicate the percent confidence that replacing this particular module will eliminate the fault(s). The best choice is the module called out in the first column ("#1"); then "#2" etc. Note that the percentages are rounded to the nearest 5%, and may therefore not always add up to exactly 100%.

   b) To the right of the module choices is summarized the

IC information obtained from the FAULT INSERTION effort of the DCS/KD11-K (signified by "FI"). IC information is referenced to a particular module by the notation:

K4=E23,E33-36,E89-E90,E101; K2=E12,E15,E69;

- -
- N O T E -

CALLOUT OF SPECIFIC IC'S ON A MODULE IS --NOT-- INTENDED INTENDED TO BE AN "EXHAUSTIVE-ONLY-THESE-ARE-THE-ONES" LIST. IT IS INTENDED TO PROVIDE REFERENCE TO A SPECIFIC FUNCTIONAL AREA OF A MODULE, AND GIVE REFERENCE TO THOSE IC'S WHICH CAUSED THE FAILURE DURING THE FAULT INSERTION EFFORT OF HARD STUCK-HIGH/-LOW AND ADJACENT-PIN-SHORT TYPE FAULTS. AGAIN, DO NOT ASSUME THIS LIST TO BE ALL INCLUSIVE OF THE POSSIBLE CHOICES FOR FAULTY IC'S.
- -

Another type of entry is of the format:

K404=ALU/CARRY-LOOKAHEAD;
or Kmpp=functional-description-of-logic-block

which references a particular module (#m) and page (#pp) in the KD11-K Processor Print set. This notation is used when specific fault insertion data is not available for a test.

4. In the instance when the TNUA obtained does not match any of those provided under a given test/ERROR code entry, a wild-card character ("?") has been used to allow a match with any octal digit. Thus 740? matches 7400, 7401, ..., 7407. These entries should be used for further information or when a specific TNUA is not present.

5. If there is no TNUA listed which matches the obtained TNUA, and also no wildcard entry is present; then the information about the functional nature of the test (from above), along with an intelligent interpretation of the obtained TNUA, will be required. The following table lists some TNUA's that might be obtained in such a case:

(see table on following page)

TNUA	Cause
4000	DCS forced to its starting address
4777\ 4756 > 4747/	an unexpected JAMUPP condition occurred
7361	in UNIBUS function tests, a JAMUPP did not occur when expected
7400- 7777	the "standard" BUT() target area for DCS micro-tests

8.3 'SCOPE Loop' Facility

8.3.1 General Information

The 'SCOPE loop' implementation provided by DCS is almost identical to that provided in the standard MAINDEC macro diagnostic program. What the 'SCOPE loop' does is to repeatedly execute the same sequence of diagnostic test code; this allows the technician to 'scope' appropriate logic signals in an effort to zero-in on the fault.

The DCS 'SCOPE loop' occurs ONLY and ALWAYS when 'ERROR' is set. There are no user options to change the size or range of the loop - all these parameters have been fixed in microcode and hardware. The loops have been setup to be as tight, and as useful, as was possible. Most are in the range of 10-30 microwords, although some (three, in particular) are larger.

8.3.2 Implementation and Use

A DCS extension rom control bit is used to enable the 'SCOPE loop' check at selected points in DCS code execution. These points are recognized by the following:

```
SCOPE123:
     <possible some other functions>
     NEXT,   BUTD[SCOPE],    !NO ERROR:  "TEST124" [+1, WORDS]
             J/TEST124       !   ERROR:  "LOOP123" [-5, WORDS]
```

The two comments "EPROR/NO-ERROR" tell the user where the DCS code will branch, depending upon the current state of 'ERROR'. Usually, the 'NO-ERROR' condition falls thru to the next word (eg, +1, words). For the 'ERROR' case, the loop is ALWAYS backwards (ie, up the page, toward the point where the error was detected). The "-number" notation gives a relative count of the number (approximately) of micro words backwards in the jump.

This facility can be used in two modes - dynamic and static. Either mode must be entered via the use of the DCS 'RUN/STOP' switch set to the 'RUN' position, as this then enables the DCS code to execute continuously. The results are generally undefined if the switch is set to 'STOP', and the "DIAG" button was used to enter the loop.

Dynamic mode requires the use of an oscilloscope, logic analyzer, etc., and the determination of an appropriate logic signal on which to sync. The DCS microcode then automatically remains in this tight loop to allow observation of the suspected faulty signals, at processor cycle speed.

Static mode is entered in the same manner as dynamic; but afterwards the "SINGLE-MICROSTEP/MAINTENANCE-CLOCK" feature of the 11/60 processor (on K6 TIMING module, the two switches - see prints) is enabled. This allows the processor to be single micro - stepped, under user control. The additional debug features of the DCS can now be employed: the BUSDIN/DOUT display LEDs (16), and the (2) "free" LEDs. See the DCS Maintenance Manual for further details. Also available are the NUA (Next-U-Address) LEDs on the 11/60 processor "UWORD" module (K2). Note that these 'point' at the NEXT microword to be executed, not the current.

9.0 REVISION HISTORY

9.1 Revision Number

After a successful 'END-OF-PASS' indication, console internal exam functions can be used to obtain the 'DCS Microcode Revision Number', stored in the macro machine general register R5. BIT<15> of this number will also be set, indicating successful 'END-OF-PASS' was reached. The initial version of the microcode will display:

(100101)

with subsequent versions to be:

(100102)
(100103) etc

If, however, an 'ERROR' is obtained, one might still be able to obtain the DCS microcode revision number. In this instance BIT<15> will/should be clear, and the lower bits the revision code:

(000101)
(000102) etc

However, this number must be taken with caution, as the error may or may not have influenced the storing of the revision number in the register.

9.2 Revisions To DCS Code

Note that ALL revisions to the DCS microcode / FAULT DIRECTORY are to be documented in this section, with the following information supplied:

a) A short description of the problem(s) found, and how they were corrected.

b) Updated MAINDEC (MD) and DCS (uCODE) revision information.

c) Date of fix, and person responsible for fix.

d) The test/ERROR codes affected by the changes.

Note that the changes MUST also be incorporated into the DCS microcode listing, and/or the FAULT DIRECTORY listing at the appropriate points. Actual microcode changes will be entered as ECO's to individual ROM patterns on the DCS module (M7871). Contact PDP-11/60 Support Engineering for the procedure.

REVISION MD/uCODE	Date	Who	Explanation
A/101	18-Jan-77	DNN	Initial Release
B/101	22-Jun-77	DNN	No microcode changes; documentation added/updated.

10.0 DCS VERIFICATION / SELF-TEST

'VERIFY MODE' is a self-check mode designed to verify the operation of the DCS module and its associated error detection/indication support logic.

10.1 Requirements

This mode of operation requires that a known good PDP-11/60 system (as described in Section 2) be used to test/verify a DCS module, so that errors detected by the DCS are due to the DCS module under test, and not due to the other system components. The set of PDP-11/60 processor macro diagnostics, or a known good DCS module, can be used to perform such a verification of the host system.

10.2 Verification Method

The method (or algorithm) used to perform the DCS self-verification is as follows:

Hardware on the DCS module is conditioned to execute a single pass thru the DCS microcode, via setting the DCS 'NORMAL/VERIFY' switch to the 'VERIFY' position. This also alters the 12 bit hardware counter on the DCS module from a 'Pass Counter' to the 'Verify Counter'.

At the start of a 'Verify Pass', this counter is preset to a specific value; predetermined so that when 'END-OF-PASS' is signaled by the DCS microcode, this counter will have a value of octal (7777), or be at the point of overflow (carry out) enabled.

As the DCS executes in 'VERIFY MODE', this counter is incremented whenever:

1. A microword is executed from page 7, or
2. A microword is executed with the 'VERIFY' bit (a page 4-6 only DCS ROM extension bit) asserted. These 'VERIFY' bits have been scattered, more or less at random, throughout the DCS microcode. Thus this counter will be incremented at random intervals during a 'Verify Pass'.

The DCS code executes approximately 350,000 microwords per pass; thus the counter will overflow between 2-85 times (depending upon the number of 'VERIFY' bits and page 7 references encountered) before the 'END-OF-PASS' / 'Verify Counter' overflow match. Physically, the verify count is retained modulo 4096 (12 bits), with only the low order bits of the count used in the comparison.

A verification will be considered successful only if a verify counter overflow point exactly matches the microword which signals 'END-OF-PASS' (done only once) in the DCS microcode.

10.3 Procedure And Indications

10.3.1 Procedure

To run the DCS in verify mode, the following procedure is followed:

1. Install the DCS in the PDP-11/60 as detailed in Section 3

2. Set the DCS switches:

   'RUN/STOP' = 'STOP' and
   'NORMAL/VERIFY' = 'VERIFY'

3. Now set:
   'RUN/STOP' = 'RUN'

4. The DCS now executes a single 'Verify Pass'

5. At the end of the 'Verify Pass' the DCS enters a microcode loop, in which:

   - An error is forced with specific
     'ENUA', 'TNUA', and 'ERROR code' values
   - 'END-OF-PASS' is repeatedly signaled
   - A 'Scope Loop' branch is executed

   See the DCS microcode listing, under 'Verify Mode Code' for the exact sequence of operations.

6. At this time examine the DCS module LEDs for comparison with their expected contents, as noted below.

7. To return control to the PDP-11/60 after a 'Verify Pass', position:

   'PUN/STOP' = 'STOP' and
   'NORMAL/VERIFY' = 'NORMAL'

   And then generate a "CONSOLE INIT" ("START/HALT") on the operator's console

10.3.2 Indicators

Only the status described below is acceptable to signal a successful DCS verification. Assuming a known good PDP-11/60 system, any deviation from the description (below) should be considered an indication of a fault in the DCS module under

test.

After a 'Verify Pass', indications on the DCS module will be:

'TNUA' = (7522)
'ERROR' = (4255)
(Note the alternating ON/OFF pattern)

'ENUA' = (7523) was loaded to force
an 'ERROR' indication

'EOP' LED = ON, Approx. 1/2 brilliance
'ERROR' LED = ON, continuously

This will be the only instance when both
the 'EOP' and 'ERROR' LEDs should be on
simutaneously.

Indications on the PDP-11/60 console should be:

"RUN" LED = OFF continously
"PROC" LED = OFF continously
"USER" LED = OFF continously
"CONSOLE" LED = OFF/ dimly lit
"BATTERY" LED = <indeterminate>

Octal display = (212121), with the
decimal points either on or off.

11.0 MISCELLANEOUS

11.1 ACT/APT/XXDP

The DCS module is not directly supported by ACT/APT/XXDP software at this time.

11.2 Macro Instruction Interface

11.2.1 DCS Presence

Presence of a DCS module in slot 1 is indicated by a bit in the "WHAMI" register:

NOTE

See PDP-11/60 documentation for a full description of the "MED" instruction.

```
MED     ,022            ;READ WHAMI => R0
BIT     #BIT08,R0       ;BIT<08>=1, DCS PRESENT
                        ;BIT<08>=0, NO DCS IN SLOT-1
```

11.2.2 DCS Register Access

Access to several of the internal registers and status bits is also possible via the "MED" instruction:

```
MED     ,152            ;READ DCS 'TNUA'
```

After execution, R0's contents is as follows:

```
0000_#TNUA<11:00>
```

Similarly:

```
MED     ,153            ;READ DCS 'EOP/ERROR'
```

and R0's contents:

```
ERROR#01#EOP#EPRCOD<11:00>
```

BIT<15> = ERROR(1)H
BIT<14:13> = "01", code for DCS module
BIT<12> = EOP(1)H

11.2.3 Macro Instruction Startup Of DCS

The DCS may also be started via a "MED" instruction. Note, however, that this is a one-way tranfer of control; there is

no means to re-enter an executing macroinstruction program without operator intervention at the operator's console.

This method simulates the operator depression of the "CNTRL/DIAG" keys via loading the KD11-K microaddress pointer (NUA) with the starting address of the "DIAGNOSE" key service routine.

```
        MOV     #011410,R0      ;(1141) = "DIAGNOSE"
        MED     ,347            ;WRITE NUA
        ;NEVER COME BACK TO HERE
        ;DCS ALWAYS EXITS TO "CONSOLE" MODE
```

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
1)	4000	TEST001	2633	6252	NUA SEQUENCING, PAGE (4) => (2) [2=>6], UBF=(34)				
					4000	K3/99	../..	../..	FI; K3=E6,E15
					4203	K2/99	../..	../..	FI; K2=E41,E47
					4252	K2/90	K3/5	K4/5	FI; K2=E13-E14,E34-E35,E40-E41,E46-E47,E58-E59,E62, E64-E65,E67-E68,E72-E74,E78-E80,E91; K3=E34, E111; K4=E3
					4253	K2/99	../..	../..	FI; K2=E14
					4256	K2/99	../..	../..	FI; K2=E34,E46,E59,E68,E74,E80
					4257	K2/99	../..	../..	FI; K2=E40,E65
					4747	K2/75	K3/25	../..	FI; K2=E2,E29,E52-E53,E79; K3=E6,E26
					4786	K2/99	../..	../..	FI; K2=E70
					4757	K3/99	../..	../..	FI; K3=E4,E7
					4776	K2/99	../..	../..	FI; K2=E60
					4777	K2/75	K3/10	K6/5	K4/5 K7/5 FI; K2=E1-E7,E10-E18,E21-E25,E27-E39, E41-E54,E57-E59,E61-E81,E84,E90,E93-E96,E100, E104; K3=E1-E20,E22,E24-E26,E32,E39,E41,E48, E101; K6=E40,E43,E60-E61,E66,E78-E81,E83,E92; K4=E18,E26,E29-E30,E38,E71,E87; K7=E36,E52,E74
					5130	K2/99	../..	../..	FI; K2=E94
					5247	K2/99	../..	../..	FI; K2=E47
					5276	K2/99	../..	../..	FI; K3=E6,E33,E60
					6000	K2/99	../..	../..	FI; K2=E7-E8,E19,E40
					6082	K2/55	K3/45	../..	FI; K2=E1,E7,E117; K3=E88,E91
					6201	K2/99	../..	../..	FI; K2=E70-E71
					6212	K3/55	K2/45	../..	FI; K3=E88,E91; K2=E2,E7
					6231	K2/99	../..	../..	FI; K2=E62
					6235	K2/99	../..	../..	FI; K2=E62
					6242	K3/55	K2/45	../..	FI; K3=E21,E81; K2=E2,E8
					6250	K3/55	K2/45	../..	FI; K3=E21,E81; K2=E2,E8
					6253	K2/55	K3/45	../..	FI; K2=E2,E60,E66,E69,E75,E81; K3=E21,E23,E44,E68
					6256	K2/55	K3/45	../..	FI; K2=E2,E8-E9,E21,E27,E60,E66,E69,E75,E81; K3=E21-E22,E37-E39,E54,E56,E74-E75
					6257	K3/80	K2/20	../..	FI; K3=E37-E38,E74; K2=E8
					6272	K2/95	K3/5	../..	FI; K2=E2-E3,E6-E7,E12,E15,E18,E24,E30,E36; K3=E52
					6277	K2/99	../..	../..	FI; K2=E2,E13
					6282	K2/80	K3/20	../..	FI; K2=E1,E3,E6-E7,E12,E15,E18,E24,E30,E36; K3=E51, E58,E70
					6372	K2/99	../..	../..	FI; K2=E7
					6682	K2/80	K3/20	../..	FI; K2=E1,E19,E42,E59,E65,E68,E74,E80; K3=E23,E63
					7077	K2/99	../..	../..	FI; K2=E117
					7231	K2/99	../..	../..	FI; K2=E14
					7282	K2/99	../..	../..	FI; K2=E35,E47,E58
					7752	K2/99	../..	../..	FI; K2=E48
					7777	K2/99	../..	../..	FI; K2=E48

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
2)	4255	VFY003	18313	7523	THIS ERROR-CODE EXPECTED IN DCS "VERIFY MODE"				
					7522	../..	../..	../..	THIS TNUA EXPECTED IN DCS "VERIFY MODE"
					7522	K6/80	K7/40	K3/5	K2/5 K4/5 FI; K6=E3-E8,E12,E14,E22,E26,E31-E32, E34,E37-E40,E42-E43,E46,E54,E56,E61-E62,E64,E69, E71-E72,E76,E78-E81,E86-E88,E90,E94-E96,E98-E102, E104-E105,E108; K7=E2,E4,E8,E12,E14-E15,E18-E23, E25-E27,E34-E35,E37-E40,E43,E45-E47,E49,E52,E54, E59,E62-E63,E66,E68,E70-E71,E87,E98,E97-E98; K3=E2,E6-E8,E10,E12,E18,E21-E26,E34,E52,E54,E64; K2=E2-E3,E6-E8,E21,E36,E50,E60,E66,E75,E81; K4=E8,E16
					????	K1/99	../..	../..	DCS VERIFY MODE, BAD TNUA LATCHED
3)	4377	TEST007	2749	7303	NUA SEQUENCING, PAGE (4) => (3) [3=>7], UBF=(35)				
					7301	K2/99	../..	../..	FI; K2=E61
					7303	K2/85	K4/35	K3/5	K6/5 FI; K2=E4,E10,E16,E22,E25-E26,E28,E31,E37, E43,E49,E52,E70-E71,E76-E77,E97; K4=E1,E12-E15, E29,E38,E70; K3=E33; K6=E34
					7307	K2/60	K3/40	../..	FI; K2=E9,E21,E27; K3=E21-E22
					7343	K2/99	../..	../..	FI; K2=E7
					7376	K3/99	../..	../..	FI; K3=E34
					7777	K2/99	../..	../..	FI; K2=E23,E29
4)	4450	TEST730C1	17211	7402	BUTA(LAST) CLEARS PROC BBSY (DATIP); EMIT=(052525) ON BUSDIN				
					7400	K5/99	../..	../..	FI; K5=E94
					7401	K6/50	K7/35	K5/15	FI; K6=E4,E61,E70,E79,E103; K7=E31,E39,E46,E49; K5=E95,E97,E105
5)	4451	TEST740D	17653	7402	INSTR1=>OVERLAP, BUS CYCLE YANKED				
					4747	K5/65	K6/35	../..	FI; K5=E95; K6=E40
					7401	K6/99	../..	../..	FI; K6=E43
6)	4452	TEST740C	17619	7402	-INSTR1*PREFETCH, BC<0>=BC<0>				
					4747	K2/99	../..	../..	FI; K2=E41
					7401	K2/99	../..	../..	FI; K2=E105
7)	4453	TEST740B	17591	7402	INSTR1*PREFETCH, BC<0>="0"				
					7401	K2/65	K3/35	../..	FI; K2=E62,E105; K3=E46
8)	4454	TEST731E	17467	7432	BUS DATI-CLKIR, BA=(000000); IR=(000125) E88/(432) LOADED				
					4747	K3/99	../..	../..	FI; K3=E1
					7402	K6/99	../..	../..	FI; K6=E5
					7407	K6/99	../..	../..	FI; K6=E4,E108
					7412	K6/85	K3/15	../..	FI; K6=E3,E5; K3=E45

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
9)	4455	TEST731D	17428	7402	BUS DATI=CLKIR, BA=(000000); SERVICE=(000340)				
					4747	K5/99	../..	../..	FI; K5=E19
					7400	K6/99	../..	../..	FI; K6=E108
10)	4456	TEST731C	17401	7432	BUS DATI, BA=(000000); MEM(000000)=(000125) VIA DATO/DATOB/DATI				
					7400	K6/99	../..	../..	FI; K6=E93
					7402	K6/99	../..	../..	FI; K6=E36,E43,E85,F90,E93
					7405	K4/99	../..	../..	FI; K4=E28
					7420	K5/99	../..	../..	FI; K5=E94,E105
					7434	K6/85	K7/15	../..	FI; K6=E11,E55,E71; K7=E49
11)	4457	TEST731B	17363	7412	IR=(128200) E78/(412); NO BUS FUNCTIONS CLOCK-IR EXCEPT DATI-CLKIR				
					7400	K2/65	K3/35	../..	FI; K2=E34,E84; K3=E48
12)	4460	TEST730C	17188	7402	DATIP HOLDING BUS (PROC BBSY); DU=(128252) ON BUSDIN				
					7401	K6/65	K7/35	../..	FI; K6=E70,E79,E103; K7=E17,E62
13)	4461	TEST730D	17233	7402	BUS DATO, BA=(000000), DATIB=BYTE=ODD, BA=(000001); SERVICE=(000340)				
					4747	K6/50	K2/50	../..	FI; K6=E47; K2=E105
					7400	K6/90	K7/15	../..	FI; K6=E38-E39,E54; K7=E49
					7401	K6/99	../..	../..	FI; K6=E38
14)	4462	TEST730F	17286	7402	BUS DATO, BA=(000000), DATIB=BYTE=ODD, BA=(000001); DU=BUSDIN=(052525)				
					7400	K6/90	K5/10	K4/5	FI; K6=E8,E46,E66-E67,E72,E74-E75,E80,E83-E84,E86, E88,E90,E92-E93,E108; K5=E53,E63,E99-E101,E109, E112-E113,E115,E122; K4=E28
					7403	K6/99	../..	../..	FI; K6=E92-E93
15)	4464	TEST722B	17004	7402	INVALIDATE, ODD ADDR JAM; JAM=(101004)				
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
16)	4465	TEST722C	17029	7402	INVALIDATE, 16. BIT PBA, -I/O PAGE(6); SERVICE=(002340)				
					7400	K6/99	../..	../..	FI; K6=E59
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
17)	4466	TEST730R	17149	7402	BUS DATIP, BA=(000001); DU=(128252) AFTER ON BUSDIN				
					4747	K7/65	K6/35	../..	FI; K7=E16,E25,E32; K6=E55,E76,E88
					7400	K6/95	K5/5	../..	FI; K6=E66-E67,E74-E75,E83-E84,E92-E93; K5=E53,E63, E66
					7401	K6/65	K7/35	../..	FI; K6=E11,E19,E47,E55,E63,E66-E67,E69,E71,E74-E76, E79,E83-E84,E92-E93,E98-E99,E101,E103,E105; K7=E10,E17,E21,E32-E33,E49,E101
					7403	K6/99	../..	../..	FI; K6=E92-E93

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
18)	4471	TEST730A	17084	7402	BUS DATO, BA=(000000), D=(125852); CHECK DBUF=D AFTER				
					4747	K6/65	K7/25	K5/10	FI; K6=E2-E3,E19-E20,E26,E40,E76,E85,E87-E88, E96-E98; K7=E2,E10,E32-E33,E36,E57-E58,F60; K5=E35,E42-E43,E62
					7400	K5/99	../..	../..	FI; K5=E90,E107-E108,E114,E120-E121
					7401	K6/65	K7/20	K4/10	K3/5 FI; K6=E11,E56,E64,E69,E72,E85,E101,E103; K7=E10,E33; K4=E28,E55; K3=E42
					7403	K6/50	K5/25	K2/25	FI; K6=E101; K5=E91; K2=E100
19)	4472	TEST132R2	7572	7417	BUTR(X*D[C]#XX), D[C]=COUT15="1"; A(0)+B(1)+CI(1)=D(0)+CO(1)				
					7413	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
20)	4473	TEST136R2	8010	7402	(122645)+(132264)+(0)=(170360); CHECK COUT15=(0)				
					7403	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
21)	4474	TEST006	2730	4377	NUA SEQUENCING, NO 'BUT'				
					4777	K2/99	../..	../..	FI; K2=E17,E63
22)	4475	TEST136B1	7983	7434	(122645)+(132264)+(0)=(170360); CARRY LOOKAHEAD LOGIC				
					7400	K4/99	../..	../..	FI; K4=E47
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
23)	4476	TEST136A2	7961	7403	(055132)+(132264)+(1)=(007417); CHECK COUT15=(1)				
					7266	K2/80	K3/20	../..	FI; K2=E8-E9,E21,E27; K3=E21
					7402	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
24)	4477	TEST135B2	7904	7413	(055132)+(113226)+(0)=(170360); CHECK COUT15=(0)				
					7417	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
25)	4500	TEST133A2	7630	7403	(103607)+(103607)+(1)=(007417); CHECK COUT15=(1)				
					7402	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
26)	4501	TEST133B1	7652	7434	(074170)+(074170)+(0)=(170360); CARRY LOOKAHEAD LOGIC				
					7402	K4/50	K2/50	../..	FI; K4=E49; K2=E102
					7420	K4/99	../..	../..	FI; K4=E49
					7421	K3/99	../..	../..	FI; K3=E71
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
27)	4502	TEST133R2	7679	7402	(074170)+(074170)+(0)=(170360); CHECK COUT15=(0)				
					7403	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
28)	4503	TEST134A2	7742	7403	(045513)+(141703)+(1)=(007417); CHECK COUT15=(1)				
					7402	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
29)	4504	TEST134B1	7764	7434	(132264)+(036074)+(0)=(170360); CARRY LOOKAHEAD LOGIC				
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
30)	4505	TEST134B2	7791	7401	(132264)+(036074)+(0)=(170360); CHECK COUT15=(0)				
					7403	K3/99	../..	../..	FI; K5=E95
					7407	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
31)	4506	TEST135A2	7855	7417	(122645)+(064551)+(1)=(007417); CHECK COUT15=(1)				
					7413	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
32)	4507	TEST135B1	7877	7434	(055132)+(113226)+(0)=(170360); CARRY LOOKAHEAD LOGIC				
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
33)	4511	TEST134A1	7705	7434	(045513)+(141703)+(1)=(007417); CARRY LOOKAHEAD LOGIC				
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
34)	4513	TEST135A1	7818	7434	(122645)+(064551)+(1)=(007417); CARRY LOOKAHEAD LOGIC				
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
35)	4515	TEST136A1	7931	7434	(055132)+(132264)+(1)=(007417); CARRY LOOKAHEAD LOGIC				
					7421	K4/75	K3/25	../..	FI; K4=E64; K3=E74
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
36)	4516	TEST132A2	7527	7403	BUTR(D[C]#BA00), D[C]=COUT15="1"; A(1)+B(0)+CI(1)=D(0)+CO(1)				
					7402	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
37)	4517	TEST132B1	7547	7434	ALU=DIVIDE=A-MINUS-B; A(052525), B(052525), D(000000), D[C]="1"				
					7400	K3/80	K4/20	../..	FI; K3=E61,E63,E61; K4=E16
					7402	K3/99	../..	../..	FI; K3=E51
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
38)	4521	TEST132A1	7502	7434	ALU=A-MINUS=B; A(125252), B(125252), D(000000)				
					7400	K4/70	K3/30	../..	FI; K4=E49; K3=E42,E92
					7402	K4/55	K3/45	../..	FI; K4=E6,E11,E17,E26,E96; K3=E41,E82
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
39)	4523	TEST133A1	7600	7434	(103607)+(103607)+(1)=(007417); CARRY LOOKAHEAD LOGIC				
					7400	K4/75	K3/25	../..	FI; K4=E8,E49,E71; K3=E53
					7402	K3/99	../..	../..	FI; K3=E43,E84
					7420	K4/99	../..	../..	FI; K4=E49,E88
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
40)	4530	TEST130B1	7334	7434	ALU=A-PLUS-B-PLUS-1; A(125252), B(125252), D(052525)				
					7400	K4/70	K3/15	K2/15	FI; K4=E49,E101-E102,E110; K3=E53; K2=E50
					7402	K4/80	K3/20	../..	FI; K4=E49,E98,E101; K3=E41

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	4530	TEST130B1	[Continued]		ALU=A-PLUS-B-PLUS-1; A(125252), B(125252), D(052525)				
					7406	K4/99	../..	../..	FI; K4=E110
					7420	K4/99	../..	../..	FI; K4=E49,E102,E112
					7421	K4/99	../..	../..	FI; K4=E71
					7436	K4/99	../..	../..	FI; K4=E112
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
41)	4532	TEST130B2	7365	7403	BUTR(COUNT#D[C]), D[C]=COUT15="1"; A(1)+B(1)+CI(0)=D(0)+CO(1)				
					7402	K2/50	K3/30	K4/25	FI; K2=E35,E41,E61,E77,E85; K3=E4,E6-E7,E11,E15, E43; K4=E63-E64
42)	4537	TEST320D	8197	7403	BUTR(COUT07#DOUT07#XX), TARGET="01"				
					7401	K3/85	K4/15	../..	FI; K3=E53,E55-E56,E95; K4=E10
					7407	K3/99	../..	../..	FI; K3=E74
43)	4541	TEST131A1	7392	7434	ALU=A-PLUS-B-PLUS-PS[C]; A(125252), B(052525), D(177777), PS[C]=(0)				
					7400	K3/75	K4/25	../..	FI; K3=E35,E41,E46,E71,E84; K4=E49
					7402	K3/99	../..	../..	FI; K3=E82
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
44)	4543	TEST320A	8098	7403	D[C] ADDR SELECT, CODE="010"=ALU00="1" ONLY ONE SET				
					7402	K4/99	../..	../..	K404=D[C]-SELECT-LOGIC
45)	4544	TEST131A2	7423	7401	BUTR(D[C]#BA00), D[C]=COUT15="0"; A(1)+B(0)+CI(0)=D(1)+CO(0)				
					7403	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
46)	4546	TEST131B1	7443	7434	ALU=DIVIDE=A-PLUS-B; A(052525), B(125252), D(177777), D[C]="0"				
					7400	K3/99	../..	../..	FI; K3=E82
					7402	K3/99	../..	../..	FI; K3=E61,E84
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
47)	4550	TEST130A2	7314	7402	BUTR(COUNT#D[C]), D[C]=COUT15="0"; A(0)+B(0)+CI(1)=D(1)+CO(0)				
					7403	K4/99	../..	../..	FI; K4=E63-E64
48)	4552	TEST320B	8138	7400	BUT(D<14:00>=0#D15), D=(000001), TARGET="00"				
					7402	K2/99	../..	../..	FI; K2=E40,E88,E94,E99,E112
49)	4553	TEST762A1	17899	NONE	DL11-W ENABLED FOR BR6 INTR; DID NOT RESPOND W/ BG-SERVICE-L WITHIN 22. MS.				
					4553	K7/85	K6/10	K5/5	K3/5 FI; K7=E3,E5-E6,E11,E13,E16-E17,E19-E20, E25-E26,E28,E35-E36,E39,E76,E80; K6=E25,E34,E62; K5=E1; K3=E74
50)	4554	TEST320E	8217	7403	D[C] ADDR SELECT, CODE="101"=COUT07="1" ONLY ONE SET				
					7401	K4/99	../..	../..	FI; K4=E63
51)	4556	TEST320F	8256	7405	BUTR(COUT07#DOUT07#XX), TARGET="10"				
					7407	K3/99	../..	../..	FI; K3=F56,E95

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
52)	4562	TEST320C	8157	7413	BUTR(X#D[C]#XX), D[C]=COUT07="0", COUT15="1"				
					7417	K4/99	../..	../..	FI; K4=E63-E64
53)	4566	TEST551C	14539	NONE	B.M. DATAPATH COUNTER, BUTA(COUNT-I8-377#D[C]), COUNT FROM (000)!(377)				
					4531	K3/99	../..	../..	FI; K3=E56
					????	K2/80	K4/20	../..	K207=ACTIVE-BUT; K409=CNTR
54)	4570	TEST122A2	7172	7403	BUTR(COUNT#D[C]), D[C]=CINMUX="1", ALU=A-IOR-B				
					7402	K3/99	../..	../..	FI; K3=E43,E61,E71
55)	4571	TEST721A	16840	4777	DATOB*=BYTE, ODD ADDR JAM, BA=(120001)				
					7341	K6/99	../..	../..	K608=UNIBUS-FUNCTION-DECODE
56)	4572	TEST537A	14413	7402	SHIFTER, 'SENDMUX' CMUX<00> OUTPUT ON CMUX/LEFT-1				
					7400	K4/90	K5/5	K3/5	FI; K4=E77-E78,E80; K5=E97; K3=E61
57)	4573	TEST721B	16894	7402	DATOB*=BYTE, ODD ADDR JAM; JAM=(101004)				
					7407	K7/99	../..	../..	K705=JAM-FLAGS,K708=STATUS-MUX
58)	4575	TEST551A	14469	NONE	B.M. DATAPATH COUNTER, BUTA(SR1-0#COUNT-I8-377), COUNT FROM (000)!(377)				
					4531	K3/75	K4/25	../..	FI; K3=E36,E54; K4=E91
					4547	K3/90	K4/10	../..	FI; K3=E36,E54,E56,E64; K4=E91
					4555	K4/90	K2/10	../..	FI; K4=E20,E84,E87,E90-E91; K2=E55
					????	K2/80	K4/20	../..	K207=ACTIVE-BUT; K409=CNTR
59)	4576	TEST551B	14498	7400	B.M. DATAPATH COUNTER, BUTA(COUNT-I8-377), COUNT FROM (000)!(377)				
					7401	K3/99	../..	../..	FI; K3=E64
					7402	K3/99	../..	../..	FI; K3=E44
					????	K2/80	K4/20	../..	K207=ACTIVE-BUT; K409=CNTR
60)	4577	TEST721C	16918	7402	DATOB*=BYTE, 16. BIT PBA, =I/O PAGE(5); SERVICE=(002340)				
					7400	K6/99	../..	../..	FI; K6=E59
61)	4601	TEST115A1	5939	7412	ALU=NOT-A; A(052525), B(177777), D(125252), BITS<15:12>=(12)				
					7400	K4/85	K7/10	K2/5	FI; K4=E1,E4-E5,E7,E15-E16,E22,E24,E34,E40-E42, E98; K7=E41,E70; K2=E70
					7402	K4/99	../..	../..	FI; K4=E33-E34
					7403	K4/75	K2/25	../..	FI; K4=E26; K2=E39
					7405	K4/55	K3/45	../..	FI; K4=E14,E21,E23; K3=E43,E52-E53,E84
					7407	K4/99	../..	../..	FI; K4=E4
					7410	K4/99	../..	../..	FI; K4=E34
					7413	K4/99	../..	../..	FI; K4=E26,E34,E62
					7416	K4/99	../..	../..	FI; K4=E17,E34,E54
					7417	K4/99	../..	../..	FI; K4=E1,E6,E8,E10,F14-E18,E20-E21,E23-E24, E26-E27,E29,E37,E44,E46

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
62)	4602	TEST115B4	6044	7402	BUTR(COUNT#D[C]), D[C]=PS[C]="0"				
					7403	K4/50	K3/45	K2/10	FI; K4=E2-E3,E56,E63; K3=E36,E57,E63; K2=E70
63)	4603	TEST114A2	5906	7402	BUTR(COUNT#D[C]), D[C]=CINMUX=PS[C]="0", ALU=ZERO				
					7403	K4/50	K3/50	../..	FI; K4=E56,E63,E72,E78; K3=E22,E41,E54,E71-E73
					7406	K3/99	../..	../..	FI; K3=E74
64)	4604	TEST115A4	5967	7403	BUTR(COUNT#D[C]), D[C]=CINMUX="1", ALU=NOT-A				
					7402	K4/55	K3/45	../..	FI; K4=E2-E3,E56,E63,E71-E72,E78,E86; K3=E41,E43, E46,E54,E61-E62,E71,E75
65)	4605	TEST121C2	7009	7412	ALU=A-XOR-B; A(000000), B(125252), D(125252), BITS<11:06>=(52)				
					7434	K7/99	../..	../..	FI; K7=E20
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
66)	4606	TEST116B	6326	7434	ALU=ZERO; A(125252), B(052525), D(000000)				
					7402	K3/99	../..	../..	FI; K3=E102
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
67)	4607	TEST114A	5874	7434	ALU=ZERO; A(177777), B(177777), D(000000)				
					7400	K3/99	../..	../..	FI; K3=E43,E82
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
68)	4611	TEST115C1	6104	7412	ALU=NOT-A; A(052525), B(000000), D(125252), BITS<15:12>=(12)				
					7400	K3/99	../..	../..	FI; K3=E51,E82
					7405	K4/99	../..	../..	FI; K4=E6,E17,E23,E31-E34,E40-E43
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
69)	4612	TEST115B3	6077	7432	ALU=NOT-A; A(125252), B(177777), D(052525), BITS<05:00>=(25)				
					7420	K4/90	K5/10	../..	FI; K4=E28,E37,E40-E41; K5=E66
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
70)	4613	TEST115B2	6060	7405	ALU=NOT-A; A(525252), B(177777), D(052525), BITS<11:06>=(25)				
					7400	K4/90	K2/10	../..	FI; K4=E37,E41-E42,E89,E108; K2=E26
					7402	K4/99	../..	../..	FI; K4=E98
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
71)	4614	TEST115B1	6021	7405	ALU=NOT-A; A(125252), B(177777), D(052525), BITS<15:12>=(05)				
					7400	K4/99	../..	../..	FI; K4=E16
					7401	K4/99	../..	../..	FI; K4=E34
					7404	K4/99	../..	../..	FI; K4=E34
					7407	K4/99	../..	../..	FI; K4=E34
					7412	K4/99	../..	../..	FI; K4=E14,E23
					7415	K4/99	../..	../..	FI; K4=E34
					7417	K4/90	K6/10	../..	FI; K4=E4,E12-E13,E21-E24; K6=E34

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	FRROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
72)	4615	TEST115A3	6000	7425					ALU=NOT-A; A(052525), B(177777), D(125252), BITS<05:00>=(52)
					7420	K4/90	K5/10	../..	FI; K4=E31,E37,E40-E41,E44,E61,E75-E76; K5=E63,E66
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
73)	4616	TEST115A2	5983	7412					ALU=NOT-A; A(052525), B(177777), D(125252), BITS<11:06>=(52)
					7400	K4/80	K2/15	K3/8	FI; K4=E5-E7,E11,E17-E18,E20,E24,E26,E28,E32, E41-E43,E60,E66-E68,E88-E89,E108; K2=E32-E33, E38-E39,E44-E48,E50-E51,E53-E54; K3=E27,E41,E82
					7402	K3/99	../..	../..	FI; K3=E53,E61
					7403	K5/99	../..	../..	FI; K5=E83
					7405	K4/90	K3/15	../..	FI; K4=E10,E22,E24,E98; K3=E84
					7434	K4/50	K2/50	../..	FI; K4=E71; K2=E117
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
74)	4617	TEST115C2	6126	7412					ALU=NOT-A; A(052525), B(000000), D(125252), BITS<11:06>=(52)
					7400	K4/99	../..	../..	FI; K4=E41-E42
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
75)	4620	TEST116A3	6271	7412					ALU=NOT-A-AND-B; A(000000), B(125252), D(125252), BITS<11:06>=(52)
					7400	K4/99	../..	../..	FI; K4=E41-E42,E89
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
76)	4621	TEST116A2	6257	7403					BUTR(COUNT$D[C]), D[C]=ALU15="1", D=(125252)
					7402	K4/99	../..	../..	FI; K4=E2-E3,E56,E63-E64
77)	4623	TEST116A1	6235	7412					ALU=NOT-A-AND-B; A(000000), B(125252), D(125252), BITS<15:12>=(12)
					7400	K4/99	../..	../..	FI; K4=E15,E24,E31-E34,E40-E43
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
78)	4624	TEST115D3	6203	7432					ALU=NOT-A; A(125252), B(000000), D(052525), BITS<05:00>=(25)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
79)	4625	TEST115D2	6186	7405					ALU=NOT-A; A(125252), B(000000), D(052525), BITS<11:06>=(25)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
80)	4626	TEST115D1	6164	7405					ALU=NOT-A; A(125252), B(000000), D(052525), BITS<15:12>=(05)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
81)	4627	TEST115C3	6143	7425					ALU=NOT-A; A(052525), B(000000), D(125252), BITS<05:00>=(52)
					7420	K4/50	K3/50	../..	FI; K4=E60; K3=E11
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
82)	4630	TEST116C5	6429	7401					BUTR(D[C]$BA00), D[C]=D[C]="0"
					7403	K4/99	../..	../..	FI; K4=E63-E64,E78

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	FRROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
83)	4631	TEST116C4	6413	7432					ALU=NOT-A-AND-B; A(000000), B(052525), D(052525), BITS<05:00>=(25)
					4631	K7/99	../..	../..	FI; K7=E43
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
84)	4632	TEST116C3	6396	7405					ALU=NOT-A-AND-B; A(000000), B(052525), D(052525), BITS<11:06>=(25)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
85)	4633	TEST116C2	6381	7402					BUTR(COUNT$D[C]), D[C]=ALU15="0", D=(052525)
					7403	K4/99	../..	../..	FI; K4=E63-E64
86)	4635	TEST116C1	6359	7405					ALU=NOT-A-AND-B; A(000000), B(052525), D(052525), BITS<15:12>=(05)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
87)	4636	TEST116A5	6305	7403					BUTR(D[C]$BA00), D[C]=D[C]="1"
					4747	K2/99	../..	../..	FI; K2=E46,E55
					7401	K4/90	K3/10	../..	FI; K4=E2-E3,E56,E63-E64,E93,E104,E113-E114; K3=E44,E62
88)	4637	TEST116A4	6288	7425					ALU=NOT-A-AND-B; A(000000), B(125252), D(125252), BITS<05:00>=(52)
					7420	K4/99	../..	../..	FI; K4=E40,E88
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
89)	4640	TEST117B2	6592	7412					ALU=A-AND-NOT-B; A(177777), B(052525), D(125252), BITS<11:06>=(52)
					7400	K4/99	../..	../..	FI; K4=E108
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
90)	4641	TEST117B1	6570	7412					ALU=A-AND-NOT-B; A(177777), B(052525), D(125252), BITS<15:12>=(12)
					7400	K4/99	../..	../..	FI; K4=E4,E10,E23-E24
					7410	K4/99	../..	../..	FI; K4=E80
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
91)	4642	TEST117A4	6549	7413					BUTR(X$D[C]$XX), D[C]=CINMUX=D[C]="0", ALU=A-AND-NOT-B
					7417	K3/65	K4/35	../..	FI; K3=E71,E75; K4=E63
					7433	K3/99	../..	../..	FI; K3=E68
					7453	K3/99	../..	../..	FI; K3=E70
					7513	K3/99	../..	../..	FI; K3=E70
					7613	K3/99	../..	../..	FI; K3=E70
					7653	K3/99	../..	../..	FI; K3=E70
92)	4643	TEST117A3	6534	7432					ALU=A-AND-NOT-B; A(177777), B(125252), D(052525), BITS<05:00>=(25)
					7420	K4/65	K3/35	../..	FI; K4=E88-E89; K3=E61
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
93)	4644	TEST117A2	6517	7405					ALU=A-AND-NOT-B; A(177777), B(125252), D(052525), BITS<11:06>=(25)
					7402	K7/99	../..	../..	FI; K7=E37

[Continued]

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	4644	TEST117A2	[Continued]						ALU=A-AND-NOT-B; A(177777), B(125252), D(052525), BITS<11:06>=(25)
					7434	K5/99	../..	../..	FI; K5=E95
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
94)	4645	TEST116D		6452	7434				ALU=ZERO; A(052525), B(125252), D(000000)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
95)	4647	TEST117A1		6495	7405				ALU=A-AND-NOT-B; A(177777), B(125252), D(052525), BITS<15:12>=(05)
					7400	K4/85	K3/15	../..	FI; K4=E5,E12,E21,E23; K3=E71
					7417	K3/99	../..	../..	FI; K3=E84
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
96)	4650	TEST120B4		6799	7402				BUTR(COUNT=D[C]), D[C]=CINMUX="0", ALU=A-AND-B
					7403	K3/99	../..	../..	FI; K3=E71
97)	4651	TEST120B3		6784	7432				ALU=A-AND-B; A(052525), B(177777), D(052525), BITS<05:00>=(25)
					7420	K4/99	../..	../..	FI; K4=E40,E88
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
98)	4652	TEST120B2		6767	7405				ALU=A-AND-B; A(052525), B(177777), D(052525), BITS<11:06>=(25)
					7400	K4/99	../..	../..	FI; K4=E41-E42
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
99)	4653	TEST120B1		6745	7405				ALU=A-AND-B; A(052525), B(177777), D(052525), BITS<15:12>=(05)
					7412	K4/99	../..	../..	FI; K4=E13,E15,E20,E22,E24,E31-E34,E40-E43
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
100)	4654	TEST120A3		6724	7425				ALU=A-AN1-B; A(125252), B(177777), D(125252), BITS<05:00>=(52)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
101)	4655	TEST120A2		6707	7412				ALU=A-AND-B; A(125252), B(177777), D(125252), BITS<11:06>=(52)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
102)	4656	TEST117C1		6633	7434				ALU=A-AND-NOT-B; A(000000), B(000000), D(000000)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
103)	4657	TEST117B3		6609	7425				ALU=A-AND-NOT-B; A(177777), B(052525), D(125252), BITS<05:00>=(52)
					7420	K4/99	../..	../..	FI; K4=E86-E89
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
104)	4660	TEST121B4		6960	7401				BUTR(D[C]=BA00), D[C]=ALU00="0", D=(125252)
					7403	K4/99	../..	../..	FI; K4=E56,E63
105)	4661	TEST121B3		6945	7425				ALU=A-XOR-B; A(177777), B(052525), D(125252), BITS<05:00>=(52)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
106)	4662	TEST121B2		6928	7412				ALU=A-XOR-B; A(177777), B(052525), D(125252), BITS<11:06>=(52)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
107)	4663	TEST121B1		6906	7412				ALU=A-XOR-B; A(177777), B(052525), D(125252), BITS<15:12>=(12)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
108)	4665	TEST121A1		6832	7405				ALU=A-XOR-B; A(000000), B(052525), D(052525), BITS<15:12>=(05)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
109)	4667	TEST120A1		6685	7412				ALU=A-AND-B; A(125252), B(177777), D(125252), BITS<15:12>=(12)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
110)	4671	TEST122A1		7148	7434				ALU=A-IOR-B; A(000000), B(000000), D(000000)
					7400	K4/99	../..	../..	FI; K4=E1,E7-E8,E11,E13,E22,E92,E96,E100-E102, E109-E112
					7402	K4/99	../..	../..	FI; K4=E7,E10,E21-E22,E101
					7417	K4/99	../..	../..	FI; K4=E110
					7420	K4/99	../..	../..	FI; K4=E22,E102,E112
					7421	K4/99	../..	../..	FI; K4=E22,E112
					7422	K4/99	../..	../..	FI; K4=E112
					7424	K4/99	../..	../..	FI; K4=E21,E112
					7426	K4/99	../..	../..	FI; K4=E102
					7430	K4/99	../..	../..	FI; K4=E102
					7433	K4/99	../..	../..	FI; K4=E102
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
111)	4673	TEST130A1		7283	7434				ALU=A-PLUS-B-PLUS-0; A(052525), B(052525), D(125252)
					4777	K2/99	../..	../..	FI; K2=E79
					7400	K4/60	K3/40	../..	FI; K4=E1,E6,E49,F64,E88-E89,E98,E101,E108,E110; K3=E35,E42,E82,E92
					7402	K4/70	K3/30	../..	FI; K4=E21,E49,E98,E100-E102,E109-E112; K3=E41,E43, E82-E83,E84
					7420	K4/99	../..	../..	FI; K4=E49,E102,E112
					7421	K4/85	K3/15	../..	FI; K4=E49,E71; K3=E71
					7423	K4/99	../..	../..	FI; K4=E112
					7427	K4/99	../..	../..	FI; K4=E112
					7431	K4/99	../..	../..	FI; K4=E102
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
112)	4674	TEST121B4		6885	7403				BUTR(D[C]=BA00), D[C]=ALU00="1", D=(052525)
					7401	K4/99	../..	../..	FI; K4=E56,E63,E114
113)	4675	TEST121A3		6871	7432				ALU=A-XOR-B; A(000000), B(052525), D(052525), BITS<05:00>=(25)
					7420	K4/99	../..	../..	FI; K4=E10
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
114)	4676	TEST121A2		6854	7405				ALU=A-XOR-B; A(000000), B(052525), D(052525), BITS<11:06>=(25)
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
115)	4677	TEST117C2	6655	7417					BUTR(X#D[C]#XX), D[C]=CINMUX=D[C]="1", ALU=A-AND-NOT-B
					4756	K3/50	K2/50	../..	FI; K3=E12,E15; K2=E80-E81
					7413	K4/90	K2/10	../..	FI; K4=E2-E3,E56,E63,E104; K2=E1
116)	4701	TEST350	8337	NONE					(NUA SEQUENCING LOGIC ERROR)
					????	K1/99	../..	../..	INTERNAL DCS ERROR
117)	4705	TEST352A	8670	7434					BSPLO ADDRESSING, USING BSP/RIF ADDRESS=(02)
					7403	K4/99	../..	../..	FI; K4=E13
					7417	K4/99	../..	../..	FI; K4=E13
					74??	K4/99	../..	../..	K407=BSP-ADDRS-MUX/REG(RIF)
118)	4707	TEST121C1	6987	7412					ALU=A=XOR=B; A(000000), B(125252), D(125252), BITS<15:12>=(12)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
119)	4710	TEST763D	18148	7407					BUTR(BG-SERVICE) NEGATED; AFTER INTR DETECTED/SERVICED
					4747	K5/99	../..	../..	FI; K5=E81-E82
					7403	K7/99	../..	../..	K703=BR-REQUEST-INTR,K704=BR-GRANT-INTR
120)	4711	TEST762F	18031	7403					BUTR(SERVICE) ASSERTED; DL11-W BR6 INTR PRESENT
					7402	K2/99	../..	../..	FI; K2=E100
121)	4712	TEST351D	8634	7434					ASPHI ADDRESSING, USING ASP/RIF ADDRESS=(05)
					4747	K?/99	../..	../..	FI; K2=E1
					74??	K4/99	../..	../..	K406=ASP-ADDRS-MUX/REG(RIF)
122)	4713	TEST352B	8692	7434					BSPLO ADDRESSING, USING BSP/RIF ADDRESS=(03)
					74??	K4/99	../..	../..	K407=BSP-ADDRS-MUX/REG(RIF)
123)	4716	TEST121C4	7040	7417					BUTR(X#D[C]#XX), D[C]=ALU07="1", D=(125252)
					7413	K4/99	../..	../..	FI; K4=E56,E63
124)	4717	TEST121C3	7025	7425					ALU=A-XOR-B; A(000000), B(125252), D(125252), BITS<05:00>=(52)
					7420	K4/99	../..	../..	FI; K4=E88
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
125)	4720	TEST763B	18108	7402					VECTOR LOADED FROM DL11-W LINE CLOCK; CHECK=(000100)
					7400	K7/85	K6/15	../..	FI; K7=E13,E17,E20-E21,E28; K6=E34
126)	4721	TEST763C	18128	7401					BUTR(VECTOR-LOAD) NEGATED; AFTER INTR DETECTED/SERVICED
					7403	K7/80	K6/20	../..	FI; K7=E10,E21,E94; K6=E26
127)	4722	TEST351B	8591	7434					ASPLO ADDRESSING, USING ASP/RIF ADDRESS=(03)
					74??	K4/99	../..	../..	K406=ASP-ADDRS-MUX/REG(RIF)

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
128)	4723	TEST351C	8612	7434					ASPHI ADDRESSING, USING ASP/RIF ADDRESS=(04)
					4777	K2/99	../..	../..	FI; K2=E1
					7271	K2/99	../..	../..	FI; K2=E28
					7400	K4/99	../..	../..	FI; K4=E14
					74??	K4/99	../..	../..	K406=ASP-ADDRS-MUX/REG(RIF)
129)	4724	TEST352C	8713	7434					BSPHI ADDRESSING, USING BSP/RIF ADDRESS=(04)
					7400	K4/99	../..	../..	FI; K4=E12
					74??	K4/99	../..	../..	K407=BSP-ADDRS-MUX/REG(RIF)
130)	4725	TEST352D	8735	7434					BSPHI ADDRESSING, USING BSP/RIF ADDRESS=(05)
					74??	K4/99	../..	../..	K407=BSP-ADDRS-MUX/REG(RIF)
131)	4726	TEST121D2	7083	7405					ALU=A-XOR-B; A(177777), B(125252), D(052525), BITS<11:06>=(25)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
132)	4727	TEST121D1	7061	7405					ALU=A-XOR-B; A(177777), B(125252), D(052525), BITS<15:12>=(05)
					74??	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
133)	4730	TEST762E	18006	7402					DL11-W BR6 INTR PENDING, LAST BUS DATO; SERVICE=(043740)
					7400	K3/99	../..	../..	FI; K3=E50
					7401	K2/99	../..	../..	FI; K2=E100
					740?	K7/99	../..	../..	K708=STATUS-MUX
134)	4732	TEST351A	8569	7434					ASPLO ADDRESSING, USING ASP/RIF ADDRESS=(02)
					7400	K4/99	../..	../..	FI; K4=E9,E14
					7402	K7/99	../..	../..	FI; K7=E52
					7403	K4/65	K2/35	../..	FI; K4=E15,E86; K2=E52
					7417	K4/99	../..	../..	FI; K4=E4,E15
					74??	K4/99	../..	../..	K406=ASP-ADDRS-MUX/REG(RIF)
135)	4734	TEST122A3	7188	7402					BUT(D<14:00>=0#D15), D=(000000), TARGET="10"
					7400	K2/95	K3/5	../..	FI; K2=E40,E56,E88-E89,E94-E96,E104-E105; K3=E56, E66
					7403	K3/99	../..	../..	FI; K3=E54,E95
					7406	K3/99	../..	../..	FI; K3=E74
136)	4735	TEST122A4	7202	7401					BUT(D<14:00>=0#D15), D=(125252), TARGET="01"
					7400	K3/99	../..	../..	FI; K3=E54-E55,E63,E95
					7403	K2/85	K3/15	../..	FI; K2=E40,E56,E90; K3=E56
137)	4736	TEST121D4	7115	7413					BUTR(X#D[C]#XX), D[C]=ALU07="0", D=(052525)
					7417	K4/99	../..	../..	FI; K4=E56,E63

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
138)	4737	TEST121D3	7100	7432	ALU=A-XOR-B; A(177777), B(125252), D(052525), BITS<05:00>=(25)				
					7434	K2/99	../..	../..	FI; K2=E2
					7477	K4/90	K3/10	../..	K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
139)	4740	TEST762C	17946	7403	BUTR(BG-SERVICE) ASSERTED; BR6 INTR PENDING, PROC PRIO=(5)				
					7407	K7/99	../..	../..	FI; K7=E3,E5,E11,E20,E25
140)	4741	TEST762D	17980	7417	BUTR(BG&SERVICE+FPSERVICE) ASSERTED; BR6 INTR PRESENT				
					7407	K3/80	K7/20	../..	FI; K3=E50,E76; K7=E80
141)	4742	TEST350C	8471	7434	ASPLO ADDRESSING, USING ASP/DF ADDRESS FROM (7):(0)				
					7400	K4/80	K3/20	K5/5	K2/5 FI; K4=E1,E5,E7,E10,E15-E16,E23,E25,E31-E34, E40-E43,E99,E110; K3=E45-E47,E59; K5=E63; K2=E55
					7402	K4/65	K3/35	K6/5	FI; K4=E1,E6,E15,E17,E22,E33,E86,E92,E99-E102, E109-E112; K3=E19,E24-E26,E45,E47; K6=E40
					7403	K3/99	../..	../..	FI; K3=E59
					7406	K4/60	K3/40	../..	FI; K4=E6; K3=E46
					7417	K4/99	../..	../..	FI; K4=E43
					7420	K4/99	../..	../..	FI; K4=E25,E31-E32,E102,E112
					7421	K4/99	../..	../..	FI; K4=E31
					7422	K4/99	../..	../..	FI; K4=E31
					7424	K4/99	../..	../..	FI; K4=E31
					7426	K4/99	../..	../..	FI; K4=E32
					7430	K4/99	../..	../..	FI; K4=E32
142)	4743	TEST350D	8499	7434	ASPHI ADDRESSING, USING ASP/DF ADDRESS FROM (0):(7)				
					7400	K4/99	../..	../..	FI; K4=E6-E7,E14,E17,E42,E99-E100,E109
					7402	K4/75	K3/25	../..	FI; K4=E17,E34,E99; K3=E45
					7417	K4/99	../..	../..	FI; K4=E15,E109
					7420	K4/99	../..	../..	FI; K4=E40-E41,E74,E92,E99,E111
					7421	K4/99	../..	../..	FI; K4=E111
					7422	K4/99	../..	../..	FI; K4=E111
					7424	K4/99	../..	../..	FI; K4=E111
					7426	K4/99	../..	../..	FI; K4=E92
					7433	K4/99	../..	../..	FI; K4=E99
143)	4744	TEST740A	17556	7402	INSTR1=-PREFETCH, BC<0>=BC<0>				
					4747	K2/99	../..	../..	FI; K2=E24
					7401	K2/99	../..	../..	FI; K2=E105
					7403	K5/99	../..	../..	FI; K5=E97
144)	4745	TEST761A	17726	7402	BUTR(SERVICE) NEGATED; AFTER CLEAR ALL SERVICE CONDITIONS, UNIBUS INIT				
					4747	K7/99	../..	../..	FI; K7=E57
					7403	K7/99	../..	../..	K707/9=UNIBUS-UCON=INIT,K704=BG-GRANT-INTR

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
145)	4750	TEST131B2	7474	7413	BUTR(X=D[C]=XX), D[C]=COUT15="0"; A(0)+B(1)+CI(0)=D(1)+CO(0)				
					7403	K4/90	K3/10	../..	K406=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE
146)	4751	TEST762B	17924	7407	BUTR(BG-SERVICE) NEGATED; BR6 INTR PENDING, PROC PRIO=(6)				
					7403	K7/99	../..	../..	FI; K7=E11,E76
					7407	K7/99	../..	../..	K703=BR-REQUEST-INTR
147)	4752	TEST350A	8417	7434	BSPLO ADDRESSING, USING BSP/DF ADDRESS FROM (0):(7)				
					7400	K4/90	K2/10	../..	FI; K4=E1,E5,E7-E9,E12,E14,E17,E21,E26,E35,E92, E99-E102,E109-E112; K2=E38,E85
					7402	K4/99	../..	../..	FI; K4=E22,E100
					7403	K4/99	../..	../..	FI; K4=E47
					7407	K4/99	../..	../..	FI; K4=E20
					7410	K4/99	../..	../..	FI; K4=E6,E13
					7413	K7/99	../..	../..	FI; K7=E25
					7417	K4/99	../..	../..	FI; K4=E4,E13,E15,E17,E22,E26,E109
					7420	K4/99	../..	../..	FI; K4=E92,E111
					7421	K4/99	../..	../..	FI; K4=E111
					7422	K4/99	../..	../..	FI; K4=E111
					7424	K4/99	../..	../..	FI; K4=E111
					7426	K4/99	../..	../..	FI; K4=E92
					7430	K4/99	../..	../..	FI; K4=E92
					7431	K4/99	../..	../..	FI; K4=E92,E99,E111
148)	4753	TEST350B	8444	7434	BSPHI ADDRESSING, USING BSP/DF ADDRESS FROM (7):(0)				
					7400	K4/80	K2/15	K7/5	K5/5 FI; K4=E6-E7,E11-E15,E17,E21-E22,E26,E55, E87,E96,E101,E110; K2=E32,E44,E80,E93; K7=E66; K5=E66
					7417	K4/85	K5/15	../..	FI; K4=E13,E15,E22; K5=E66
					7420	K4/99	../..	../..	FI; K4=E102,E112
149)	4755	TEST731A	17321	7402	BUS DATOB=-BYTE=-ODD, BA=(000001); DBUF=D=(000000)				
					4415	K2/99	../..	../..	FI; K2=E30
					4747	K6/65	K2/35	../..	FI; K6=E5; K2=E18
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
150)	4760	TEST720C	16813	7402	DATIB=-BYTE, 16. BIT PBA, -I/D PAGE(3); SERVICE=(100340)				
					7400	K6/99	../..	../..	FI; K6=E59
151)	4761	TEST763A	18062	4733	ALLOW-BG[1]H GIVEN TO BR6 INTR; BUTR (VECTOR-LOAD) ASSERTED				
					####	../..	../..	../..	!! ALSO CHECK GRANT CONTINUITY CARD !!
					4731	K7/95	K2/5	K6/5	K5/5 FI; K7=E4-E5,E8,E10,E12-E13,E17-E18,E20-E22, E25,E29,E33,E35,E37,E41,E51,E59,E61,E76-E77,E79, E94,E101; K2=E70; K6=E56; K5=E53
					4756	K7/99	../..	../..	FI; K7=E6-E7

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	→Module sequence→ #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
152)	4771	TEST761B	17765	7401	BUTR(VECTOR-LOAD) NEGATED; AFTER UNIBUS INIT				
					7403	K7/99	../..	../..	K707/9=UNIBUS-UCON-INIT,K704=BG-GRANT-INTR
					7403	K3/99	../..	../..	FI; K3=E44
153)	4773	TEST762A	17829	4343	(NUA SEQUENCING LOGIC ERROR)				
					4747	K6/75	K5/20	K7/5	K4/5 FI; K6=E11,E19,E25,E29,E33,E49-E50; K5=E2, E10,E33,E80,E82,E97; K7=E66; K4=E48
154)	4774	TEST761C	17786	7407	BUTR(BG-SERVICE) NEGATED; AFTER UNIBUS INIT				
					7403	K7/99	../..	../..	K707/9=UNIBUS-UCON-INIT,K704=BG-GRANT-INTR
155)	4775	TEST010	2802	5245	BUTA(SUBR-B) => BUTA(RETURN) SEQUENCE, RETURN="1010 1010 0101"=(5245)				
					4245	K2/65	K3/35	../..	FI; K2=E35,E41,E61,E77,E85; K3=E4,E7,E15,E43
					4376	K2/90	K3/15	../..	FI; K2=E33,E35,E39-E40,E45-E46,E51,E54; K3=E34
					4777	K2/99	../..	../..	FI; K2=E5,E13-E14,E41,E57,E63,E82,E85-E86,E91-E92, E97,E106,E110,E116,E118
					5005	K2/99	../..	../..	FI; K2=E25
					5045	K2/85	K4/15	../..	FI; K2=E7,E13,E25,E31,E37,E43,E49,E52,E70,E97; K4=E12-E13
					5105	K2/99	../..	../..	FI; K2=E13
					5125	K2/99	../..	../..	FI; K2=E13
					5205	K2/90	K4/15	../..	FI; K2=E4,E7,E10,E13,E16,E22,E25,E28,E71,E97; K4=E1
					5240	K2/99	../..	../..	FI; K2=E26
					5241	K2/85	K4/15	../..	FI; K2=E4,E8,E10,E14,E16,E22,E26,E28,E62,E91; K4=E20,E86
					5242	K2/99	../..	../..	FI; K2=E14
					5244	K2/70	K4/30	../..	FI; K2=E8,E14,E26,E58,E64,E67,E71,E73,E79,E91; K4=E12,E14
					5245	K2/85	K4/15	../..	FI; K2=E25,E31,E35,E37,E43,E49,E52,E58,E62,E64,E67, E73,E77,E79,E91,E97; K4=E3,E70
					5247	K2/99	../..	../..	FI; K2=E8,E14,E26
					5252	K2/99	../..	../..	FI; K2=E14
					5255	K2/99	../..	../..	FI; K2=E8,E14,E26
					5256	K2/99	../..	../..	FI; K2=E8
					5257	K2/99	../..	../..	FI; K2=E14
					5265	K2/99	../..	../..	FI; K2=E7,E13,E25
					5345	K2/99	../..	../..	FI; K2=E7,E13,E25
					5365	K2/99	../..	../..	FI; K2=E7,E13
					5376	K2/99	../..	../..	FI; K2=E40
					7245	K2/99	../..	../..	FI; K2=E35,E41,E77
					7247	K2/99	../..	../..	FI; K2=E40
					7273	K3/85	K2/45	../..	FI; K3=E4,E6-E7,E11,E15,E43; K2=E61,E77,E85
					7401	K2/99	../..	../..	FI; K2=E41
					7777	K2/99	../..	../..	FI; K2=E11

Module codes: K1/DCS K2/UWORD K3/IPDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	→Module sequence→ #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
156)	5146	TEST005	2711	4474	NUA SEQUENCING, PAGE (5) => (4), UBF=(34)				
					4574	K3/50	K2/50	../..	FI; K3=E58; K2=E7
					5441	K3/60	K2/40	../..	FI; K3=E10,E18,E20; K2=E30,E54
157)	5463	TEST722A	16951	4777	INVALIDATE, ODD ADDR JAM, BA=(140001)				
					7341	K6/75	K4/15	K3/15	FI; K6=E71,E76,E81,E88,E96; K4=E51; K3=E11
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
158)	5465	TEST720A	16730	4777	DATIB=-BYTE, ODD ADDR JAM, BA=(060001)				
					7341	K5/50	K3/50	../..	FI; K5=E67,E94; K3=E34
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
159)	5467	TEST713A	16594	4777	DATI-NOINT, ILLEGAL INTERNAL ADDR JAM, BA=(177776)				
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE,INTERNAL-ADDR-DETECT
160)	5471	TEST712A	16460	4777	DATI, INTERNAL ADDRESS JAM, BA=(177776)				
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE,INTERNAL-ADDR-DETECT
161)	5473	TEST711A	16328	4777	DATOB=BYTE, SSYN TIMEOUT JAM, BA=(160001)				
					7341	K6/70	K4/20	K7/5	K5/5 FI; K6=E4,E11,E28,E62,E64,E78-E79,E98-E99, E101-E102; K4=E18,E28; K7=E60; K5=E55
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
162)	5475	TEST710A	16157	4777	DATO, ODD ADDRESS ERROR JAM, BA=(160001)				
					4747	K6/99	../..	../..	FI; K6=E60
					7341	K6/75	K7/15	K4/10	K5/5 K3/5 FI; K6=E2,E4,E10,E38,E40,E42-E43, E46-E47,E54-E56,E60,E64,E69,E71-E72,E76,E79,E81, E89,E95,E98-E99,E103,E108; K7=E22,E25,E39,E43, E45-E46,E65; K4=E9,E18,E26,E30,E71; K5=E44,E64; K3=E52
					7401	K5/99	../..	../..	FI; K5=E97
					7445	K6/99	../..	../..	FI; K6=E43
					????	K6/99	../..	../..	K605=UNIBUS-FUNCTION-DECODE
163)	5477	TEST702A	16040	7402	LOAD BA<17:16>="01", 18. BIT MODE, READ THRU STATUS=MUX(SERVICE)<9:8>				
					4747	K2/99	../..	../..	FI; K2=E34
					7400	K6/40	K5/25	K4/20	K7/10 K2/5 FI; K6=E11,E51-E54,E59; K5=E4,E13, E15,E26,E54,E84,E97; K4=E20,E65; K7=E48,E56; K2=E61
164)	5500	TEST374D2	10178	7434	A/B SP WRITE FCN WR(B,HI,A=ADDR) AND WR(B,HI,B=ADDR)				
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
165)	5502	TEST374F2	10251	7434	A/B SP WRITE FCN WR(AB,LO,A=ADDR) AND WR(AB,LO,B=ADDR)				
					7400	K2/99	../..	../..	FI; K2=E117

[Continued]

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5502	TEST374E2	[Continued]						A/B SP WRITE FCN WR(AB,LO,A=ADDR) AND WR(AB,LO,B=ADDR)
					7420	K4/99	../..	../..	FI; K4=E10
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
166)	5504	TEST374F2	10324	7434					A/B SP WRITE FCN WR(AB,HI,A=ADDR) AND WR(AB,HI,B=ADDR)
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
167)	5505	TEST712B	16512	7402					DATI, INTERNAL ADDR; JAM=(001000)
					7400	K6/70	K7/15	K3/18	K5/5 FI; K6=E46,E49-E51,E81,E99; K7=E19,E58,E61, E81; K3=E48,E69; K5=E13,E72
					7401	K6/99	../..	../..	FI; K6=E76
					7777	K6/99	../..	../..	K605=INTERNAL-ADDR-DETECT
168)	5507	TEST410	10666	NONE					(NUA SEQUENCING LOGIC/DCS ERROR)
					7777	K1/99	../..	../..	INTERNAL DCS ERROR
169)	5511	TEST620A	15262	7406					BUTM(INIT-JAM) NEGATED=*0* AFTER CLR-JAM-ERRORS UCON
					7407	K7/90	K2/10	../..	FI; K7=E18,E41,E51; K2=E112
170)	5512	TEST701D	16011	7402					BUTR(D[C]$BA00), BA<00>=*0*
					7403	K3/99	../..	../..	FI; K3=E64
171)	5513	TEST376A	10595	5440					BUTA(R-IOR-1) DOES NOT CAUSE A BRANCH
					5441	K3/99	../..	../..	FI; K3=E64
172)	5517	TEST375A	10512	7432					DAD/3 CAUSES BYTE-WRITE(LO) TO ASPLO; DAD/1 OR DAD/2 NOT
					7400	K3/80	K4/20	../..	FI; K3=E17,E20,E36,E38,E46; K4=E5,E99
					7402	K3/25	K4/15	../..	FI; K3=E27,E36,E38,E46,E49,E59-E60; K4=E5,E33
					7433	K4/99	../..	../..	FI; K4=E25
					7434	K3/99	../..	../..	FI; K3=E59
173)	5521	TEST102A	5225	7432					CSP ADDRESS, LOC(02); EMIT/CSP/ALU-B/D/DBUF/IR WITH DATA=(000125)
					7400	K4/60	K3/40	../..	FI; K4=E47,E55,E88-E89,E95-E96,E98,E105,E108; K3=E5,E8-E10,E14,E32,E35,E42,E92
					7402	K4/70	K3/30	../..	FI; K4=E85,E95,E98; K3=E12-E13,E32,E35,E42
					7403	K4/99	../..	../..	FI; K4=E96
					7410	K3/75	K4/25	../..	FI; K3=E1-E3,E5,E13-E14,E42; K4=E1,E30
					7417	K4/99	../..	../..	FI; K4=E105,E108
					7420	K4/70	K6/10	K2/10	K3/5 K7/5 K5/5 FI; K4=E1,E4,E7-E8,E11-E12, E31-E32,E35,E40-E41,E52,E56,E65-E66,E72,E74,E79, E88-E92,E96,E100-E102,E105-E106,E109-E112; K6=E65,E67,E73,E75,E108; K2=E83,E94,E98,E100, E102-E104,E107-E108,E111,E113-E114; K3=E72; K7=E85-E86; K5=E63,E66
					7421	K4/99	../..	../..	FI; K4=E87
					7427	K6/55	K4/30	K7/15	FI; K6=E73; K4=E89; K7=E37
					7433	K4/90	K3/15	../..	FI; K4=E89,E105; K3=E8
					7434	K4/75	K3/10	K6/10	K7/5 K2/5 FI; K4=E1-E5,E7,E9-E11,E18,E20-E26,

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5521	TEST102A	[Continued]						CSP ADDRESS, LOC(02); EMIT/CSP/ALU-B/D/DBUF/IR WITH DATA=(000125)
					7434	K4/75	K3/10	K6/10	E28-E30,E38,E47,E51,E55-E56,E59,E64,E66,E70-E71, E74,E87-E89,E96,E98-E99,E108; K3=E2-E3,E12,E35, E42-E43,E53,E59,E82,E84; K6=E31,E34,E42,E82, E103; K7=E76; K2=E102
174)	5523	TEST701B	15962	7403					BUTR(D[C]$BA00), BA<00>=*1*
					7402	K3/99	../..	../..	K308=MICROBRANCH
175)	5524	TEST374C2	10105	7434					A/B SP WRITE FCN WR(B,LO,A=ADDR) AND WR(B,LO,B=ADDR)
					7400	K3/99	../..	../..	FI; K3=E45
					7402	K4/99	../..	../..	FI; K4=E10,E17,E21-E22
					7420	K3/99	../..	../..	FI; K3=E93
					7421	K4/99	../..	../..	FI; K4=E21-E22
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
176)	5529	TEST004	2692	5146					NUA SEQUENCING, NO 'BUT'
					5147	K3/99	../..	../..	FI; K3=E38
					5156	K3/99	../..	../..	FI; K3=E37
					5346	K3/99	../..	../..	FI; K3=E23
177)	5531	TEST103A	5370	7412					CSP ADDRESS, LOC(13); EMIT/CSP/ALU-B/D/DBUF/IR WITH DATA=(125200)
					7400	K4/99	../..	../..	FI; K4=E59,E66,E74,E92,E102,E109-E112
178)	5533	TEST610B1	14869	7413					PS[CC]=(13); IR=(105300), CC-ROM-ADDR(132)
					7401	K3/99	../..	../..	FI; K3=E55
					7403	K3/99	../..	../..	FI; K3=E63,E72
					7411	K3/90	K4/10	../..	FI; K3=E55,E62,E65,E85; K4=E72
					7417	K3/60	K2/40	../..	FI; K3=E55,E72; K2=E105
179)	5535	TEST610C1	14987	7407					PS[CC]=(07); IR=(072000), CC-ROM-ADDR(437)
					7405	K3/99	../..	../..	FI; K3=E33
					7406	K3/99	../..	../..	FI; K3=E62
					7415	K2/99	../..	../..	FI; K2=E8
180)	5541	TEST105A	5592	7432					SR LOAD/READ, SR=(000125), RES=SR/LOAD; ALU=A/D/DBUF/IR PATH
					7400	K4/85	K3/10	K2/5	FI; K4=E1,E3,E11,E16,E18,E20,E27,E30,E35-E36, E45-E47,E52,E80; K3=E5,E10,E14,E51,E66; K2=E89
					7402	K4/85	K3/10	K2/5	FI; K4=E30,E35,E45-E47; K3=E8,E14; K2=E101
					7403	K4/50	K3/50	../..	FI; K4=E80; K3=E9
					7406	K3/99	../..	../..	FI; K3=E9
					7410	K4/99	../..	../..	FI; K4=E36,E52
					7412	K3/99	../..	../..	FI; K3=E8
					7417	K4/99	../..	../..	FI; K4=E27,E36,E47,E52
					7420	K4/90	K3/10	../..	FI; K4=E1,E3,E7,E11,E16,E20,E26,E31-E32,E34-E35. E37,E40-E42,E44,E47-E48,E52-E54,E57,E60-E62, E67-E68,E75-E76,E80; K3=E41,E43,E51,E67,E71,E75, E82 (Continued)

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

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      ERROR                      Line              ->Module sequence->
###)  code   Symbolic label      number  ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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      5541   TEST105A            [Continued]   SR LOAD/READ, SR=(000125), RES=SR/LOAD; ALU=A/D/DBUF/IR PATH
                                               7427  K4/99  ../..  ../..  FI; K4=E1,E7,E16,E33,E35
                                               7430  K4/99  ../..  ../..  FI; K4=E1
                                               7431  K4/99  ../..  ../..  FI; K4=E36,E45
                                               7433  K4/99  ../..  ../..  FI; K4=E35,E37,E47,E66
                                               7434  K4/99  K3/5   ../..  FI; K4=E1,E4,E7,E11,E16,E30-E32,E35-E36,E39,E43,
                                                                              E45,E47-E48,E52-E53,E55,E57,E65,E80; K3=E102

181)  5545   TEST610D1           15101   7410  PS[CC]=(10); IR=(072000), CC=ROM-ADDR(216)
                                               7412  K3/99  ../..  ../..  FI; K3=E33,E62

182)  5547   TEST104A             5516   7425  CSP BASCON ADDR, LOC(16); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(000152)
                                               7400  K4/99  ../..  ../..  FI; K4=E38,E96
                                               7417  K4/99  ../..  ../..  FI; K4=E38
                                               7420  K4/99  ../..  ../..  FI; K4=E74,E111-E112
                                               7434  K3/60  K4/35  K2/5   FI; K3=E1-E3,E12-E13; K4=E1,E30,E38; K2=E70

183)  5551   TEST050A             5077   7405  BUT(INSTR5), IR=(172500); E88(725)=(05)
                                               7477  K3/99  ../..  ../..  K305=INSTR5-DECODE

184)  5553   TEST101A             5161   7434  ALU=ZERO, D/DBUF/IR PATH; BUT(INSTR5) FOR IR=ZERO
                                               7400  K4/65  K6/20  K3/10  K7/5   K2/5   FI; K4=E33-E34,E42-E43,E51,E59,E82,
                                                                              E95,E100-E101,E109-E110; K6=E73,E82,E91,E96;
                                                                              K3=E1,E43,E51,E71,E82; K7=E52,E54; K2=E70
                                               7402  K4/80  K6/15  K3/5   FI; K4=E33-E34,E51,E82,E95,E100-E101; K6=E91;
                                                                              K3=E13
                                               7410  K3/99  ../..  ../..  FI; K3=E43,E82,E102
                                               7411  K6/99  ../..  ../..  FI; K6=E65,E82
                                               7412  K7/65  K2/30  K3/5   FI; K7=E28,E41,E52,E54,E70; K2=E61,E83; K3=E43
                                               7417  K6/99  ../..  ../..  FI; K6=E82
                                               7420  K4/75  K6/15  K7/5   K5/5   K3/5   K2/5   FI; K4=E31-E32,E38,E40-E41,
                                                                              E47,E55,E66,E74,E79,E92,E102,E111-E112; K6=E65,
                                                                              E73; K7=E41,E48,E65,E70; K5=E14,E54; K3=E82,E84;
                                                                              K2=E34,E85
                                               7421  K4/90  K6/15  ../..  FI; K4=E31,E40,E47,E72,E74,E111-E112; K6=E65
                                               7422  K7/75  K4/20  K6/5   FI; K7=E6-E7,E15,E23,E31,E45,E48,E65-E67,E69,E74,
                                                                              E78,E91-E92; K4=E31,E40,E72,E74,E111-E112;
                                                                              K6=E43,E65
                                               7424  K4/80  K6/20  ../..  FI; K4=E31,E40,E74,E79,E111-E112; K6=E65
                                               7426  K6/50  K3/50  ../..  FI; K6=E73; K3=E51,E82
                                               7427  K4/99  ../..  ../..  FI; K4=E74
                                               7431  K3/99  ../..  ../..  FI; K3=E43
                                               7477  K4/90  K3/10  ../..  K404=ALU/CARRY-LOOKAHEAD; K313=ALU-FCN-DECODE

185)  5554   TEST102D             5330   7425  CSP ADDRESS, LOC(01); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(000152)
                                               7400  K4/99  ../..  ../..  FI; K4=E4
                                               7402  K5/99  ../..  ../..  FI; K5=E44
                                               7420  K4/60  K6/10  K3/5   K2/5   K5/5   K7/5   FI; K4=E35,E52,E65-E66,E72,
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      ERROR                      Line              ->Module sequence->
###)  code   Symbolic label      number  ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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      5554   TEST102D            [Continued]   CSP ADDRESS, LOC(01); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(000152)
                                               7420  K4/60  K6/10  K3/5   E74,E79,E88-E92,E102,E106,E111-E112; K6=E65,E67,
                                                                              E73,E75; K3=E72; K2=E94,E104; K5=E66,E106;
                                                                              K7=E85-E86
                                               7434  K4/99  ../..  ../..  FI; K4=E38,E70,E88-E89,E98,E108

186)  5561   TEST047A             4988   7412  BUT(INSTR5), IR=(122566); E88(325)=(12)
                                               7400  K3/99  ../..  ../..  FI; K3=E88
                                               7405  K3/99  ../..  ../..  FI; K3=E88
                                               7413  K3/99  ../..  ../..  FI; K3=E88
                                               7416  K3/99  ../..  ../..  FI; K3=E88

187)  5563   TEST701A            15925   7402  LOAD BA<15:00>=(052525), READ THRU BA/KT-ALU/PBA/STATUS-MUX(PBA)
                                               7400  K5/55  K6/15  K7/15  K4/15  K3/5   FI; K5=E3,E7,E9-E11,E13,E25,E27,E30,
                                                                              E32,E37-E39,E43,E45-E47,E50,E58-E60,E65-E67,
                                                                              E69-E70,E72,E79-E82,E93-E94; K6=E19,E25,E29,E33,
                                                                              E36,E38,E49,E54,E59,E70,E76,E90,E96,E104,E108;
                                                                              K7=E48,E56,E64-E65,E73,E80-E82,E88; K4=E29,E39,
                                                                              E48,E57,E65,E87; K3=E9,E14,E33,E64
                                               7401  K4/45  K3/35  K6/20  FI; K4=E57,E65,E87; K3=E5,E8,E10,E33; K6=E31
                                               7403  K7/50  K4/50  ../..  FI; K7=E80; K4=E39

188)  5564   TEST102C             5303   7412  CSP ADDRESS, LOC(04); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(125200)
                                               7400  K4/65  K6/15  K2/10  K5/5   K3/5   FI; K4=E35-E36,E45,E51,E56,E59,E66,
                                                                              E72,E79-E80,E82,E89,E91-E92,E95,E98,E100-E102,
                                                                              E105,E108-E110; K6=E73,E75,E82,E84,E91,E93;
                                                                              K2=E95-E96,E104; K5=E53,E63; K3=E56,E95
                                               7403  K4/75  K6/25  ../..  FI; K4=E45,E51,E64; K6=E91
                                               7405  K4/99  ../..  ../..  FI; K4=E98
                                               7420  K3/99  ../..  ../..  FI; K3=E17,E20,E27,E36
                                               7432  K3/99  ../..  ../..  FI; K3=E32
                                               7434  K4/75  K2/25  ../..  FI; K4=E29,E38,E70,E88-E89,E98,E108; K2=E5,E11,E17,
                                                                              E23,E29,E84

189)  5565   TEST624B            15817   7434  CLOCKING D REGISTER PROPOGATED THRU MICROBREAK JAM (P2-T)
                                               7477  K4/99  ../..  ../..  K403/4=U-CLKD-CNTRL

190)  5571   TEST624A            15724   4777  MICROBREAK JAM AT MICROADDRESS=(6255); FLAG<8> CLEARED IN JAM WORD
                                               ????  K3/99  ../..  ../..  K311=MICROBREAK-LOGIC

191)  5572   TEST103B             5423   7432  CSP ADDRESS, LOC(15); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(000125)
                                               7411  K2/80  K3/20  ../..  FI; K2=E2,E8-E9,E21,E27,E60,E66,E69,E75,E81;
                                                                              K3=E21-E22,E76

                                               7415  K3/99  ../..  ../..  FI; K3=E21
                                               7420  K4/99  ../..  ../..  FI; K4=E74,E111-E112

192)  5573   TEST623             15680   7402  BUTA(CUA-TRACK) RESETS CUA TO TRACKING NUA VALUE
                                               4747  K3/99  ../..  ../..  FI; K3=E91                              [Continued]
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###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5573	TEST623	[Continued]						BUTA(CUA-TRACK) RESETS CUA TO TRACKING NUA VALUE
					7400	K2/99	../..	../..	FI; K2=E3,E6,E9,E10,E24-E25,E30,E33,E39,E45,E51, E54,E60,E66,E75,E81,E86-E87,E113
193)	5574	TEST102B	5277	7405					CSP ADDRESS, LOC(10); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(152500)
					7400	K4/65	K6/30	K2/5	K5/5 FI; K4=E36,E38,E42-E43,E51,E59,E82,E89,E98, E105,E108-E110; K6=E82,E84,E91; K2=E96; K5=E63
					7402	K4/65	K6/15	K5/10	K2/10 K3/5 FI; K4=E45,E51,E64,E70,E95,E98, E100-E101; K6=E91,E93; K5=E53; K2=E95; K3=E95
					7403	K2/99	../..	../..	FI; K2=E34
					7412	K4/99	../..	../..	FI; K4=E89,E92,E102,E106
					7434	K4/90	K7/5	K3/5	K2/5 FI; K4=E4,E38,E70,E88-E89,E98-E99,E108; K7=E21; K3=E102; K2=E84
194)	5575	TEST622C	15657	7402					CLR-JAM-ERRORS RESETS STATUS-MUX(JAM)=(001000) AFTER UBREAK JAMUPP
					7407	K7/99	../..	../..	K705=UBRK-JAM-FLAGS,K707=JAM-CLEAR,K708=STATUS-MUX
195)	5576	TEST103C	5449	7425					CSP ADDRESS, LOC(16); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(000152)
					7402	K4/99	../..	../..	FI; K4=E100-E101
					7420	K3/99	../..	../..	FI; K3=E93
196)	5577	TEST622B	15634	7401					BUTR(OTHER-JAM) NEGATED="0" AFTER CLR-JAM-ERRORS
					7403	K7/99	../..	../..	FI; K7=E51-E52,E57
197)	5600	TEST105B1	5666	7412					BUT(SR3=0), SR=(000152); SR<3:0>="1010"
					7410	K4/99	../..	../..	FI; K4=E44
					7413	K3/99	../..	../..	FI; K3=E67
					7416	K3/97	../..	../..	FI; K3=E75
198)	5601	TEST622A	15605	7403					UCONS 'START-DELAY' & 'CLR-NPR-TIMEOUT' DONT EFFECT 'CLR-JAM-ERRORS'
					7401	K7/99	../..	../..	FI; K7=E36
199)	5602	TEST610C2	15038	7401					PS[CC]=(01); IR=(072000), CC-ROM-ADDR(037)
					7403	K3/99	../..	../..	FI; K3=E62
					7405	K3/99	../..	../..	FI; K3=E55,E66
200)	5603	TEST621F	15521	7402					PROC-MUX(CUA-PORT)=(055226); CUA-LOCKED, EXFLAGS SET, PREFETCH-JAM CLEAR
					7400	K2/99	../..	../..	FI; K2=E46,E58,E90,E100,E105
201)	5604	TEST374A2	9959	7434					A/B SP WRITE FCN WR(A,LO,A=ADDR) AND WR(A,LO,B=ADDR)
					7400	K4/80	K2/20	../..	FI; K4=E11,E17,E23,E47; K2=E34
					7402	K4/75	K3/25	../..	FI; K4=E17,E26; K3=E93
					7420	K4/70	K2/30	../..	FI; K4=E10,E17,E23-E24,E26; K2=E32,E38,E44,E50,E53
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
202)	5605	TEST621E	15495	7402					STATUS-MUX(JAM-PORT)=(001001) AFTER MICROBREAK JAM
					7400	K2/75	K7/25	../..	FI; K2=E56,E76,E83,E100; K7=E56,E73

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
203)	5606	TEST374B2	10032	7434					A/B SP WRITE FCN WR(A,HI,A=ADDR) AND WR(A,HI,B=ADDR)
					7477	K4/99	../..	../..	K409=SP-REWRITE-CNTL,K406/7=A/B-SPADS
204)	5607	TEST621D	15476	7403					BUTR(OTHER-JAM) ASSERTED="1" AFTER MICROBREAK JAM
					7401	K7/70	K3/30	../..	FI; K7=E32,E38,E57,E73; K3=E44
205)	5610	TEST105A1	5619	7405					BUT(SR3=0), SR=(000125); SR<3:0>="0101"
					7407	K3/99	../..	../..	FI; K3=E77
					7415	K3/99	../..	../..	FI; K3=E76
					7425	K3/99	../..	../..	FI; K3=E68
206)	5611	TEST621C	15458	7406					BUTM(INIT-JAM) STAYS NEGATED AFTER MICROBREAK JAM
					7407	K2/99	../..	../..	FI; K2=E46
207)	5612	TEST610B2	14919	7406					PS[CC]=(06); IR=(005300), CC-ROM-ADDR(253)
					7402	K3/99	../..	../..	FI; K3=E55,E63,E66
					7404	K3/55	K4/45	../..	FI; K3=E55,E65; K4=E78
					7414	K3/99	../..	../..	FI; K3=E55
208)	5613	TEST621B	15440	7402					CLOCKING D-REGISTER PROPAGATED THRU MICROBREAK JAM (P3-T)
					7477	K4/99	../..	../..	K403/4=U-CLKD-CNTRL
209)	5614	TEST376A1	10619	7434					SP/SF-ADDRESS: FLTPT/BIT02="0"; R-IOR-1/BIT00="1" FORCED
					7400	K3/40	K2/40	K4/25	FI; K3=E50,E57,E94,E97; K2=E55,E108,E112; K4=E4,E9, E34,E101
					7410	K2/65	K3/35	../..	FI; K2=E95,E118; K3=E47,E96
210)	5615	ERROR621A	15426	0000					MICROBREAK JAMUPP AT (5522) ATTEMPTED; DID NOT OCCUR
					5615	K3/75	K2/10	K5/10	K6/5 K7/5 FI; K3=E32,E41,E52,E61,E81,E91,E101, E111-E112; K2=E35,E41,E70,E77; K5=E60-E61,E68, E77; K6=E39-E40; K7=E48,E57
211)	5616	TEST713B	16640	7402					DATI-NOINT, ILLEGAL INTERNAL ADDR; JAM=(001040)
					7400	K6/70	K7/15	K5/15	FI; K6=E46,E51; K7=E74,E88; K5=E38,E72
212)	5617	TEST621A	15344	4777					MICROBREAK JAM AT MICROADDRESS=(5522); ACTIVE-BUT, WR-CSP LATCHES CLEARED
					4747	K3/99	../..	../..	FI; K3=E91,E111
213)	5620	TEST105E	5743	7415					SR LOAD/READ, SR=(152500); SR<15:12>="1101"
					7405	K5/99	../..	../..	FI; K5=E60
					7411	K4/75	K6/10	K5/5	K2/5 FI; K4=E33-E34,E39,E45-E46,E51,E54,E78,E95, E98,E100-E101; K6=E91,E93; K5=E53; K2=E95
					7414	K4/85	K6/10	K5/5	K2/5 FI; K4=E33-E34,E36,E39,E45-E46,E51,E62,E80, E82,E95,E98,E100-E101; K6=E91,E93; K5=E53; K2=E95

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
214)	5621	TEST620C	15309	7402	STATUS-MUX(JAM-PORT)=(001000) AFTER CLR-JAM-ERRORS UCON				
					7400	../..	../..	../..	!! MOS BATTERY BACKUP MUST BE GOOD !!
					7400	K7/85	K2/5	K6/5	FI; K7=E48-E49,E52,E56-E58,E64-E66,E73,E80-E82, E88; K2=E37,E64,E66,E70; K6=E51
					7401	K7/85	K2/15	../..	FI; K7=E28,E37; K2=E100
					7403	K7/99	../..	../..	FI; K7=E80
215)	5622	TEST610A2	14806	7406	PS[CC]=(06); IR=(105200), CC-ROM-ADDR(145)				
					7404	K3/90	K4/10	../..	FI; K3=E55,E62,E65,E72,E85; K4=E72
					7407	K3/99	../..	../..	FI; K3=E62,E72
216)	5623	TEST620B	15286	7401	BUTR(OTHER-JAM) NEGATED="0" AFTER CLR-JAM-ERRORS UCON				
					7403	K7/80	K6/20	K3/5	FI; K7=E18,E26,E32,E38,E49,E57-E58,E74; K6=E2-E3, E62,E64,E105; K3=E44
217)	5624	TEST610D2	15145	7410	PS[CC]=(10); IR=(072000), CC-ROM-ADDR(116)				
					7414	K3/99	../..	../..	FI; K3=E63,E66
218)	5625	TEST375B	10563	7432	DAD/3 CAUSES BYTE-WRITE(LO) TO BSPLO; DAD/1 OR DAD/2 NOT				
					7400	K3/99	../..	../..	FI; K3=E46
					7402	K4/99	../..	../..	FI; K4=E99-E100
219)	5627	TEST610A1	14744	7405	PS[CC]=(05); IR=(105200), CC-ROM-ADDR(665)				
					7400	K3/99	../..	../..	FI; K3=E57
					7401	K3/70	K2/30	../..	FI; K3=E55,E72; K2=E105
					7404	K3/99	../..	../..	FI; K3=E62,E72
					7406	K3/99	../..	../..	FI; K3=E62,E65,E85
					7407	K3/80	K4/20	../..	FI; K3=E34,E55,E62,E65,E72; K4=E72
					7411	K3/99	../..	../..	FI; K3=E34,E55,E65
					7412	K3/99	../..	../..	FI; K3=E5,E8-E10,E14,E36,E72
					7415	K3/99	../..	../..	FI; K3=E55,E62-E63,E72
220)	5631	TEST046A	4920	7426	BUT(INSTR5), IR=(000200); E78(200)=(26)				
					6000	K2/99	../..	../..	FI; K2=E47
					7426	K2/99	../..	../..	FI; K2=E25
					7477	K3/99	../..	../..	K305=INSTR5-DECODE
221)	5633	TEST045A	4878	7405	BUT(DM0$SM0$BYTE), IR=(004300); DM0, -SM0, BYTE (SWAB)				
					7404	K3/99	../..	../..	FI; K3=E85
222)	5635	TEST044A	4833	7447	BUT(INSTR1), IR=(076250), CLASS-A(XFC)				
					7417	K3/99	../..	../..	FI; K3=E90,E99
					7464	K3/99	../..	../..	FI; K3=E90,E110

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
223)	5636	TEST105D	5716	7405	SR LOAD/READ, SR=(152500); ALU-A/D/DBUF/IR PATH				
					7400	K4/99	../..	../..	FI; K4=E27,E35-E36,E39,E42-E43,E48,E67
					7402	K2/95	K4/5	../..	FI; K2=E6,E9,E12,E18,E26,E30,E33,E39,E45,E51,E54, E60,E66,E69,E75,E86-E88,E94,E99,E103; K4=E77
224)	5637	TEST043B	4796	7711	BUT(INSTR1), IR=(161707), CLASS-G(DOP*-SM0)				
					5126	K6/99	../..	../..	FI; K6=E42
					7710	K3/99	../..	../..	FI; K3=E105
					7717	K3/99	../..	../..	FI; K3=E107
					7750	K3/99	../..	../..	FI; K3=E90
225)	5641	TEST043A	4767	7404	BUT(DM0$SM0$BYTE), IR=(161707); DM0, -SM0, -BYTE (SUB)				
					7400	K3/99	../..	../..	FI; K3=E74
					7406	K3/99	../..	../..	FI; K3=E109
226)	5642	TEST105C	5690	7412	SR LOAD/READ, SR=(125200); ALU-A/D/DBUF/IR PATH				
					7400	K4/99	../..	../..	FI; K4=E27,E32-E37,E39,E41-E43,E45-E46,E48,E60,E62, E67-E68,E72
					7403	K4/99	../..	../..	FI; K4=E33-E34,E39,E45-E46,E54,E64,E77-E78
					7405	K4/99	../..	../..	FI; K4=E45-E46
					7420	K4/99	../..	../..	FI; K4=E28
					7434	K4/99	../..	../..	FI; K4=E29
227)	5643	TEST042B	4731	7714	BUT(INSTR1), IR=(144020), CLASS-G(DOP*-SM0)				
					7417	K3/99	../..	../..	FI; K3=E90,E110
					7514	K3/99	../..	../..	FI; K3=E99
					7614	K3/99	../..	../..	FI; K3=E100
					7710	K3/99	../..	../..	FI; K3=E106,E120
					7715	K2/99	../..	../..	FI; K2=E77
					7717	K3/99	../..	../..	FI; K3=E97,E105-E107
228)	5645	TEST042A	4703	7401	BUT(DM0$SM0$BYTE), IR=(144020); -DM0, -SM0, BYTE				
					7400	K3/70	K2/30	../..	FI; K3=E54,E60,E65,E85; K2=E19,E41,E77-E78
					7403	K5/50	K3/50	../..	FI; K5=E98; K3=E109
					7406	K2/99	../..	../..	FI; K2=E78
229)	5646	TEST104B	5543	7432	CSR BASCON ADDR, LOC(15); EMIT/CSR/ALU-B/D/DBUF/IR WITH DATA=(000125)				
					7400	K4/99	../..	../..	FI; K4=E38
					7402	K4/99	../..	../..	FI; K4=E51,E100-E101
230)	5647	TEST041B	4667	7517	BUT(INSTR1), IR=(120777), CLASS-B(DOP*-MOV*SM0*-DM0)				
					7617	K3/99	../..	../..	FI; K3=E115
231)	5651	TEST041A	4638	7412	BUT(IR15-12), IR=(120777); IR<15:12>="1010"				
					7042	K2/99	../..	../..	FI; K2=E1

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
232)	5652	TEST105B	5642	7425					SR LOAD/READ, SR=(000153); ALU=A/D/DBUF/IR PATH
					7420	K4/70	K3/30	../..	FI; K4=E31-E32,E35,E37,E40-E41,E44,E52-E53,E57,E61, E75-E76; K3=E43,E51,E74,E76-E77,E82,E102
					7432	K4/99	../..	../..	FI; K4=E55
233)	5653	TEST040B	4602	7517					BUT(INSTR1), IR=(050777), CLASS=B(DOP*-MOV*SM0*-DM0)
					7417	K3/99	../..	../..	FI; K3=E80
234)	5655	TEST040A	4574	7405					BUT(IR15-12), IR=(050777); IR<15:12>="0101"
					7401	K3/99	../..	../..	FI; K3=E121
235)	5657	TEST037A	4531	7446					BUT(INSTR1), IR=(060205), CLASS=A(DOP*SM0*DM0)
					7417	K7/35	K3/35	K2/35	FI; K7=E17; K3=E115; K2=E73
					7447	K3/99	../..	../..	FI; K3=E94
236)	5661	TEST036A	4486	7455					BUT(INSTR1), IR=(150506), CLASS=A(DOP*SM0*DM0)
					7457	K3/99	../..	../..	FI; K3=E94
237)	5663	TEST035A	4442	7443					BUT(INSTR1), IR=(030701), CLASS=A(DOP*SM0*DM0)
					7417	K3/99	../..	../..	FI; K3=E60,E80,E88,E90,E95,E97,E105,E107,E110, E115-E117,E120
					7441	K3/45	K6/30	K5/30	FI; K3=E43,E94,E107; K6=E91-E92; K5=E67,E98
					7442	K3/99	../..	../..	FI; K3=E94,E108
					7460	K3/99	../..	../..	FI; K3=E90
					7540	K3/99	../..	../..	FI; K3=E120
238)	5665	TEST034A	4398	7511					BUT(INSTR1), IR=(005112), CLASS=B(SOP*-DM0)
					7517	K3/99	../..	../..	FI; K3=E98
					7751	K3/99	../..	../..	FI; K3=E98
239)	5667	TEST033A	4354	7517					BUT(INSTR1), IR=(106274), CLASS=B(SOP*-DM0)
					7417	K3/99	../..	../..	FI; K3=E80,E100,E108,E120
					7515	K2/99	../..	../..	FI; K2=E114
					7562	K3/99	../..	../..	FI; K3=E108
					7716	K3/99	../..	../..	FI; K3=E100
240)	5670	TEST047B	5019	7413					BUT(IR11=FLOAT), IR=(122566); FP=ROM(534)=(13)
					7477	K3/99	../..	../..	K305=FP-INSTR-DECODE
241)	5671	TEST032B	4317	7612					BUT(INSTR1), IR=(110125), CLASS=C(MOV*SM0*-DM0)
					7451	K3/99	../..	../..	FI; K3=E109
					7602	K3/99	../..	../..	FI; K3=E4,E6-E7,E11,E15,E43,E118
					7752	K3/99	../..	../..	FI; K3=E85,E94,E104

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/RTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
242)	5673	TEST032A	4288	7412					BUT(MOV/DR7@IR5-3), IR=(110125); IR<5:3>="010", MOV
					7402	K3/80	K5/20	../..	FI; K3=E57,E97; K5=E68
243)	5674	TEST103D	5476	7405					CSP ADDRESS, LOC(07); EMIT/CSP/ALU=B/D/DBUF/IR WITH DATA=(152500)
					7322	K3/99	../..	../..	FI; K3=E22
					7400	K4/99	../..	../..	FI; K4=E59,E109-E110
244)	5675	TEST031B	4253	7604					BUT(INSTR1), IR=(010242), CLASS=C(MOV*SM0*-DM0)
					7404	K3/99	../..	../..	FI; K3=E99
					7417	K3/90	K5/15	../..	FI; K3=E87,E90,E113,E119; K5=E98
					7514	K3/55	K6/30	K5/15	FI; K3=E115-E117; K6=E91-E92; K5=E67
					7607	K3/99	../..	../..	FI; K3=E98
					7614	K3/99	../..	../..	FI; K3=E97,E118
					7640	K3/99	../..	../..	FI; K3=E90
					7700	K3/99	../..	../..	FI; K3=E99,E110
					7704	K3/99	../..	../..	FI; K3=E98,E120
245)	5677	TEST031A	4224	7402					BUT(DM0&SM0&BYTE), IR=(010242); -DM0, SM0, -BYTE
					7005	K3/99	../..	../..	FI; K3=E56
					7400	K3/99	../..	../..	FI; K3=E47,E56,E60,E80,E90,E109,E119-E120
					7406	K3/99	../..	../..	FI; K3=E109
246)	5701	TEST030A	4117	7552					BUT(INSTR1), IR=(005204), CLASS=D(SOP*DM0)
					7313	K3/99	../..	../..	FI; K3=E2
					7553	K3/99	../..	../..	FI; K3=E87
247)	5703	TEST027A	4074	7561					BUT(INSTR1), IR=(106102), CLASS=D(SOP*DM0)
					7777	K3/99	../..	../..	K304/5=INSTR1-DECODE
248)	5705	TEST026A	4029	7574					BUT(INSTR1), IR=(105403), CLASS=D(SOP*DM0)
					7570	K3/99	../..	../..	FI; K3=E108
					7574	K2/99	../..	../..	FI; K2=E67
					7757	K6/99	../..	../..	FI; K6=E82
249)	5707	TEST025A	3986	7543					BUT(INSTR1), IR=(006303), CLASS=D(SOP*DM0)
					7540	K3/99	../..	../..	FI; K3=E99
					7557	K3/99	../..	../..	FI; K3=E105
250)	5710	TEST014D	3436	7401					BUT(IR11=FLOAT), IR=(000125); FP=ROM(020)=(01)
					7400	K3/99	../..	../..	FI; K3=E86
251)	5711	TEST024B	3949	7557					BUT(INSTR1), IR=(005706), CLASS=D(SOP*DM0)
					5125	K3/99	../..	../..	FI; K3=E12
					7306	K3/99	../..	../..	FI; K3=E5
					7407	K3/99	../..	../..	FI; K3=E44

[Continued]

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     ERROR                        Line             ->Module sequence->
###)  code  Symbolic label       number  ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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      5711  TEST024B            (Continued)    BUT(INSTR1), IR=(005706), CLASS=D(SOP*DMO)
                                               7417  K3/99  ../..  ../..  FI; K3=E80,E88,E108,E117
                                               7547  K3/99  ../..  ../..  FI; K3=E118
                                               7550  K3/99  ../..  ../..  FI; K3=E120
                                               7553  K3/99  ../..  ../..  FI; K3=E106
                                               7555  K3/99  ../..  ../..  FI; K3=E103,E107
                                               7556  K3/99  ../..  ../..  FI; K3=E103,E105
                                               7577  K3/99  ../..  ../..  FI; K3=E108

252)  5712  TEST030B              4147   7424  BUT(IR11#FLOAT), IR=(005204); FP=ROM(240)=(04)
                                               7420  K3/99  ../..  ../..  FI; K3=E86
                                               7425  K4/60  K2/20  K3/20  FI; K4=E32,E41-E43,E59,E66,E71,E79,E82,E92,E102,
                                                                              E109-E110; K2=E96,E101,E104,E110,E119; K3=E12,
                                                                              E43,E52,E71,E82,E86,E102
                                               7426  K3/99  ../..  ../..  FI; K3=E86

253)  5713  TEST030C              4166   7403  BUTR(IR11), IR=(005204); IR11="1"
                                               7401  K3/99  ../..  ../..  K307=MICROBRANCH

254)  5715  TEST024A              3920   7402  BUTR(DR6/7L), IR=(005706); DR6
                                               7403  K3/99  ../..  ../..  FI; K3=E93

255)  5717  TEST023A              3877   7560  BUT(INSTR1), IR=(106004), CLASS=D(SOP*DMO)
                                               5122  K3/99  ../..  ../..  FI; K3=E14,E23
                                               5401  K3/99  ../..  ../..  FI; K3=E1
                                               7401  K3/99  ../..  ../..  FI; K3=E19
                                               7417  K3/99  ../..  ../..  FI; K3=E47,E60,E74,E80,E88,E90,E99,E104,E108-E110,
                                                                              E116,E119-E120
                                               7460  K3/99  ../..  ../..  FI; K3=E100
                                               7510  K3/99  ../..  ../..  FI; K3=E109
                                               7520  K3/99  ../..  ../..  FI; K3=E100
                                               7540  K3/99  ../..  ../..  FI; K3=E85,E108,E110
                                               7557  K3/99  ../..  ../..  FI; K3=E97,E105-E108,E118
                                               7561  K3/85  K4/15  ../..  FI; K3=E79,E87,E103,E105; K4=E9
                                               7570  K3/99  ../..  ../..  FI; K3=E76,E118
                                               7760  K3/99  ../..  ../..  FI; K3=E96,E104,E114,E119

256)  5721  TEST022A              3833   7757  BUT(INSTR1), IR=(003063), CLASS=F(BRANCH)
                                               0000  K3/99  ../..  ../..  FI; K3=E6
                                               5200  K3/99  ../..  ../..  FI; K3=E11
                                               7417  K3/60  K7/40  ../..  FI; K3=E96,E104; K7=E13,E101
                                               7517  K3/99  ../..  ../..  FI; K3=E25

257)  5722  TEST015C              3519   7655  BUT(INSTR1), IR=(000152), CLASS=E(JMP)
                                               7651  K3/99  ../..  ../..  FI; K3=E103,E106
                                               7654  K3/99  ../..  ../..  FI; K3=E93,E105
                                               7657  K3/99  ../..  ../..  FI; K3=E69,E89,E103

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Module codes:   K1/DCS   K2/UWORD   K3/IRDECODE   K4/DATAPATH   K5/KTCACHE   K6/TIMING   K7/STATUS
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     ERROR                        Line             ->Module sequence->
###)  code  Symbolic label       number  ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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258)  5723  TEST021B              3775   7757  BUT(INSTR1), IR=(002315), CLASS=F(BRANCH)
                                               7417  K3/99  ../..  ../..  FI; K3=E89,E96,E104,E109
                                               7751  K3/99  ../..  ../..  FI; K3=E116

259)  5725  TEST021A              3746   7400  BUT(DMO#SMO#BYTE), IR=(002315); -DMO, -SMO, -BYTE
                                               7401  K3/99  ../..  ../..  FI; K3=E84,E85,E87-E88,E116
                                               7402  K3/99  ../..  ../..  FI; K3=E56,E109-E110,E114,E119
                                               7403  K3/50  K6/25  K5/25  FI; K3=E112,E114; K6=E83; K5=E59
                                               7404  K3/99  ../..  ../..  FI; K3=E74,E90,E109,E119-E120
                                               7406  K7/99  ../..  ../..  FI; K7=E20
                                               7600  K2/99  ../..  ../..  FI; K2=E36
                                               7606  K2/99  ../..  ../..  FI; K2=E15

260)  5726  TEST050B              5108   7412  BUT(INSTR5), IR=(175200); E88(752)=(12)
                                               7434  K7/99  ../..  ../..  FI; K7=E13,E29,E94,E101
                                               74??  K3/99  ../..  ../..  K305=INSTR5-DECODE

261)  5727  TEST020C              3711   7757  BUT(INSTR1), IR=(001257), CLASS=F(BRANCH)
                                               7417  K3/99  ../..  ../..  FI; K3=E95-E96,E104,E114
                                               7740  K3/99  ../..  ../..  FI; K3=E99
                                               7755  K3/99  ../..  ../..  FI; K3=E117

262)  5730  TEST047C              5039   7406  BUT(MOV/DR7#IR5-3), IR=(122566); IR<5:3>="110", -MOV
                                               740?  K3/99  ../..  ../..  K308=MICROBRANCH

263)  5731  TEST020B              3689   7405  BUT(MOV/DR7#IR5-3), IR=(001257); IR<5:3>="101", -MOV
                                               7407  K3/99  ../..  ../..  FI; K3=E54
                                               7415  K3/99  ../..  ../..  FI; K3=E94,E120

264)  5733  TEST020A              3662   7412  BUT(IR9-6), IR=(001257); IR<9:6>="1010"
                                               7232  K3/99  ../..  ../..  FI; K3=E58
                                               7402  K3/70  K6/30  ../..  FI; K3=E76,E83,E85-E86,E88; K6=E82-E83
                                               7413  K6/99  ../..  ../..  FI; K6=E73

265)  5734  TEST030D              4189   7405  BUT(INSTR5), IR=(005204); E88(452)=(05)
                                               7400  K3/99  ../..  ../..  FI; K3=E88
                                               7403  K3/99  ../..  ../..  FI; K3=E88
                                               7407  K3/99  ../..  ../..  FI; K3=E88
                                               7415  K3/99  ../..  ../..  FI; K3=E88
                                               7417  K3/99  ../..  ../..  FI; K3=E88
                                               7425  K3/99  ../..  ../..  FI; K3=E68
                                               7426  K3/99  ../..  ../..  FI; K3=E38,E78,E109

                                               7437  K3/99  ../..  ../..  FI; K3=E38
                                               74??  K3/99  ../..  ../..  K305=INSTR5-DECODE

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Module codes:   K1/DCS   K2/UWORD   K3/IRDECODE   K4/DATAPATH   K5/KTCACHE   K6/TIMING   K7/STATUS
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     ERROR                        Line              ->Module sequence->
###) code  Symbolic label        number ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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266) 5735  TEST017B                3626 7757  BUT(INSTR1), IR=(000522), CLASS=F(BRANCH)
                                              7417  K3/99  ../..  ../..  FI; K3=E109-E110
                                              7652  K3/99  ../..  ../..  FI; K3=E114
                                              7717  K3/99  ../..  ../..  FI; K3=E89
                                              7752  K3/99  ../..  ../..  FI; K3=E96

267) 5737  TEST017A                3598 7405  BUT(IR9-6), IR=(000522); IR<9:6>="0101"
                                              7401  K3/90  K5/10  ../..  FI; K3=E50,E79,E83-E86,E88,E114; K5=E98
                                              7405  K3/99  ../..  ../..  FI; K3=E23
                                              7415  K6/65  K5/35  ../..  FI; K6=E82-E83; K5=E59

268) 5741  TEST016A                3555 7757  BUT(INSTR1), IR=(100000), CLASS=F(BRANCH)
                                              7400  K3/99  ../..  ../..  FI; K3=E51
                                              7417  K3/75  K6/15  K5/10  FI; K3=E43,E95,E98,E110,E113; K6=E91-E92; K5=E98
                                              7512  K6/99  ../..  ../..  FI; K6=E74
                                              7557  K3/99  ../..  ../..  FI; K3=E99
                                              7657  K3/99  ../..  ../..  FI; K3=E58,E70,E100
                                              7717  K3/99  ../..  ../..  FI; K3=E100
                                              7760  K3/99  ../..  ../..  FI; K3=E100
                                              7770  K3/99  ../..  ../..  FI; K3=E95,E110,E115,E119
                                              7777  K3/99  ../..  ../..  FI; K3=E108

269) 5743  TEST015A                3473 7425  BUT(INSTR5), IR=(000152); E78(152)=(25)
                                              5076  K3/99  ../..  ../..  FI; K3=E10
                                              5673  K3/99  ../..  ../..  FI; K3=E3
                                              7305  K3/99  ../..  ../..  FI; K3=E20
                                              7400  K3/99  ../..  ../..  FI; K3=E33,E106
                                              7420  K4/50  K3/35  K6/15  FI; K4=E12,E14; K3=E75,E103; K6=E65
                                              7424  K3/99  ../..  ../..  FI; K3=E67,E78,E88
                                              7434  K2/99  ../..  ../..  FI; K2=E103,E111,E114
                                              7435  K3/99  ../..  ../..  FI; K3=E76,E78
                                              74??  K3/99  ../..  ../..  K305=INSTR5-DECODE
                                              7655  K3/99  ../..  ../..  FI; K3=E36

270) 5745  TEST014A                3368 7432  BUT(INSTR5), IR=(000125); E78(125)=(32)
                                              7400  K3/99  ../..  ../..  FI; K3=E88
                                              7420  K3/50  K6/25  K5/20  K2/5   FI; K3=E66-E67,E77-E78,E84-E88,E93,E101,
                                                                            E103,E112; K6=E65-E66,E73-E74,E83,E92; K5=E67,
                                                                            E70,E106; K2=E112
                                              7422  K3/99  ../..  ../..  FI; K3=E78,E88
                                              7430  K3/99  ../..  ../..  FI; K3=E78,E88
                                              7434  K2/55  K7/15  K6/15  K3/15  FI; K2=E33,E71,E102,E108; K7=E17; K6=E91;
                                                                            K3=E43
                                              7436  K3/99  ../..  ../..  FI; K3=E75,E78
                                              74??  K3/99  ../..  ../..  K305=INSTR5-DECODE                              [Conti
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     ERROR                        Line              ->Module sequence->
###) code  Symbolic label        number ENUA  TNUA  #1/%%  #2/%%  #3/%%  Test summary - Print reference - Chip information
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     5745  TEST014A             [Continued]   BUT(INSTR5), IR=(000125); E78(125)=(32)
                                              7672  K3/99  ../..  ../..  FI; K3=E98

271) 5746  SFDFT0SR               10415 7777  (NUA SEQUENCING LOGIC ERROR)
                                              ????  K1/99  ../..  ../..  INTERNAL DCS ERROR

272) 5747  TEST013G                3331 7417  BUT(INSTR1), IR=(000000), CLASS=OTHER(NOT-A-THRU-G)
                                              7400  K3/99  ../..  ../..  FI; K3=E97,E115
                                              7407  K3/99  ../..  ../..  FI; K3=E76,E97,E118
                                              7410  K3/99  ../..  ../..  FI; K3=E97-E98
                                              7413  K3/99  ../..  ../..  FI; K3=E75,E106
                                              7415  K3/99  ../..  ../..  FI; K3=E77,E107
                                              7416  K3/99  ../..  ../..  FI; K3=E67,E105
                                              7437  K3/99  ../..  ../..  FI; K3=E68,E108
                                              7440  K3/99  ../..  ../..  FI; K3=E90,E95,E99,E113,E115-E117,E121
                                              7457  K3/99  ../..  ../..  FI; K3=E70,E97,E100
                                              7460  K3/99  ../..  ../..  FI; K3=E47,E57,E90,E94,E97,E108,E110
                                              7510  K3/99  ../..  ../..  FI; K3=E120
                                              7540  K3/99  ../..  ../..  FI; K3=E108
                                              7650  K3/99  ../..  ../..  FI; K3=E96,E98
                                              7710  K3/99  ../..  ../..  FI; K3=E110
                                              7757  K3/99  ../..  ../..  FI; K3=E59,E110
                                              7776  K2/99  ../..  ../..  FI; K2=E32

273) 5750  TEST013F                3312 7434  BUT(INSTR5), IR=(000000); E78(000)=(34)
                                              7400  K3/95  K4/5   K2/5   FI; K3=E38,E59,E68,E88-E89,E96,E98-E99,E104-E107,
                                                                            E109-E110,E113-E114,E116-E119; K4=E4; K2=E25
                                              7402  K3/99  ../..  ../..  FI; K3=E104,E106,E113,E115-E117
                                              7414  K3/99  ../..  ../..  FI; K3=E89
                                              7420  K3/99  ../..  ../..  FI; K3=E78
                                              7421  K2/55  K3/25  K5/20  FI; K2=E91,E111; K3=E78,E93; K5=E94
                                              7422  K2/50  K3/30  K5/20  FI; K2=E91,E111; K3=E78,E93; K5=E94
                                              7424  K3/55  K2/35  K5/15  FI; K3=E76,E78,E88,E93; K2=E91,E103; K5=E94
                                              7426  K3/99  ../..  ../..  FI; K3=E78
                                              7427  K2/99  ../..  ../..  FI; K2=E71
                                              7430  K3/99  ../..  ../..  FI; K3=E75,E78,E88
                                              7435  K3/99  ../..  ../..  FI; K3=E67,E78
                                              7436  K3/99  ../..  ../..  FI; K3=E77-E78
                                              7437  K3/99  ../..  ../..  FI; K3=E78

274) 5751  TEST013E                3291 7400  BUT(MOV/DR7:IR5-3), IR=(000000); IR<5:3>="000", -MOV
                                              7401  K2/50  K3/30  K5/15  K6/5   FI; K2=E84,E91,E103; K3=E67,E93; K5=E94;
                                                                            K6=E65

                                              7402  K3/45  K2/35  K5/15  K6/5   FI; K3=E77,E103,E107,E109; K2=E91,E114;
                                                                            K5=E105; K6=E73
                                              7404  K2/45  K3/35  K5/20  FI; K2=E91,E114; K3=E75,E103; K5=E105
                                              7410  K3/99  ../..  ../..  FI; K3=E47,E57,E76,E113,E115-E117,E119-E120
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###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
275)	5752	TEST014B	3394	7403	BUTR(DR6/7L), IR=(000125); DR8=(DR6+7)				
					7402	K3/99	../..	../..	FI; K3=E37-E39,E64,E66,E79
276)	5753	TEST013D	3272	7400	BUT(IR9-6), IR=(000000); IR<9:6>="0000"				
					7401	K3/99	../..	../..	FI; K3=E67
					7402	K3/99	../..	../..	FI; K3=E77,E103
					7404	K3/99	../..	../..	FI; K3=E78
					7410	K3/99	../..	../..	FI; K3=E76
277)	5754	TEST621H	15572	7402	CHECK "WR-CSP" LATCH CLEARED IN JAMMED U-WORD, WRITE NOT DONE				
					7401	K7/65	K3/35	../..	FI; K7=E25,E41; K3=E32
278)	5755	TEST013C	3253	7401	BUTR(IR11), IR=(000000); IR11="0"				
					7403	K3/99	../..	../..	FI; K3=E39,E56
279)	5756	TEST624D	15864	7403	BUTR(PREFETCH-JAM) ASSERTED="1", GETS PREFETCH-H AT JAMUPP="1"				
					7401	K3/99	../..	../..	K306=PREFETCH-JAM-LOGIC
					7747	K3/99	../..	../..	FI; K3=E17
280)	5757	TEST013B	3233	7400	BUT(IR11-FLOAT), IR=(000000); IR<11>="0", FP-ROM(000)=(00)				
					7401	K2/45	K3/30	K5/15	K6/5 FI; K2=E97,E113; K3=E67,E86,E103; K5=E105; K6=E66,E73
					7402	K2/45	K3/35	K5/15	K6/5 FI; K2=E97-E98; K3=E77,E86,E114; K5=E97; K6=E82
					7404	K2/50	K3/35	K5/15	FI; K2=E97-E98; K3=E75,E86,E114; K5=E97
					7410	K2/45	K3/40	K5/15	FI; K2=E97,E107; K3=E76,E86,E114; K5=E97
					7417	K3/99	../..	../..	FI; K3=E86
					7420	K2/50	K3/25	K5/15	K6/10 FI; K2=E97,E107; K3=E68,E114; K5=E97; K6=E82
281)	5761	TEST013A	3205	7400	BUT(IR15-12), IR=(000000); IR<15:12>="0000"				
					7401	K2/55	K3/25	K5/20	FI; K2=E85,E102; K3=E67,E113; K5=E95
					7402	K2/50	K3/30	K5/20	FI; K2=E85,E102; K3=E77,E113; K5=E95
					7404	K2/45	K3/35	K5/20	FI; K2=E85,E108; K3=E75,E113; K5=E95
					7405	K2/99	../..	../..	FI; K2=E102-E103,E108,E111,E114
					7410	K2/45	K3/30	K5/15	K6/10 FI; K2=E85,E108; K3=E76,E113; K5=E95; K6=E91
					7417	K2/60	K5/20	K7/10	K6/5 K4/5 FI; K2=E1,E17,E23,E34,E55-E56,E62, E70-E71,E76,E82-E83,E85,E92,E100-E101,E105; K5=E54,E84,E94-E95,E97,E105; K7=E28,E37,E54; K6=E101; K4=E26,E29,E38,E87
282)	5762	TEST014C	3414	7652	BUT(INSTR1), IR=(000125), CLASS-E(JMP)				
					7417	K3/99	../..	../..	FI; K3=E96,E98,E103,E107
					7452	K3/99	../..	../..	FI; K3=E58,E70,E99
					7612	K3/99	../..	../..	FI; K3=E100
					7640	K3/99	../..	../..	FI; K3=E90 [Continued]

Module codes: K1/DC8 K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5762	TEST014C	[Continued]		BUT(INSTR1), IR=(000125), CLASS-E(JMP)				
					7642	K3/99	../..	../..	FI; K3=E90,E98,E119
					7650	K3/99	../..	../..	FI; K3=E103,E107
					7653	K3/99	../..	../..	FI; K3=E58,E79,E93,E105,E109
					7656	K3/99	../..	../..	FI; K3=E69,E75,E89,E103,E106,E109
					7657	K3/99	../..	../..	FI; K3=E98,E105-E107
					7740	K3/99	../..	../..	FI; K3=E100
					7752	K3/99	../..	../..	FI; K3=E99,E120
283)	5763	TEST012G	3169	7474	BUT(INSTR1), IR=(177777), CLASS-A(FLOATING-POINT), FLAG<4:5>="00"				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					7434	K3/99	../..	../..	FI; K3=E37,E58,E70,E97-E98,E100
					7437	K3/99	../..	../..	FI; K3=E90,E97,E105-E107,E118
					7454	K3/99	../..	../..	FI; K3=E68,E108
					7464	K3/99	../..	../..	FI; K3=E76,E113,E118
					7470	K3/99	../..	../..	FI; K3=E75,E106
					7475	K4/45	K3/40	K2/15	K7/5 FI; K4=E3,F33-E34,E51,E55,E71,E82, E100-E101; K3=E3,E43,E51,E67,E82,E94,E102,E105; K2=E77,E95,E106; K7=E43
					7476	K4/50	K3/35	K2/15	K5/5 FI; K4=E3,E42-E43,E55,E59,E82,E109-E110; K3=E41,E43,E57,E77,E82,E94,E107; K2=E96,E100, E106; K5=E59
					7477	K3/65	K4/40	../..	FI; K3=E1,E41,E43,E51-E52,E61,E82,E102; K4=E3,E26, E29,E55,E70-E71
					7574	K3/99	../..	../..	FI; K3=E70,E97-E98,E100,E108,E116-E117,E120-E121
					7674	K3/99	../..	../..	FI; K3=E70,E90,E97-E100
					7774	K3/99	../..	../..	FI; K3=E95-E97,E99-E100,E104,E110,E119
284)	5764	TEST012F	3147	7402	BUTR(DR6/7L), IR=(177777); DR7				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					7403	K3/99	../..	../..	FI; K3=E64,E66
285)	5765	TEST012E	3127	7417	BUT(MOV/DR7-IR5-3), IR=(177777); IR<5:3>="111", -MOV				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					7400	K2/99	../..	../..	FI; K2=E26,E91
					7406	K3/75	K5/25	../..	FI; K3=E93; K5=E94
					7407	K3/60	K5/20	K2/10	K4/10 K6/5 K7/5 FI; K3=E57,E66,E71,E76, E78-E79,E81,E84,E92-E93,E95,E99,E101,E105-E107, E110,E113,E115-E119; K5=E48-E49,E67-E68,E94,E106, E113-E115; K2=E91,E103,E111-E112; K4=E12-E15, E106; K6=E65-E66; K7=E73,E82
					7413	K3/35	K5/30	K2/15	K6/5 K4/5 K7/5 FI; K3=E75,E78,E86-E87,E101, E103; K5=E56,E61,E70,E92,E105-E106; K2=E91,E114; K6=E73-E74; K4=E106; K7=E88
					7415	K5/40	K3/30	K2/10	K7/5 K6/5 K4/5 FI; K5=E56,E61,E67,E105-E106, E112; K3=E77-E78,E86-E87,E101,E103; K2=E91,E114; K7=E88; K6=E73-E74; K4=E106
					7416	K5/35	K3/35	K2/15	K6/10 K4/5 K7/5 FI; K5=E49,E67-E68,E94,E106,

Module codes: K1/DC8 K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5765	TEST012E	(Continued)		BUT(MOV/DR7#IR5-3), IR=(177777); IR<5:3>="111", =MOV				
					7416	K5/35	K3/35	K2/15	E120; K3=E67,E78,E86,E93,E101; K2=E91,E103; K6=E65-E66; K4=E106; K7=E82
					7437	K3/99	../..	../..	FI; K3=E68
286)	5766	TEST621G	15550	7401	BUTR(PREFETCH=JAM) NEGATED; GETS PREFETCH=H AT JAMUPP=="0"				
					7403	K3/99	../..	../..	FI; K3=E44
					7407	K3/99	../..	../..	K306=PREFETCH=JAM-LOGIC
					7763	K2/75	K3/25	../..	FI; K2=E10-E12,E37-E39,E64-E66; K3=E2,E4-E5
287)	5767	TEST012D	3108	7417	BUT(IR9-6), IR=(177777); IR<9:6>="1111"				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					7407	K3/99	../..	../..	FI; K3=E76
					7412	K3/99	../..	../..	FI; K3=E34,E54,E64,E67-E68,E74-E75,E98
					7414	K3/75	K5/25	../..	FI; K3=E103; K5=E105
					7415	K3/45	K5/25	K2/10	K4/10 K6/5 K7/5 FI; K3=E34,E44,E50,E56, E76-E79,E84-E86,E88,E103,E112; K5=E51,E61,E70, E105-E106,E121; K2=E97,E113; K4=E12,E14,E105; K6=E73-E74; K7=E64
					7416	K3/40	K5/30	K2/15	K7/5 K6/5 K4/5 FI; K3=E67,E78,E84-E86,E88, E96,E103,E112; K5=E51,E61,E70,E105-E106,E122; K2=E97,E113; K7=E44; K6=E73-E74; K4=E105
					7437	K3/99	../..	../..	FI; K3=E68
					7457	K3/99	../..	../..	FI; K3=E98
288)	5770	TEST046B	4950	7401	BUT(IR11#FLOAT), IR=(000200); FP=ROM(040)=(01)				
					7477	K3/99	../..	../..	K305=FP-INSTR-DECODE
289)	5771	TEST012C	3088	7403	BUTR(IR11), IR=(177777); IR11="1"				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					5403	K2/99	../..	../..	FI; K2=E34
					7401	K3/99	../..	../..	FI; K3=E23,E33-E34,E37-E39,E44,E56,E70,E76-E77
					7407	K3/99	../..	../..	FI; K3=E74
					7443	K3/99	../..	../..	FI; K3=E37,E98
					7475	K2/90	K3/15	../..	FI; K2=E34,E40,E59,E65,E68,E74,E80; K3=E39
					7477	K3/99	../..	../..	FI; K3=E39
					7767	K2/99	../..	../..	FI; K2=E40
290)	5772	TEST015B	3500	7403	BUTR(DR6/7L), IR=(000152); DR2=-(DR6+7)				
					7402	K3/99	../..	../..	FI; K3=E66,E79
291)	5773	TEST012B	3069	7437	BUT(IR11#FLOAT), IR=(177777); IR<11>="1", FP=ROM(776)=(17)				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					7400	K7/80	K6/15	K3/15	K2/15 FI; K7=E80; K6=E91; K3=E34; K2=E97
					7401	K3/75	K5/25	../..	FI; K3=E114; K5=E97
					7403	K3/99	../..	../..	FI; K3=E34
					7411	K7/99	../..	../..	FI; K7=E80
					7413	K3/99	../..	../..	FI; K3=E34 (Continued)

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5773	TEST012B	(Continued)		BUT(IR11#FLOAT), IR=(177777); IR<11>="1", FP=ROM(776)=(17)				
					7416	K6/99	../..	../..	FI; K6=E91
					7417	K3/65	K5/15	K2/10	K6/5 K7/5 K4/5 FI; K3=E34,E52,E54,E56,E64, E67-E68,E74-E75,E87-E88,E98-E99,E112,E114, E116-E117; K5=E20,E59-E60,E97-E98,E107; K2=E97, E107; K6=E82-E83; K7=E81; K4=E38,E105
					7427	K3/55	K5/20	K2/10	K7/5 K6/5 K4/5 FI; K3=E34,E44,E56,E76-E77, E83,E85-E88,E99,E112,E114,E116; K5=E20,E59-E60, E97-E98,E109; K2=E97,E107; K7=E81; K6=E82-E83; K4=E105
					7433	K3/99	../..	../..	FI; K3=E75,E86
					7434	K3/40	K5/30	K2/15	K7/5 K6/5 K4/5 FI; K3=E76,E83,E85-E86,E88, E112,E114,E117; K5=E21,E59-E60,E97-E98,E108; K2=E97-E98; K7=F56; K6=E82-E83; K4=E105
					7435	K3/99	../..	../..	FI; K3=E77,E86
					7436	K3/80	K5/25	K2/10	K7/5 K6/5 K4/5 FI; K3=E50,E67,E75,E79, E83-E86,E88-E89,E112,E114; K5=E21,E59-E60, E97-E99; K2=E97-E98; K7=E56; K6=E82-E83; K4=E105
292)	5774	TEST021C	3797	7411	BUT(IR11#FLOAT), IR=(002315); FP=ROM(462)=(11)				
					7401	K3/99	../..	../..	FI; K3=E86
					7416	K5/99	../..	../..	FI; K5=E59
					7477	K3/99	../..	../..	K305=FP-INSTR-DECODE
293)	5775	TEST012A	3031	7417	BUT(IR15-12), IR=(177777); IR<15:12>="1111"				
					####	../..	../..	../..	!!! WATCH FOR BUSDIN PULLED LOW BY OTHER DRIVER !!!
					3000	K7/99	../..	../..	FI; K7=E10,E94
					3020	K7/99	../..	../..	FI; K7=E27
					3220	K7/99	../..	../..	FI; K7=E10,E21,E27,E29,E42,E52
					4102	K6/99	../..	../..	FI; K6=E70,E74,E92,E105
					5760	K2/99	../..	../..	FI; K2=E61
					7005	K2/55	K5/25	K3/25	FI; K2=E5,E29,E34,E38-E39,E50,E61,E68,E71,E76, E83-E85; K5=E20-E21,E48-E49,E51,E60; K3=E34,E37, E39,E51,E103,E112
					7376	K2/99	../..	../..	FI; K2=E46
					7400	K2/40	K3/25	K7/15	K5/15 K6/10 K4/5 FI; K2=E1,E5,E11,E17,E23, E25-E26,E29,E32-E34,E38-E39,E44-E46,E50-E51, E53-E54,E56,E59,E61-E62,E65,E70-E71,E74,E76-E77, E80,E82-E86,E91,E97-E98,E102-E103,E105,E107-E108, E111,E113-E114; K3=E23,E31-E34,E36-E39,E43,E45, E48,E51-E52,E57,E65-E66,E73,E92-E93,E101,E103, E112-E114; K7=E10,E13,E17,E20-E21,E27,E29,E33, E41,E52,E94; K5=E6,E20-E21,E31,E48-E49,E51,E54, E56,E61,E77,E95; K6=E65-E66,E70,E73-E74,E79-E80, E82-E83,E86,E95-E96,E98-E99,E101,E105,E108; K4=E29-E30,E38
					7401	K3/99	../..	../..	FI; K3=E113
					7402	K2/99	../..	../..	FI; K2=E29,E34,E61 (Conti

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	5775	TEST012A	[Continued]		BUT(IR15-12), IR=(177777); IR<15:12>="1111"				
					7403	K7/96	K2/5	../..	FI; K7=E20,E56,E64-E65,E73,E81-E82,E88; K2=E61
					7404	K6/50	K2/50	../..	FI; K6=E105; K2=E76
					7408	K2/55	K6/25	K3/15	K5/5 FI; K2=E34,E71,E83-E85,E98,E102-E103, E107-E108,E111,E113-E114; K6=E3,E5; K3=E34,E45; K5=E65
					7407	K3/50	K5/25	K2/10	K6/5 K7/5 K4/5 FI; K3=E21,E76,E83,E85, E87-E88,E108,E110,E113; K5=E31,E77,E91,E95,E98; K2=E85,E108; K6=E91-E92; K7=E80; K4=E95
					7412	K3/85	K5/10	K7/5	K2/5 FI; K3=E34,E54,E64,E67-E68,E74-E75; K5=E68, E92; K7=E33; K2=E61
					7413	K5/45	K3/30	K6/10	K2/10 K7/5 K4/5 FI; K5=E31,E59,E67,E70,E77, E84,E95,E98,E101; K3=E21,E75,E85,E113,E121; K6=E91-E92,E95,E105; K2=E85,E108; K7=E80; K4=E95
					7414	K5/99	../..	../..	FI; K5=E60-E61,E77
					7415	K3/40	K5/25	K2/15	K6/5 K4/5 K7/5 FI; K3=E21,E77,E85,E94,E104, E113; K5=E6,E67,E77,E90,E95,E98; K2=E85,E102; K6=E91-E92; K4=E95; K7=E65
					7416	K3/40	K5/30	K2/10	K6/5 K4/5 K7/5 FI; K3=E21,E67,E85,E94,E104, E113; K5=E6,E67,E77,E95,E98,E100; K2=E85,E102; K6=E91-E92; K4=E95; K7=E65
					7437	K3/99	../..	../..	FI; K3=E34,E38,E68
					7447	K3/99	../..	../..	FI; K3=E70,E98
294)	5776	TEST624C	15839	7402	PROC=MUX(CUA-PORT)=(062551); CUA LOCKED, EXFLAG CLEAR, PREFETCH=JAM SET				
					7216	K3/99	../..	../..	FI; K3=E48
					7400	K3/75	K2/25	../..	FI; K3=E44,E48; K2=E111
295)	5777	TEST011	2847	6532	BUTA(SUBR-B) -> BUTA(RETURN) SEQUENCE, RETURN="1101 0101 1010"=(6532)				
					0777	K2/99	../..	../..	FI; K2=E55
					4644	K2/99	../..	../..	FI; K2=E46
					4747	K2/70	K4/20	K3/5	FI; K2=E5,E11,E23,E34,E46,E55; K4=E3; K3=E23
					5245	K6/99	../..	../..	FI; K6=E80
					6132	K2/99	../..	../..	FI; K2=E19,E41,E77-E78
					6432	K2/99	../..	../..	FI; K2=E7,E13,E25
					6512	K2/99	../..	../..	FI; K2=E7,E13,E25
					6532	K2/65	K4/35	../..	FI; K2=E26,E97; K4=E15
					6533	K2/99	../..	../..	FI; K2=E8,E14,E26
					6536	K2/99	../..	../..	FI; K2=E8,E14,E26
					7005	K3/55	K2/45	../..	FI; K3=E4,E6-E7,E11,E15,E43; K2=E70,E85
					7271	K3/60	K2/40	../..	FI; K3=E4,E6-E7,E11,E15,E43; K2=E61,E77,E85
					7274	K2/70	K3/30	../..	FI; K2=E1,E3,E6-E7,E12,E15,E18,E24,E30,E36; K3=E23, E50,E70
					7275	K2/99	../..	../..	FI; K2=E8,E25
					7301	K6/99	../..	../..	FI; K6=E104
					7417	K3/99	../..	../..	FI; K3=E23
					7532	K2/99	../..	../..	FI; K2=E35,E41,E77
					7577	K2/99	../..	../..	FI; K2=E42

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
296)	6252	TEST002	2654	6631	NUA SEQUENCING, NO 'BUT'				
					2631	K2/99	../..	../..	FI; K2=E55
					6231	K3/55	K2/45	../..	FI; K3=E63,E111; K2=E1,E19
					6777	K3/50	K2/50	../..	FI; K3=E11; K2=E32
297)	6520	TEST720B	16788	7402	DATIB=-BYTE, ODD ADDR JAM; JAM=(101004)				
					7400	K6/99	../..	../..	FI; K6=E82
298)	6521	TEST713D	16689	7402	DATI-NOINT, I/O PAGE, 16. BIT I/O PAGE MODE; SERVICE=(101740)				
					7400	K6/99	../..	../..	FI; K6=E81
					7401	K2/99	../..	../..	FI; K2=E8,E14,E26
299)	6522	TEST713C	16664	7403	BUTR(OTHER-JAM=FP), ILLEGAL INTERNAL ADR; OTHER-JAM="1"				
					7401	K7/99	../..	../..	FI; K7=E74
300)	6523	TEST712D	16555	7402	DATI, I/O PAGE, 16. BIT I/O PAGE MODE; SERVICE=(101740)				
					7400	K7/99	../..	../..	FI; K7=E82
					7403	K7/65	K6/35	../..	FI; K7=E80; K6=E89
301)	6524	TEST712C	16530	7401	BUTR(OTHER-JAM=FP), VALID INTERNAL ADDR; OTHER-JAM="0"				
					7403	K2/85	K5/15	../..	FI; K2=E26,E88,E104,E110,E116; K5=E105
302)	6526	TEST711D	16427	7402	CLEAR JAM ERRORS/SSYN TIMEOUT; JAM=(001000)				
					7400	K6/90	K7/10	../..	FI; K6=E3,E51,E80-E81,E99; K7=E58
303)	6530	TEST711C	16404	7402	DATOB=BYTE, I/O PAGE, 16. BIT I/O PAGE MODE; SERVICE=(005740)				
					7400	K2/70	K4/20	K7/5	K6/5 FI; K2=E1,E8,E14,E26,E31,E37,E43,E49,E52, E71,E82,E91,E105; K4=E13,E15; K7=E81,E97; K6=E34
					7401	K2/99	../..	../..	FI; K2=E26
304)	6534	TEST711B	16374	7402	DATOB=BYTE, SSYN TIMEOUT; JAM=(021200)				
					7400	K6/65	K7/30	K5/5	FI; K6=E80-E82,E81,E99; K7=E58,E64-E65,E84; K5=E84
					7401	K6/50	K7/25	K5/20	K3/10 FI; K6=E47,E55,E76,E85; K7=E81,E84; K5=E64, E67,E93; K3=E34
305)	6535	TEST512E2	13261	7412	KT-BSPHI[SP]=(06), NEGATED				
					7400	K3/99	../..	../..	FI; K3=E47
					7477	K3/99	../..	../..	K312=KT-SP-ADDR-DECODE
306)	6537	TEST512D1	13185	7400	KT-ASPHI[SP]=(16), ASSERTED, -F2*SR6*PS15				
					7412	K3/99	../..	../..	FI; K3=E47
					7477	K3/99	../..	../..	K312=KT-SP-ADDR-DECODE
307)	6541	TEST373A	9738	4777	BUTA(DIAGNOSE) CAUSES XFER TO B,M, ROM/JAMUPP TO DCS RETURN				
					0000	K2/99	../..	../..	FI; K2=E24,E30,E39,E45,E48,E51,E54,E60,E66,E68-E69,

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	6541	TEST373A	[Continued]		BUTA(DIAGNOSE) CAUSES XFER TO B.M. ROM/JAMUPP TO DCS RETURN				
					0000	K2/99	../..	../..	E78,E81
					0003	K3/99	../..	../..	FI; K3=E23
					0020	K2/99	../..	../..	FI; K2=E21
					0055	K2/99	../..	../..	FI; K2=E15
					0212	K2/99	../..	../..	FI; K2=E4,E10,E16,E22,E27-E28,E31,E36-E37,E42-E43, E49,E52,E58,E64,E67,E73,E79
					0777	K2/99	../..	../..	FI; K2=E24
					1020	K2/99	../..	../..	FI; K2=E50
					1025	K6/99	../..	../..	FI; K6=E42
					2000	K2/99	../..	../..	FI; K2=E40,E51,E57,E63
					2042	K2/99	../..	../..	FI; K2=E21,E74
					2153	K2/99	../..	../..	FI; K2=E75
					2211	K2/99	../..	../..	FI; K2=E75
					2247	K3/99	../..	../..	FI; K3=E22
					2310	K2/99	../..	../..	FI; K2=E75
					2314	K2/99	../..	../..	FI; K2=E75
					2408	K2/99	../..	../..	FI; K2=E75
					2442	K2/99	../..	../..	FI; K2=E21
					2526	K2/99	../..	../..	FI; K2=E24
					2530	K2/99	../..	../..	FI; K2=E24
					2577	K2/99	../..	../..	FI; K2=E40
					2671	K2/99	../..	../..	FI; K2=E57
					3007	K2/99	../..	../..	FI; K2=E57,E78
					3055	K2/99	../..	../..	FI; K2=E5,E11,E15,E17,E23,E29,E32,E38,E44,E50,E53, E59,E65,E68,E74,E80
					3353	K2/99	../..	../..	FI; K2=E75
					3462	K2/99	../..	../..	FI; K2=E42,E74
					3505	K2/99	../..	../..	FI; K2=E15,E21,E74
					3507	K2/99	../..	../..	FI; K2=E21
					3522	K2/99	../..	../..	FI; K2=E5,E11,E15,E17,E21,E27,E29,E32,E44,E50,E53, E68,E73-E74,E80
					3637	K2/99	../..	../..	FI; K2=E45,E68
					3777	K2/99	../..	../..	FI; K2=E42
					4621	K2/99	../..	../..	FI; K2=E68
					4747	K3/85	K2/15	../..	FI; K3=E0-E9; K2=E18
					5501	K2/99	../..	../..	FI; K2=E48,E57,E63,E78
					5555	K2/99	../..	../..	FI; K2=E48,E57,E63,E78
					5557	K2/99	../..	../..	FI; K2=E78
					6073	K2/99	../..	../..	FI; K2=E73
					7005	K2/99	../..	../..	FI; K2=E6,E12,E18,E24,E33,E45,E75
					7037	K4/60	K2/50	../..	FI; K4=E66; K2=E08
					7274	K2/99	../..	../..	FI; K2=E35,E47,E55
					7373	K2/99	../..	../..	FI; K2=E36,E73
					7637	K4/60	K7/40	../..	FI; K6=E39-E40,E42-E43,E56; K7=E36,E52
					7777	K2/99	../..	../..	FI; K2=E47

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
308)	6542	TEST512A1	13026	7405	KT-ASPHI[SF]=(02), NEGATED, -SR6				
					7412	K3/99	../..	../..	FI; K3=E45,E47
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DECODE
309)	6544	TEST512A2	13053	7400	KT-BSPHI[DF]=(16), ASSERTED, DR6*PS15*FLOAT				
					7412	K3/85	K4/15	../..	FI; K3=E45,E47,E58,E69,E79; K4=E13,E15
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DFCODE
310)	6546	TEST512P2	13108	7400	KT-BSPHI[SF]=(16), ASSERTED, F2*SR6*SM0*PS13+-FLOAT				
					7412	K3/65	K4/35	../..	FI; K3=E45,E47,E89; K4=E13,E15
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DECODE
311)	6552	MFS805	12715	6545	BUTR(MF-SAME-STACK)=H, EXPECTED L				
					6547	K3/80	K2/20	../..	FI; K3=E56,E79,E89,E96; K2=E106,E118
312)	6553	MFS806	12725	6547	BUTR(MF-SAME-STACK)=L, EXPECTED H				
					6545	K3/75	K2/20	K5/5	FI; K3=E13,E47,E56,E63,E69,E79,E89,E96; K2=E62,E84, E106,E118; K5=E63
313)	6556	TEST512C1	13130	7400	KT-ASPHI[DF]=(16), ASSERTED, F1*DR6*DM0*PS13+-FLOAT				
					7412	K2/99	../..	../..	FI; K2=E119
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DECODE
314)	6557	TEST507D	12243	7407	BUTM(MASK-PS[T]), MASK-PS[T]=1*1="1"				
					7406	K2/99	../..	../..	FI; K2=E78,E101,E105,E112
315)	6561	TEST500	10968	6131	(NUA SEQUENCING LOGIC ERROR)				
					????	K1/99	../..	../..	INTERNAL DCS ERROR
316)	6563	TEST374	9898	NONE	(NUA SEQUENCING LOGIC/DCS ERROR)				
					????	K1/99	../..	../..	INTERNAL DCS ERROR
317)	6565	TEST512R1	13081	7412	KT-ASPHI[DF]=(06), NEGATED				
					7400	K3/99	../..	../..	FI; K3=E45,E47
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DECODE
318)	6566	TEST512C2	13157	7412	KT-BSPHI[SF]=(06), NEGATED				
					7400	K3/99	../..	../..	FI; K3=E47
					7406	K4/99	../..	../..	FI; K4=E59
					74??	K3/99	../..	../..	K312=KT-SP-ADDR=DFCODE
319)	6567	ERROR624A	15803	0005	MICROBREAK JAMUPP AT (6255) ATTEMPTED; DID NOT OCCUR				
					6567	K3/99	../..	../..	FI; K3=E81,E91,E101,E111-E112

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	FPROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
320)	6571	TEST372A	9606	6222	BUTA(SUBR-A)/BUTA(RETURN) SEQUENCE; D<14:03> -> RETURN; "1100 1001 0010"=(6222				
					4022	K2/99	../..	../..	FI; K2=E92
					4222	K2/99	../..	../..	FI; K2=E48,E77,E89,E92-E93,E95,E102,E108,E118
					6000	K2/99	../..	../..	FI; K2=E90
					6022	K2/99	../..	../..	FI; K2=E3,E6,E12,E18,E24-E25,E30,E33,E39,E45,E51, E54,E60,E66,E69,E75,E81,E89,E92-E93,E96,E101,E107
					6076	K2/99	../..	../..	FI; K2=E84,E90
					6200	K6/50	K2/90	../..	FI; K6=E34; K2=E86
					6202	K2/99	../..	../..	FI; K2=E3,E6,E12,E18,E24,E30,E33,E39,E45,E51,E54, E60,E66,E69,E75,E81,E86-E88,E104,E110,E113,E116
					6220	K2/99	../..	../..	FI; K2=E6,E9,E12,E18,E24,E26,E30,E33,E39,E45,E51, E54,E60,E66,E69,E75,E81,E86-E88,E104,E110,E114, E116
					6223	K2/99	../..	../..	FI; K2=E9,E26,E86,E103
					6226	K2/99	../..	../..	FI; K2=E9,E26,E86,E114
					6232	K2/99	../..	../..	FI; K2=E9,E26,E86,E113
					6262	K2/99	../..	../..	FI; K2=E3,E25,E86,E98
					6322	K2/99	../..	../..	FI; K2=E3,E25,E92,E98
					6362	K2/99	../..	../..	FI; K2=E98
					6376	K2/70	K7/15	K5/15	FI; K2=E61,E71,E83; K7=E36,E51; K5=E15
					6622	K2/99	../..	../..	FI; K2=E42,E77,E92,E107
					7222	K2/99	../..	../..	FI; K2=E72,E77,E92,E102
					7700	K2/99	../..	../..	FI; K2=E86
321)	6572	TEST373B	9814	7425	EXEC B.M. ROM CODE FOR "FLPADR" ASSERT TO ASPHI/READ				
					7400	K4/55	K2/35	K3/10	FI; K4=E1,E16,E20,E51,E54,E59-E60,E67,E69,E84,E93, E104,E114; K2=E4,E7,E10,E16,E18,E22,E25,E27-E28, E37,E43,E49,E52,E58,E64,E73; K3=E3,E7
					7402	K3/55	K2/25	K4/15	FI; K3=E1-E20,E22-E26,E45,E51,E66; K2=E4,E10,E16, E22,E27-E28,E31,E36-E37,E43,E49,E52,E58,E64,E67, E69,E73,E79; K4=E13,E15,E51,E54,E62,E69,E113-E114
					7403	K3/95	K4/5	../..	FI; K3=E1-E19,E22,E24-E26; K4=E29
					7417	K4/80	K2/20	../..	FI; K4=E59-E60,E84,E93; K2=E31,E69
					7420	K4/99	../..	../..	FI; K4=E1,E61,E66,E68,E70,E74-E77,E83,E85,E93-E94, E103-E104,E113-E114
					7426	K2/99	../..	../..	FI; K2=E43
					7432	K2/99	../..	../..	FI; K2=E4,E16,E22,E27-E28,E37,E43,E52,E58,E67,E79
					7433	K4/99	../..	../..	FI; K4=E54,E60,E66-E68,E70,E75-E76,E83,E103
					7434	K7/30	K6/30	K2/30	K3/15 FI; K7=E41,E66; K6=E78,E90; K2=E18,E75; K3=E7
322)	6573	TEST361A	8827	7434	SR=(052525), D[C]="1"; SR/XMUX=(100125) (FLTPT)				
					7400	K4/96	K3/5	../..	FI; K4=E27,E29,E37,E44,E46,E54,E69,E78; K3=E92
					7402	K4/99	../..	../..	FI; K4=E46
					7417	K4/99	../..	../..	FI; K4=E27 [Continued]

###)	FPROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	6573	TEST361A	[Continued]		SR=(052525), D[C]="1"; SR/XMUX=(100125) (FLTPT)				
					7420	K6/99	../..	../..	FI; K6=E37,K44
					7425	K4/99	../..	../..	FI; K6=E18
					7426	K4/99	../..	../..	FI; K4=E37
323)	6574	TEST710D	16265	7402	DATO, I/O PAGE, 16, BIT I/O PAGE MODE; SERVICE=(003740)				
					7400	K7/80	K6/30	K5/20	FI; K7=E44,E68,E71; K6=E51,E53-E54,E59,E105; K5=E7, E27,E30,E95
324)	6575	TEST710E	16294	7402	CLEAR JAM ERRORS/ODD ADDR; JAM=(001000)				
					7401	K7/99	../..	../..	FI; K7=E25,E59
325)	6576	TEST512D2	13212	7405	KT-BSPHI[DF]=(02), NEGATED, =DR6				
					7412	K3/99	../..	../..	FI; K3=E47,E79,E93
					7477	K3/99	../..	../..	K312=KT-SP-ADDR-DECODE
326)	6577	TEST512F1	13234	7400	KT-ASPHI[DF]=(16), ASSERTED, F1=DR6=-DM0=PS15				
					7405	K3/99	../..	../..	FI; K3=E45
					7412	K3/99	../..	../..	FI; K3=E47
					7477	K3/99	../..	../..	K312=KT-SP-ADDR-DECODE
327)	6600	TEST510D	12438	7406	BUTM(MASK-PS[T]), MASK-PS[T]=1=0="0"				
					7407	K2/99	../..	../..	FI; K2=E72,E101,E105
328)	6601	TEST503DA	11359	7406	BUTM(FLTPT-INSTR), IR=(125122), -FLTPT				
					7407	K2/99	../..	../..	FI; K2=E53,E112
329)	6603	TEST510A	12363	7407	BUTR(BG-SERVICE-L), NEGATED WHEN PS PRIO<7:5>=(7)				
					7403	K7/80	K3/15	K2/5	FI; K7=E3,E5,E28,E76; K3=E50,E74; K2=E100
330)	6604	TEST510E	12497	7403	BUTR(SERVICE-H), ASSERTED="1" WHEN FLAG<7>H="1"				
					7402	K2/99	../..	../..	FI; K2=E78,E100
331)	6605	TEST506F	12099	7403	BUTR(INTR-HIGH), INTR-HIGH-H="1"; INTERNAL SERVICE CLEAR				
					4747	K6/99	../..	../..	FI; K6=E78
					7401	K7/85	K3/10	K2/5	FI; K7=E37,E43,E48,E50,E57-E58,E66-E67,E76-E77, E84; K3=E44,E50; K2=E72,E100
332)	6607	TEST511A	12755	NONE	(NUA SEQUENCING LOGIC ERROR)				
					????	K1/99	../..	../..	INTERNAL DCS ERROR
333)	6610	TEST510F	12524	7402	BUTR(SERVICE-H), NEGATED="0", NO INPUTS ACTIVE				
					7403	K7/80	K2/15	K3/5	FI; K7=E3,E7-E8,E11,E16,E27; K2=E38,E78,E100; K3=E64
334)	6611	TEST507C	12221	7406	BUTM(PS03), PS<03>H="0"				
					7407	K2/99	../..	../..	FI; K2=E112
					7407	K2/80	K3/20	../..	K210=MULTIPLE-BUT; K306=PS[CC]

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
335)	6613	TEST507A	12144	7402	LOAD/READ PS=(140125) PS-PORT PROC=MUX; UCON FUNCTION				
					7400	K2/50	K3/45	K4/5	K7/5 FI; K2=E102-E103,E105,E111,E113-E114,E116, E118; K3=E35,E71-E73,E83; K4=E63,E72; K7=E3
					7401	K3/45	K2/45	K4/10	FI; K3=E28,E47,E54,E63; K2=E108,E118; K4=E72
336)	6615	TEST504A	11578	4777	NUA SEQUENCING ERROR, JAMUPP ERROR; BUTA(DIAGNOSE) TO B.M. 'LOADNZW4/LOADNZW5'				
					4744	K2/99	../..	../..	FI; K2=E54
					4757	K2/99	../..	../..	FI; K2=E54
337)	6616	TEST510C	12418	7403	BUTR(SERVICE-H), ASSERTED="1" WHEN INTR-HIGH-H="0"				
					7345	K3/99	../..	../..	FI; K3=E76
					7402	K2/75	K3/25	../..	FI; K2=E100; K3=E64
338)	6617	TEST510DA	12475	7407	BUTM(D00), D=(040401)				
					7406	K2/99	../..	../..	K210=MULTIPLE-BUT
339)	6621	TEST506A	11952	7402	LOAD/READ PS=(030252) PS/PROC-MUX; BUTA(CLR-...) SETS BUSDIN=EMIT; UCON FCN				
					7400	K2/50	K3/40	K7/10	K5/5 FI; K2=E61-E62,E70-E71,E82-E83,E98, E102-E103,E107-E108,E111-E114,E116-E118; K3=E47, E52,E57,E62-E63,E72-E73,E83,E89; K7=E3,E27,E42, E44,E48; K5=E13,E54,E84
					7401	K2/90	K3/10	../..	FI; K2=E62,E82,E117; K3=E57
					7403	K2/99	../..	../..	FI; K2=E108
340)	6623	TEST505A	11847	7402	SET ALL FLAGS, CHECK BUTA(CLR-FLAG-RES-UCON) CLEARS SHORT TERM FLAGS				
					7400	K2/99	../..	../..	FI; K2=E101,E105,E119
341)	6625	TEST533A	13528	7402	SHIFTER, AMUX/D[HI]=D[LO]=(052652), D=(0)(052652)				
					7400	K4/99	../..	../..	FI; K4=E29,E51,E54,E60-E62,E66-E69,E77,E83-E85, E93-E94,E103-E104,E113-E114
342)	6627	TEST520A	13322	7403	INSTR-BRANCH-L="H", IR=(101004)=BHI, PS[NZVC]=(04)				
					7402	K3/99	../..	../..	FI; K3=E64,E83
					7407	K3/99	../..	../..	K2=PS[CC]-BRANCH(F64,72-73,83)
343)	6630	TEST503B	11318	7406	BUTM(FLAG7), FLAG<7>H="0"				
					7407	K2/85	K3/15	../..	FI; K2=E112; K3=E54
344)	6631	TEST003	2673	5525	NUA SEQUENCING, PAGE (6) => (5), UBF=(35)				
					4525	K2/80	K4/10	K3/10	FI; K2=E35,E47,E58,E62,E64,E67,E72-E73,E78,E91; K4=E3; K3=E111
					5425	K3/80	K2/50	../..	FI; K3=E58,E91; K2=E1,E7
					5520	K2/99	../..	../..	FI; K2=E76
					5544	K2/99	../..	../..	FI; K2=E90
					5546	K2/99	../..	../..	FI; K2=E71 [Continued]

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	6631	TEST003	[Continued]		NUA SEQUENCING, PAGE (6) => (5), UBF=(35)				
					6525	K2/99	../..	../..	FI; K2=E46,E59,E65,E68,E74,E80
					7525	K2/99	../..	../..	FI; K2=E35,E47
345)	6632	TEST503C	11338	7402	BUTR(FLTPT-PROC-H), FLTPT-PROC-H="0"				
					4402	K2/99	../..	../..	FI; K2=E34
					7403	K3/50	K2/50	../..	FI; K3=E64; K2=E119
					7406	K2/60	K3/40	../..	FI; K2=E2,E8,E66,E69,E75,E81; K3=E21,E81
346)	6633	TEST533B	13569	7402	SHIFTER, AMUX/D[HI]=D[LO]=(125125), D=(0)(125125)				
					6367	K3/99	../..	../..	FI; K3=E38
					7400	K4/99	../..	../..	FI; K4=E51,E54,E59-E62,E66-E69,E74-E76,E83-E85, E93-E94,E103-E104,E113
					7401	K4/99	../..	../..	FI; K4=E75-E76
					7403	K4/99	../..	../..	FI; K4=E51,E54,E62,E69,E84,E103,E114
347)	6634	TEST534B	13650	7402	SHIFTER, AMUX/D[LO]=D[HI]=(052652), D=(0)(125125)				
					7400	K4/99	../..	../..	FI; K4=E93-E94,E103-E104,E113
					7403	K4/99	../..	../..	FI; K4=E114
348)	6635	TEST534D	13725	7402	SHIFTER, AMUX/8=D[C]=D[HI]=(000377), D=(0)(177777)				
					7400	K4/75	K2/20	K3/10	FI; K4=E59,E93,E104,E113-E114; K2=E65,E68; K3=E75
					7403	K4/99	../..	../..	FI; K4=E114
349)	6636	TEST534F	13805	7402	SHIFTER=COUNTER, AMUX/COUNT=D[HI]=(052652), CTR=(125), D=(0)(125000)				
					7400	K4/99	../..	../..	FI; K4=E87,E90-E91,E93,E104,E113
					7401	K4/99	../..	../..	FI; K4=E114
					7403	K4/99	../..	../..	FI; K4=E8,E91,E114
350)	6637	TEST535B	13926	7402	SHIFTER, BMUX/4=D[C]=AMUX=(002645), D=(0)(055132)				
					7400	K4/99	../..	../..	FI; K4=E69,E83-E85
					7403	K4/99	../..	../..	FI; K4=E69
351)	6640	TEST536B	14019	7402	SHIFTER, CMUX/2=D[C]=BMUX=(034343), D=(0)(161616)				
					7400	K4/99	../..	../..	FI; K4=E54,E60-E61,E67,E75
					7401	K5/99	../..	../..	FI; K5=E105
					7403	K4/99	../..	../..	FI; K4=E54
352)	6641	TEST536D	14103	7402	SHIFTER, CMUX/D[C]=BMUX=(063146), D=(0)(146314)				
					7400	K4/90	K3/15	../..	FI; K4=E60-E62,E67-E68,E75-E76; K3=E42
					7403	K4/99	../..	../..	FI; K4=E54
353)	6642	TEST536F	14196	7402	SHIFTER, CMUX/BMUX=SENDMUX=(063146), D/SR=(0)(031463)(077777)				
					7400	K4/99	../..	../..	FI; K4=E60-E62,E67-E68,E75-E77
					7403	K4/99	../..	../..	FI; K4=E54
354)	6643	NEWCTP537A	14291	7370	(NUA SEQUENCING LOGIC ERROR)				
					????	K1/99	../..	../..	INTERNAL DCS ERROR

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
355)	6644	TEST710B	16212	7402	DATO, ODD ADDR ERR; JAM=(101004)				
					7400	K7/45	K5/45	K6/10	FI; K7=E61,E68-E66,E80,E82,E84; K5=E13,E43-E45, E64; K6=E76
					7401	K6/80	K7/20	../..	FI; K6=E71,E80-E81,E99; K7=E80,E82
356)	6645	TEST710C	16236	7402	DATO, I/O PAGE, 18. BIT I/O PAGE MODE; SERVICE=(002340)				
					7400	K7/65	K5/15	K6/18	K4/5 K3/5 FI; K7=E14,E27,E32,E44,E64-E65,E68, E70,E73,E76-E77,E79-E82,E84,E98; K5=E13-E14,E39, E67,E93; K6=E43,E46-E47,E53-E54,E59,E81; K4=E20, E65; K3=E34
					7401	K2/65	K7/15	K6/15	FI; K2=E1,E82; K7=E80; K6=E43
					7403	K7/99	../..	../..	FI; K7=E80
357)	6646	TEST503K	11531	7407	BUTM(FLTPT=INSTR), IR=(175252), FLTPT				
					7406	K2/50	K3/50	../..	K210=MULTIPLE-BUT; K304=FP-DECODE
358)	6647	TEST507F	12286	7407	CHECK PS[C]=PS<00>="1", D[C] INPUTS PS[C], CIN/PS[C], CIN/D[C]=PS[C] ALL SET				
					7400	K3/50	K2/50	../..	FI; K3=E93; K2=E112
					7401	K4/99	../..	../..	FI; K4=E86
					7406	K3/99	../..	../..	FI; K3=E35,E46
359)	6653	TEST536E	14154	7402	SHIFTER, CMUX/BMUX=SENDMUX=(114631), D/SR=(0)(146314)(100000)				
					7400	K4/99	../..	../..	FI; K4=E54,E60-E62,E67-E68,E75-E77,E80
360)	6655	TEST536C	14067	7402	SHIFTER, CMUX/D[C]=BMUX=(114631), D=(1)(031463)				
					7400	K4/95	K6/5	../..	FI; K4=E54,E60-E62,E67-E68,E70,E75-E76; K6=E108
361)	6657	TEST536A	13973	7402	SHIFTER, CMUX/2=D[C]=BMUX=(143434), D=(1)(016161)				
					7400	K4/99	../..	../..	FI; K4=E60-E62,E68,E76,E84
					7401	K4/99	../..	../..	FI; K4=E54,E60-E62,E67-E68,E70,E75-E76
362)	6661	TEST535A	13879	7402	SHIFTER, BMUX/4=D[C]=AMUX=(175132), D=(1)(122645)				
					7400	K4/99	../..	../..	FI; K4=E3,E60,E69,E75,E77,E83-E85
363)	6663	TEST534E	13765	7402	SHIFTER=COUNTER, AMUX/COUNT=D[LO]=(125125), CTR=(252), D=(0)(000125)				
					7400	K4/96	K2/5	../..	FI; K4=E87,E90-E91,E93,E104,E113-E114; K2=E55
					7401	K4/80	K6/15	K2/5	FI; K4=E87,E90-E91; K6=E103; K2=E55
					7403	K4/99	../..	../..	FI; K4=E91,E114
364)	6665	TEST534C	13691	7402	SHIFTER, AMUX/8=D[C]=D[HI]=(177600), D=(1)(000000)				
					7400	K4/99	../..	../..	FI; K4=E67-E88
					7401	K4/99	../..	../..	FI; K4=E28-E29,E93,E104,E113-E114
365)	6667	TEST534A	13615	7402	SHIFTER, AMUX/D[LO]=D[HI]=(125125), D=(0)(052652)				
					6356	K2/65	K3/35	../..	FI; K2=E2,E8-E9,E21,E27,E60,E66,E69,E75,E81;

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
	6667	TEST534A	[Continued]		SHIFTER, AMUX/D[LO]=D[HI]=(125125), D=(0)(052652)				
					6356	K2/65	K3/35	../..	K3=E21-E22,E44,E56,E77
					7341	K2/99	../..	../..	FI; K2=E34
					7343	K3/99	../..	../..	FI; K3=E37-E39,E44,E64
					7400	K4/90	K3/5	K2/5	FI; K4=E28-E29,E77,E93-E94,E103-E104,E113-E114; K3=E3; K2=E74
					7401	K4/99	../..	../..	FI; K4=E28-E29,E93,E104,E113-E114
366)	6670	TEST503D	11379	7476	BUT(INSTR1), IR=(175252), CLASS=A(FLTPT), FLAG<4:5>H="10"				
					7474	K2/85	K7/15	../..	FI; K2=E62,E100; K7=E44
					7477	K3/99	../..	../..	K308=FLAGS/FP-INSTR1
367)	6671	TESTD500	11008	6377	(NUA SEQUENCING LOGIC ERROR)				
					6173	K2/70	K3/30	../..	FI; K2=E2-E3,E6-E7,E12,E15,E18,E24,E30,E36; K3=E23, E58,E70
					7376	K3/99	../..	../..	FI; K3=E58
					????	K1/99	../..	../..	INTERNAL DCS ERROR
368)	6672	TEST504F	11742	7407	BUTM(EXFLAG2), EXFLAG<2>H="1"				
					7406	K2/99	../..	../..	K210=FLAGS
369)	6673	TEST500A	11070	7434	SP REWRITE FUNCTION WR(A,HI,A) DOESN'T WRITE B-SIDE				
					7477	K4/99	../..	../..	K405=SP-REWRITE-CNTL,K406/7=A/B-SPADS
370)	6674	TEST507F	12265	7401	BUTR(INTR-HIGH), INTR-HIGH-H="0"; INTERNAL SERVICE SET				
					7403	K2/65	K3/35	../..	FI; K2=E72; K3=E44
371)	6675	TEST510B	12396	7407	BUTR(BG+FP/SERVICE), NEGATED="0" WHEN PS PRIO<7:5>=(7)				
					7377	K2/99	../..	../..	FI; K2=E43
					7377	K2/65	K3/35	../..	FI; K2=E16-E18,E44-E45,E67-E69; K3=E3,E7-E8,E25
					7417	K3/99	../..	../..	FI; K3=E50,E76
372)	6677	TEST503A	11238	4332	NUA SEQUENCING ERROR; RUTA(DIAGNOSE) TO B,M, 'LOADNEW4', 'LOADNEW5'				
					0000	K2/99	../..	../..	FI; K2=E11,E17,E23,E29,E32,E38,E44,E50,E53-E54,E57, E89,E63,E65,E68,E72,E74,E78,E80,E92-E93
					0127	K2/75	K3/25	../..	FI; K2=E35,E47,E72,E78; K3=E111
					0332	K2/99	../..	../..	FI; K2=E63,E80
					0732	K2/99	../..	../..	FI; K2=E5,E11,E15,E17,E23,E29,E32,E38,E44,E50,E53, E59,E65,E68,E74,E80
					4032	K2/99	../..	../..	FI; K2=E30
					4126	K2/99	../..	../..	FI; K2=E6,E12,E18,E24,E30,E33,E39,E45,E51,E54,E60, E66,E69,E75,E81
					4322	K2/99	../..	../..	FI; K2=E81
					4330	K2/99	../..	../..	FI; K2=E81
					4331	K2/99	../..	../..	FI; K2=E81
					4335	K2/99	../..	../..	FI; K2=E81
					4336	K2/99	../..	../..	FI; K2=E80
					4337	K2/99	../..	../..	FI; K2=E57,E78

[Continued

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	6677	TEST503A	[Continued]						NUA SEQUENCING ERROR; BUTA(DIAGNOSE) TO B.M. 'LOADNZW4', 'LOADNZW5'
					4352	K2/99	../..	../..	FI; K2=E30
					4372	K2/99	../..	../..	FI; K2=E30
					4375	K2/99	../..	../..	FI; K2=E92
					4732	K2/99	../..	../..	FI; K2=E5,E11,E17,E21,E23,E29,E32,E38,E44,E50,E53, E59,E65,E68,E74,E80
					4747	K3/99	../..	../..	FI; K3=E1-E20,E24-E26
					7005	K2/99	../..	../..	FI; K2=E5,E11,E15,E17,E29,E32,E50,E53-E54,E61,E68, E68,E74,E80
373)	6700	TEST503E	11407	7402					EXFLAGS<2:1>H="01", READ THRU CUA-PORT, PROC-MUX
					7400	K2/85	K3/15	../..	FI; K2=E92,E101,E103,E106,E108,E111-E112,E119; K3=E48
					7403	K2/99	../..	../..	FI; K2=E108
374)	6701	TEST372A	9658	5555					BUTA(SUBR-A)/BUTA(RETURN) SEQUENCE; D<14:03> -> RETURN; "1011 0110 1101"=(5555
					4555	K2/99	../..	../..	FI; K2=E77,E89,E92,E95,E102,E106
					5155	K2/99	../..	../..	FI; K2=E6,E12,E18,E24,E30,E33,E39,E42,E45,E51,E54, E60,E66,E69,E75,E77,E81,E89,E92-E93,E96,E106-E107
					5355	K2/99	../..	../..	FI; K2=E92,E107
					5455	K2/99	../..	../..	FI; K2=E3,E6,E12,E18,E24-E25,E30,E33,E39,E45,E51, E54,E60,E66,E69,E75,E81,E89,E92-E93,E96,E98,E101
					5515	K2/99	../..	../..	FI; K2=E3,E6,E12,E18,E24-E25,E30,E33,E39,E45,E51, E54,E60,E66,E69,E75,E81,E86-E87,E89,E96,E98,E101
					5557	K2/99	../..	../..	FI; K2=E9,E26,E86,E114
					7555	K2/99	../..	../..	FI; K2=E72,E77,E92,E102
375)	6702	TEST504G	11762	7406					BUTM(EXFL\G1), EXFLAG<1>H="0"
					7407	K2/99	../..	../..	FI; K2=E112
376)	6704	TEST410B	10814	7434					IR PATTERN LOOP; D<14:00>=ZERO NEGATED CORRECT # TIMES
					7400	K4/65	K3/35	../..	FI; K4=E24,E33; K3=E84
377)	6705	TEST410E	10911	7402					IR PATTERN LOOP; "BYTE-CONSTANT/SECOND-1-OR-2" ASSERTED CORRECT # TIMES
					7400	K4/99	../..	../..	FI; K4=E33
					7401	K3/99	../..	../..	FI; K3=E49,E60
378)	6706	TEST504H	11783	7406					BUTR(FPS05), FPS<05>="0"
					7407	K3/99	../..	../..	FI; K3=E54
379)	6707	TEST410C	10844	7402					IR PATTERN LOOP; "BYTE-H" ASSERTED/NEGATED CORRECT # TIMES
					7400	K3/65	K5/35	../..	FI; K3=E85; K5=E63
					7401	K6/85	K7/15	../..	FI; K6=E60,E78-E80; K7=E10
380)	6710	TEST503F	11433	7406					BUTM(EXFLAG2), EXFLAG<2>H="0"
					7407	K2/99	../..	../..	FI; K2=E112

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###)	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
381)	6711	TEST410A	10790	7422					IR PATTERN LOOP; D<14:00>=ZERO ONLY ASSERTED 2, TIMES
					7420	K2/99	../..	../..	FI; K2=E40,E88-E89
					7421	K4/65	K3/35	../..	FI; K4=E99; K3=E66
					7424	K2/99	../..	../..	FI; K2=E77,E88-E89,E95,E99,E101,E106
					7436	K2/99	../..	../..	FI; K2=E88-E89,E106
382)	6712	TEST505B	11891	7407					EXFLAG<2> NOT CLEARED BY BUTA(CLR-FLAG-RES-UCON)
					7406	K2/99	../..	../..	K207=ACTIVE-BUT,K210=FLAGS
383)	6713	TEST371B	9538	7401					SR/NOP HAS NO EFFECT ON GUARD="0100"
					7477	K4/99	../..	../..	K408=SR/RES/GUARD-LOGIC
384)	6714	TESTA503A	11292	7402					LOAD/READ FLAGS#FPS=(125252) FLAG-PORT PROC-MUX; UCON FUNCTION
					4777	K3/99	../..	../..	FI; K3=E41,E52,E111
					7400	K3/60	K2/40	K7/5 K5/5	FI; K3=E1-E20,E22-E27,E29,E33,E35,E41,E47, E51,E54,E94; K2=E4,E10,E16,E22,E28,E31,E36-E37, E43,E49,E52,E58,E62,E64,E67,E73,E79,E82,E98-E99, E101-E103,E106-E108,E110-E111,E113-E114,E117, E119; K7=E42,E44; K5=E84
					7401	K2/85	K7/20	K5/15 K3/10	FI; K2=E62,E71,E82-E83,E100-E101,E106,E108, E117; K7=E42,E44,E51,E79; K5=E15,E59,E67,E70; K3=E57,E61
					7403	K2/65	K3/25	K4/10	FI; K2=E95,E106,E108,E118; K3=E41; K4=E33
385)	6715	TEST371A	9490	7434					SR/NOP HAS NO EFFECT ON SR=(052525)
					7400	K4/99	../..	../..	FI; K4=E36,E80
					7433	K4/99	../..	../..	FI; K4=E35
386)	6716	TEST504I	11804	7403					BUTM(FLTPT-FD-H), FLTPT-FD-H="1"
					7402	K3/50	K2/50	../..	FI; K3=E64,E86; K2=E119
387)	6717	TEST370D	9467	7401					SR/LEFT-GUARD/ENB SHIFTS GUARD LEFT, GD<3:0>="0100" AFTER
					7400	K4/99	../..	../..	FI; K4=E53
388)	6720	TEST503G	11453	7407					BUTM(EXFLAG1), EXFLAG<1>H="1"
					4756	K3/99	../..	../..	FI; K3=E61
					7406	K2/65	K4/15	K3/15	FI; K2=E112; K4=E86; K3=E54
389)	6721	TEST370C	9429	7434					SR/LEFT-GUARD/ENB, GD<3>="1"; SR=(052525) AFTER
					7477	K4/99	../..	../..	K408=SR/RES/GUARD-LOGIC
390)	6722	TEST505C	11912	7406					EXFLAG<1> CLEARED BY BUTA(CLR-FLAG-RES-UCON)
					7406	K2/99	../..	../..	K207=ACTIVE-BUT,K210=FLAGS

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
391)	6723	TEST370B	9405	7402	SR/LEFT-GUARD/ENB SHIFTS GUARD LEFT, GD<3:0>="1010" AFTER				
					7400	K4/99	../..	../..	FI; K4=E30
					7401	K2/99	../..	../..	FI; K2=E83
392)	6724	TEST507B	12201	7403	BUTR(PS15), PS<15>H="1"				
					7402	K5/99	../..	../..	FI; K5=E54
393)	6725	TEST370A	9360	7434	SR LEFT 1, SR=(125252) AFTER; GUARD/ENB="1010" AFTER				
					7400	K2/85	K4/10	K7/5	FI; K2=E46,E55,E61,E83,E105; K4=E80,E87; K7=E28
					7421	K4/99	../..	../..	FI; K4=E80,E86
394)	6726	TEST500C	11100	7402	IR PATTERN LOOP; 'OVERLAP-L' ASSERTED TO ASPLO CORRECT # TIMES				
					7400	K3/80	K4/10	K7/5	K2/5 FI; K3=E46,E59,E80,E84,E87,E89,E116-E117; K4=E25,E96,E99; K7=E69; K2=E55,E105
					7401	K3/99	../..	../..	FI; K3=E46,E57,E59,E80,E84,E87,E89,E121
395)	6727	TEST410D	10879	7402	IR PATTERN LOOP; "BYTE-CONSTANT/FIRST-1-OR-2" ASSERTED CORRECT # TIMES				
					7400	K3/90	K5/5	K4/5	FI; K3=E50,E59-E60,E79,E89,E116-E117; K5=E63,E66; K4=E15
					7401	K3/96	K4/5	../..	FI; K3=E32,E36,E46,E49-E50,E59-E60,E79,E89; K4=E38
396)	6730	TEST504B	11647	7407	BUTM(FLAG7), FLAG<7>H="1"				
					7406	K2/99	../..	../..	FI; K2=E106
397)	6731	TEST367A	9317	7401	SR/LOAD-GUARD/DISABLED SETUP BY BUTA(CLR-RES), GUARD NOT ALTERED				
					7477	K4/99	../..	../..	K406=SR/RES/GUARD-LOGIC
398)	6732	TEST503H	11474	7407	BUTR(FP605), FPS<05>H="1"				
					7406	K2/99	../..	../..	FI; K2=E7,E13,E25,E110,E117
399)	6733	TEST366C	9278	7434	SR LEFT 1, D[C]="1"; SR=(025251) AFTER; (GUARD/DIS)				
					7400	K4/99	../..	../..	FI; K4=E36
					7402	K4/99	../..	../..	FI; K4=E45
					7420	K4/99	../..	../..	FI; K4=E35
					7421	K4/99	../..	../..	FI; K4=E52,E71,E86
400)	6734	TEST506D	12076	7406	BUTM(MASK-PS[T]), MASK-PS[T]=0,1="0"				
					7407	K2/99	../..	../..	FI; K2=E72,E78,E105,E112
401)	6735	TEST366B	9256	7401	CHECK GUARD NOT ALTERED ON SR/LEFT-GUARD/DISABLED SHIFT				
					7402	K4/99	../..	../..	FI; K4=E30,E80,E86
402)	6736	TEST500E	11164	7402	IR PATTERN LOOP; BUTR(PREFETCH[01H]) ASSERTED CORRECT # OF TIMES				
					7400	K3/89	../..	../..	FI; K3=E32,E34,E38,E44,E48,E80
					7401	K3/90	K2/10	../..	FI; K3=E32,E38,E44,E48,E80; K2=E105

Module codes: K1/DCS K2/UWORD K3/IRDECODE K4/DATAPATH K5/KTCACHE K6/TIMING K7/STATUS

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/##	#2/##	#3/##	Test summary - Print reference - Chip information
403)	6737	TEST366A	9209	7434	SR LEFT 1, D[C]="0"; SR=(112524) AFTER; (GUARD/DIS)				
					7005	K4/99	../..	../..	FI; K4=E80
					7400	K4/99	../..	../..	FI; K4=E45
					7421	K4/99	../..	../..	FI; K4=E52,E71,E86
404)	6740	TEST504C	11667	7403	BUTR(FLTPT-PROC-H), FLTPT-PROC-H="1"				
					7402	K2/65	K3/35	../..	FI; K2=E101,E106,E119; K3=E64
405)	6741	TEST365B	9187	7401	CHECK GUARD NOT ALTERED ON SR/RIGHT-GUARD/DISABLED SHIFT				
					7402	K4/99	../..	../..	FI; K4=E30,E53,E80
406)	6742	TEST503I	11495	7402	BUTR(FLTPT-FD-H), FLTPT-FD-H="0"				
					7403	K3/99	../..	../..	FI; K3=E64
					7756	K2/99	../..	../..	FI; K2=E40
407)	6743	TEST365A	9146	7434	SR RIGHT 1, D<00>="1"; SR=(145252) AFTER				
					7400	K4/99	../..	../..	FI; K4=E10,E17,E36,E45
					7420	K4/99	../..	../..	FI; K4=E52
408)	6744	TEST506C	12054	7407	BUTM(PS03), PS<03>H="1"				
					7406	K2/80	K3/20	../..	K210=MULTIPLE-BUT; K306=PS[CC]
409)	6745	TEST364B	9119	7401	BUT(GD3-2), GD<3:0>="0101" AFTER SR/RIGHT, SR<00>="0"				
					7477	K4/99	../..	../..	K406=SR/RES/GUARD-LOGIC
410)	6746	TEST500D	11136	7402	IR PATTERN LOOP; 'OVERLAP-L' ASSERTED SAME # TIMES TO ASPLO AND BSPLO				
					7401	K4/99	../..	../..	FI; K4=E99
411)	6747	TEST364A	9091	7402	BUT(GD3-2), GD<3:0>="1010" AFTER SR/RIGHT, SR<00>="1"				
					7477	K4/99	../..	../..	K406=SR/RES/GUARD-LOGIC
412)	6750	TEST504D	11688	7475	BUT(INSTR1), IR=(172525), CLASS=A(FLTPT), FLAG<4:5>H="01"				
					7477	K3/99	../..	../..	K305=FLAGS/FP-INSTR1
413)	6751	TEST363B	9069	7401	BUT(GD3-2), GD<3:0>="0100" AFTER SR/RIGHT, SR<00>="0"				
					7400	K3/60	K4/40	../..	FI; K3=E54; K4=E53
					7403	K4/99	../..	../..	FI; K4=E53
414)	6752	TEST534G	13844	7402	B.M. COUNTER CLEARED TO ZEROS BY BUTA(LAST)				
					7400	K4/65	K2/35	../..	FI; K4=E87,E90-E91; K2=E55
					7637	K2/70	K3/30	../..	FI; K2=E22-E24,F49-E51,E73-E75; K3=E6,E9,E13,E19
415)	6753	TEST363A	9033	7434	SR RIGHT 1, D<00>="0"; SR=(052525) AFTER				
					7400	K4/99	../..	../..	FI; K4=E10,E17,E24,E45,E74,E85,E94
					7410	K4/99	../..	../..	FI; K4=E47

[Continued]

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
	6753	TEST363A	[Continued]						SR RIGHT 1, D<00>="0"; SR=(052525) AFTER
					7417	K4/99	../..	../..	FI; K4=E36
					7420	K4/99	../..	../..	FI; K4=E52
					7426	K4/99	../..	../..	FI; K4=E35
416)	6754	TEST506B	12034	7402					BUTR(PS15), PS<15>H="0"
					7403	K3/99	../..	../..	FI; K3=E54
417)	6755	TEST362F	9010	7402					BUT(GD3-2), GD<3:0>="1000" AFTER SR/RIGHT, SR<00>="1"
					7400	K4/80	K3/15	K2/5	FI; K4=E26,E28-E30,E47,E53,E55,E71,E80,E86; K3=E1-E3,E12-E13,E56; K2=E39,E54
418)	6756	TEST503J	11513	7406					BUTM(D00), D=(000000)
					7407	K2/99	../..	../..	FI; K2=E112
419)	6757	TEST362D	8989	7405					BUTR(SR1-0$COUNT), SP<1:0>="10"
					4747	K2/99	../..	../..	FI; K2=E46,E55
					747?	K4/99	../..	../..	K408=SR/RES/GUARD-LOGIC
420)	6760	TEST504E	11716	7402					EXFLAGS<2:1>H="10", READ THRU CUA-PORT, PROC-MUX
					7400	K2/99	../..	../..	FI; K2=E103,E106,E111-E112
421)	6761	TEST702R	16089	7402					LOAD BA<17:16>="10", 18. BIT MODE, READ THRU STATUS-MUX(SERVICE)<9:8>
					7400	K6/55	K4/25	K7/10	K5/10 FI; K6=E11,E51-E54; K4=E65; K7=E56; K5=E26, E60
422)	6762	TEST520D	13417	7402					INSTR-BRANCH-L="L", IR=(101401)=BLOS, PS[NZVC]=(01)
					740?	K3/99	../..	../..	K2=PS[CC]-BRANCH(E64,72-73,83)
423)	6763	TEST362R	8962	7434					SR=(125252), D[C]="0"; SR/XMUX=(000052) (FLTPT)
					7400	K4/99	../..	../..	FI; K4=E46,E55,E78
					7420	K4/99	../..	../..	FI; K4=E37
					7421	K4/99	../..	../..	FI; K4=E44
					7424	K4/99	../..	../..	FI; K4=E44
424)	6764	TEST520B	13360	7402					INSTR-BRANCH-L="L", IR=(003000)=BGT, PS[NZVC]=(00)
					7403	K3/99	../..	../..	FI; K3=E64,E83
					740?	K3/99	../..	../..	K2=PS[CC]-BRANCH(E64,72-73,83)
425)	6765	TEST362A	8917	7434					SR RIGHT 1, D<00>="1"; SR=(125252) AFTER
					7400	K4/99	../..	../..	FI; K4=E3,E13,E22,E24,E29,E35-E36,E45,E52,E55,E74, E76,E85,E94,E104
426)	6766	TESTA504A	11621	7402					LOAD/READ FLAG=FPS=(052525) FLAG-PORT PROC-MUX; UCON FUNCTION
					7400	K2/90	K3/10	../..	FI; K2=E78,E98-E99,E101-E103,E105-E108,E110-E114, E119; K3=E27,E47,E94,E96
					7403	K2/99	../..	../..	FI; K2=E106,E108

###	ERROR code	Symbolic label	Line number	ENUA	TNUA	->Module sequence-> #1/%%	#2/%%	#3/%%	Test summary - Print reference - Chip information
427)	6767	TEST361E	8894	7400					BUT(GD3-2), GD<3:0>="0000" AFTER ENABLED, SR/LOAD
					7401	K4/80	K2/15	K3/5	FI; K4=E17,E28,E30,E53,E80,E86-E87; K2=E33,E45, E51; K3=E54
					7402	K4/90	K3/10	../..	FI; K4=E26,E30,E53,E87; K3=E56
					7404	K3/99	../..	../..	FI; K3=E74
428)	6770	TEST701C	15981	7402					LOAD BA<15:00>=(125252), READ THRU BA/KT-ALU/PBA/STATUS-MUX(PBA)
					7400	K5/50	K4/15	K6/15	K7/15 FI; K5=E7,E9-E11,E27,E37-E38,E43,E45-E47, E80,E59,E69-E70,E72,E79-E82,E94; K4=E39,E48,E57; K6=E19,E25,E29,E33,E49,E59; K7=E56,E64-E65,E73, E80-E82,E88
					7401	K7/50	K4/50	../..	FI; K7=E88; K4=E29
					7403	K5/65	K6/20	K7/10	FI; K5=E7,E26-E27,E46-E47; K6=E25,E59; K7=E80
429)	6771	TEST361D	8873	7403					BUTR(SR1-0$COUNT), SR<1:0>="01"
					6377	K2/65	K3/35	../..	FI; K2=E4-E5,E58-E59; K3=E1,E16
					7407	K3/99	../..	../..	FI; K3=E74
					747?	K4/99	../..	../..	K408=SR/RES/GUARD-LOGIC
430)	6772	TEST520C	13388	7403					INSTR-BRANCH-L="H", IR=(002416)=BLT, PS[NZVC]=(16)
					7402	K3/99	../..	../..	FI; K3=E72,E83
					740?	K3/99	../..	../..	K2=PS[CC]-BRANCH(E64,72-73,83)
431)	6773	TEST0410	10707	7361					(NUA SEQUENCING LOGIC ERROR)
					6777	K2/99	../..	../..	FI; K2=E48
					????	K1/99	../..	../..	INTERNAL DC8 ERROR
432)	6775	TEST520E	13445	7403					INSTR-BRANCH-L="H", IR=(103406)=BLO, PS[NZVC]=(06)
					7402	K3/99	../..	../..	FI; K3=E83
					740?	K3/99	../..	../..	K2=PS[CC]-BRANCH(E64,72-73,83)

1 !
2 !
3 !

```
4     !
5     !
6     !                    I D E N T I F I C A T I O N
7     !                    ---------------------------
8     !
9     !
10    !       PRODUCT CODE:   MAINDEC-11-DQKUB-B0
11    !
12    !       PRODUCT NAME:   KD11-K Microdiagnostic
13    !
14    !       MAINTAINER:     Diagnostic Engineering
15    !
16    !       AUTHOR:         Don North
17    !
18    !       DATE CREATED:   18-January-1977
19    !
20    !       LAST REVISION:  15-June-1977,  Version /101/
21    !
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23    !
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57      !.PAGE
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59      .TOC    * IDENTIFICATION
60      !
61      .TITLE KD11-K MICRODIAGNOSTIC
62
63
64
65
66
67          !*************************************************************************************************!
68          !                                                                                                 !
69          !                        K     K  DDDDDD          1      1           /  K     K                  !
70          !                        K    K   D     D        11     11          /   K    K                   !
71          !                        K   K    D     D       1 1    1 1         /    K   K                    !
72          !                        KKK      D     D  XXX    1      1       /      KKK                     !
73          !                        K   K    D     D         1      1     /        K   K                    !
74          !                        K    K   D     D         1      1    /         K    K                   !
75          !                        K     K  DDDDDD       11111  11111  /          K     K                  !
76          !                                                                                                 !
77          !                                                                                                 !
78          !                DDDDDD   IIIII    AAA     GGGGG   N     N   OOOOO    SSSSS   TTTTTTT  IIIII   CCCCC  !
79          !                D     D    I     A   A   G     G  NN    N  O     O  S     S     T       I    C     C !
80          !   U     U      D     D    I    A     A  G        N N   N  O     O  S           T       I    C       !
81          !   U     U      D     D    I    A     A  G  GGG   N  N  N  O     O   SSSSS      T       I    C       !
82          !   U     U      D     D    I    AAAAAAA  G     G  N   N N  O     O        S     T       I    C       !
83          !   U     U      D     D    I    A     A  G     G  N    NN  O     O  S     S     T       I    C     C !
84          !  U UUUUU U     DDDDDD   IIIII  A     A   GGGGG   N     N   OOOOO    SSSSS      T     IIIII   CCCCC  !
85          ! U                                                                                               !
86          ! U                                                                                               !
87          !                                                                                                 !
88          !*************************************************************************************************!
89
90
91
92      !.PAGE
93
94      .TOC    * REVISION HISTORY
95
96      .IDENT /V101A0/
97
98              REV-NUMBER           !!=  000101          !NO BIT15 DURING EXECUTION
99              REV-NUMBER-AND-B15   !!=  100101          !BUT SET W/REV. NUMBER AT EOP ONLY
100
101
102
103
104     !.PAGE
105
106     .TOC    * MICROWORD FIELD DEFINITIONS
107
108     !       NOTE:   THE FOLLOWING ARE THE ASSIGNED RANGES OF THE
```

```
!               MICROWORD FIELD BIT DEFINITIONS USED IN THIS
!               SOURCE LISTING:
!
!               BITS(NUMBER)        WHERE HELD
!               ------------        ---------------------------
!
!               [47:00] 48/48       MAIN MACHINE ROM,
!                                   DCS MAIN ROM
!               [59:48] 12/12 *     MAIN MACHINE ROM EXTENSION,
!                                   USES 12/12 BITS
!               [54:48] 7/12 *      DCS 4-BIT ROM EXTENSION,
!                                   USES 7/12 BITS, [54:48]
!
!       * = NOTE OVERLAP OF BM EXTENSION/DCS EXTENSION BITS,
!               THESE BITS ARE MUTUALLY EXCLUSIVE.



!.PAGE=================================================================================================

.TOC    * MICROWORD BIT LAYOUT
!       BASE            1-EMIT                          6-RETURN                                        UCON
!       MACHINE         2-SHIFT-TREE    4-UCON-DATA     7-PAGING        9-RES-BITS      DCS             PROCESSOR
!       CONTROL         3-RESIDUAL-CTL  5-CSP-ADDRESS   8-UCON-CONTROL  10-MULTIPLE     EXTENSION       CONTROL
!       -------         -------------   ------------    -------------   ----------      ------------    -----------
!U47    ALU3            1-EMITH15       4-UCONL10                                       DCS-CTR3        PS<3:0>-CLK
!U46    ALU2            1-EMITH14       4-UCON-I/O-SEL  6-RETR11        9-HISMUXSELI    DCS-CTR2
!U45    ALU1            1-EMITH13       4-UCON-WCS-SEL  6-RETR10        9-SR81-L        DCS-CTR1
!U44    ALU0            1-EMITH12       4-UCON-KT-SEL   6-RETR09        9-SR80-L        DCS-CTR0
!U43    BEN1
!U42    BEN0                            4-UCONL09                                                       UBREAK-CLK
!U41    BSEL1           1-EMITM11       4-UCONL08       6-RETR08        9-GUARD-EN-H    ENUA11            <NU>
!U40    BSEL0           1-EMITM10       4-UCONL07       6-RETR07                        ENUA10            <NU>
!U39    AEN1            1-EMITM09       4-UCONL06       6-RETR06                        ENUA09          SEL-HBMUX1L
!U38    AEN0            1-EMITM08       4-UCONL05       6-RETR05                        ENUA08          SEL-HBMUX0L
!U37    ASEL1           1-EMITL07                       6-RETR04                        ENUA07
!U36    ASEL0           1-EMITL06       4-UCON-PROC-SEL 6-RETR03                        ENUA06
!U35    RIF2            1-EMITL05       4-UCONM12       6-RETR02                        ENUA05          FPS<7:4>-CLK
!U34    RIF1            1-EMITL04       4-UCONM11       6-RETR01                        ENUA04          PS<7:4>-CLK
!U33    RIF0            1-EMITL03       4-UCON-FP-SEL   6-RETR00                        ENUA03
!U32    COUT2           1-EMITL02       4-UCONH15       7-NEXT-PAGE2    10-MULT-SEL2    ENUA02          IR-CLOCK
!U31    COUT1           1-EMITL01       4-UCONH14       7-NEXT-PAGE1    10-MULT-SEL1    ENUA01          PS<15:12>-CLK
!U30    COUT0           1-EMITL00       4-UCONH13       7-NEXT-PAGE0    10-MULT-SEL0    ENUA00          FLAG<8:0>-CLK
!U29 *  WHEN
!U28 *  CLK-D
!U27 *  CLK-SR
!U26 *  CLK-BA
!U25 *  SET-CC
!U24 *  BEGIN
!U23    SELECT(=0)      2-BMUX          5-CSPADR3       8-SELECT(=1)
!U22    BUSCOD2         2-AMUX2         5-CSPADR2       8-FLPGO
!U21    BUSCOD1         2-AMUX1         5-CSPADR1       8-UCON-KFER
!U20    BUSCOD0         2-AMUX0         5-CSPADR0       8-UCON-LOAD
!U19 *  WRCSP
```



```
!U18    HI/LO           3-LOAD-RES
!U17    WRSEL
!U16    WRB             3-LOAD-COUNT
!U15    WRA
!U14 *  MOD(=0)         3-MOD(=1)
!U13 *  UBF4
!U12 *  UBF3
!U11 *  UBF2
!U10 *  UBF1
!U09 *  UBF0
!U08 *  UPF8
!U07 *  UPF7
!U06 *  UPF6
!U05 *  UPF5
!U04 *  UPF4
!U03 *  UPF3
!U02 *  UPF2
!U01 *  UPF1
!U00 *  UPF0            ( * = DEDICATED TO THE CORRESPONDING SINGLE FUNCTION )



!.PAGE=================================================================================================

.TOC    * A & B & C SCRATCHPAD LAYOUT, DCS SPECIFIC
!
!       THE USE OF THE A, B, & C SCRATCHPADS AS TEMPORARY STORAGE AREAS
!       IS OUTLINED BELOW.   NOTE THAT IN MOST CASES, THE REGISTERS
!       EMPLOYED HAVE NO RESEMBLANCE  TO ANY SIMILAR NAMED REGISTER
!       IN THE KD11-K BASE MACHINE MICROCODE, EITHER LIVING OR DEAD.
!
!       THE BELOW DEFINITIONS ARE -DCS SPECIFIC- ONLY.
!
!
!       OCTAL           ASPHI           ASPLO           BSPHI           BSPLO           CSP
!       ADDRESS
!
!         00            . . .           . . .           . . .           . . .           <RETURN>
!
!         01            (000000)        . . .           (000000)        . . .           TEMP/(000152)
!
!         02            . . .           . . .           . . .           . . .           TEMP/(000125)
!
!         03            (177777)        . . .           (177777)        . . .           TEMP
!
!         04            . . .           . . .           . . .           . . .           TEMP/(125200)

!
!         05            (125252)        . . .           (125252)        . . .           TEMP/(052522)/(170360)
!
!         06            . . .           . . .           . . .           . . .           TEMP/(053433)/(007417)
!
!         07            (052525)        . . .           (052525)        . . .           TEMP
!
!         10            . . .           . . .           . . .           . . .           (052525)
```

```
217     !
218     !       11          (000001)        . . .       (000001)        . . .       (125252)
219     !
220     !       12          . . .           . . .       . . .           . . .       (177777)
221     !
222     !       13          (100000)        . . .       (100000)        . . .       (000000)
223     !
224     !       14          . . .           . . .       . . .           . . .       TEMP/(000100)/(057077)
225     !
226     !       15          (000200)        . . .       (000200)        . . .       TEMP/(000077)/(177067)
227     !
228     !       16          . . .           . . .       . . .           . . .       TEMP/(170000)
229     !
230     !       17          TEMPAHI         TEMPALO     TEMPBHI         TEMPBLO     TEMP/(007700)
231     !
232     !
233     !
234     !       NOTES:  (XXXXXX) ;= A REGISTER W/ A CONSTANT VALUE, NAMED:
235     !               CXXXXXX-A, IF ON THE A-SIDE, OR
236     !               CXXXXXX-B, IF ON THE B-SIDE
237     !
238
239
240
241     !.PAGE*****************************************************************************************************************
242
243     .TOC    * MICROWORD FIELD SPECIFICATION
244
245
246     !-------------------------------------------------------------------------------
247
248     .TOC    *   MICROWORD FIELD FORMAT
249
250     .RADIX 8                        ! ALL NUMBERS ARE OCTAL, UNLESS OTHERWISE NOTED
251
252     .WIDTH 64R                      ! MICROWORD IS 64\10 BITS WIDE, BIT <00> IS RIGHTMOST BIT
253
254     .BOUNDS         [4000:7777]             ! ADDRESSES ARE 12 BITS, ON PAGES 4:7
255
256     !.OBJECT  <15:00>'<31:16>'<47:32>'<63:48>            ! OUTPUT FORMAT (DEFAULT SPEC)
257
258     !-------------------------------------------------------------------------------
259
260     .TOC    *   NULL FIELD/MACRO SPECIFICATION
261
262     .FIELD N;;=<63>
263     .MACRO NULL;;=N/0
264
265
266     .TOC    *   ALU AND INTERNAL DATA BUS CONTROL
267
268
269
270     .TOC    *     <ALU>-ALU FUNCTION CONTROL BITS
```



```
271     !SPECIFIES ALU FUNCTION CODE AND CINMUX SELECT, ALWAYS IN EFFECT.
272     .FIELD ALU;;=<47:44>
273     !                               ---FUNCTION---      LOGIC/ARITH  ALUS<3:0> H     CINMUX L
274             NOT-A;;=00              !COMPLEMENT A,          L           0000        =1
275             A-PLUS-B-PLUS-PS[C];;=01 !ADD,                  A           1001        =PS[C]
276             NOT-A-AND-B;;=02        !AND,                   L           0010        =PS[C]
277             ZERO;;=03               !ZERO,                  L           0011        =PS[C]
278             A-PLUS-B-PLUS-D[C];;=04 !PLUS,                  A           1001        =D[C]
279             A-PLUS-NOT-B-PLUS-D[C];;=05 !PLUS,              A           0110        =D[C]
280             A-XOR-B;;=06            !XOR,                   L           0110        =D[C]
281             A-AND-NOT-B;;=07        !AND,                   L           0111        =D[C]
282             DIVIDE;;=10             !DIVIDE STEP,
283                                     !SUB,   IF D[C]M=1      A           0110        =D[C]=-1
284                                     !ADD,   IF D[C]M=0      A           1001        =D[C]=-0
285             A-PLUS-B;;=11           !PLUS,                  A           1001        =0
286             B;;=12                  !SELECT B,              L           1010        =0
287             A-AND-B;;=13            !AND,                   L           1011        =0
288             A-PLUS-B-PLUS-1;;=14    !PLUS,                  A           1001        =1
289             A-MINUS-B;;=15          !MINUS,                 A           0110        =1
290             A-IOR-B;;=16            !IOR,                   L           1110        =1
291             A;;=17                  !SELECT A,              L           1111        =1
292
293
294
295     .TOC    *     <BEN>-B-BUS DATA SOURCE
296     !SPECIFIES GATING OF DATA ONTO B-BUS, ALWAYS IN EFFECT.
297     .FIELD BEN;;=<43:42>
298             BSPLO;;=0               !DIRECT BSP LOCATIONS 00-17
299             BSPHI;;=1               !DIRECT BSP LOCATIONS 20-37
300             CSP;;=2                 !USE <CSPADDR> [SIC] AS ADDRESS (4 BIT)
301             BASCON;;=3              !1 OF 4 BASE CONSTANTS IN CSP17 TO CSP14 (2 BIT)
302
303
304
305     .TOC    *     <BSEL>-B-BUS SOURCE SELECTION CONTROL
306     !SPECIFIES CONTROL OF INDIVIDUAL B-BUS SOURCES, ALWAYS IN EFFECT.
307     .FIELD BSEL;;=<41:40>
308     !NOT USED WHEN BEN/CSP
309     !CSP17 TO CSP14 IMMEDIATE ADDRESS WHEN BEN/BASCON
310             B17;;=0                 !
311             B16;;=1                 !
312             B15;;=2                 !
313             B14;;=3                 !
314     !USED IN CONJUNCTION WITH <RIF> FOR SP ADDRESS WHEN BEN/BSPLO OR BEN/BSPHI
315             DF;;=0                  !DESTINATION FIELD
316             SF;;=1                  !SOURCE FIELD
317
317             IMMED0;;=?              !DIRECT ADDRESS, LOW BIT=0
318               R00;;=2               !FOR JOINT USE W/ RIF FIELD
319               R02;;=2               !
320               R04;;=2               !
321               R06;;=2               !
322               R10;;=2               !
323               R12;;=2               !
324               R14;;=2               !
```

```
            R16:::=2                ;
           IMMED1:::=3              ;DIRECT ADDRESS, LOW BIT=1
             R01:::=3               ;FOR JOINT USE W/ RIF FIELD
             R03:::=3               ;
             R05:::=3               ;
             R07:::=3               ;
             R11:::=3               ;
             R13:::=3               ;
             R15:::=3               ;
             R17:::=3               ;
           C000000:::=3             ;ASPHI/BSPHI CONSTANTS
           C177777:::=3             ;
           C125252:::=3             ;
           C052525:::=3             ;
           C000001:::=3             ;
           C100000:::=3             ;
           C000200:::=3             ;


    .TOC   *     <AEN>-A-BUS DATA SOURCE
    ;SPECIFIES GATING OF DATA ONTO A-BUS, ALWAYS IN EFFECT.
    .FIELD AEN:::=<39:38>
           XMUX:::=0                ;XMUX=SR OR FLTPT ASSEMBLE
           CMUX:::=1                ;SHIFT TREE
           ASPLO:::=2               ;DIRECT ASP LOCATIONS 00-17
           ASPHI:::=3               ;DIRECT ASP LOCATIONS 20-37


    .TOC   *     <ASEL>-A-BUS SOURCE SELECTION CONTROL
    ;SPECIFIES CONTROL OF INDIVIDUAL A-BUS SOURCES, ALWAYS IN EFFECT.
    .FIELD ASELO:::=<36>
    ;XMUX CONTROL WHEN AEN/XMUX  (USES ASEL0 ONLY)
           SR:::=0                  ;SR OUTPUT ONTO BUS-A
           FLTPT:::=1               ;FLTPT-ASSEMBLE ONTO BUS-A
    .FIELD ASEL:::=<37:36>
    ;CMUX CONTROL WHEN AEN/CMUX.  SHIFTS CMUX INPUT APPROPRIATE AMOUNT
           LEFT-1:::=0              ;LOW BIT GETS SENDMUX OUTPUT
           DIRECT:::=1              ;OUTPUT=INPUT
           RIGHT-1:::=2             ;HIGH BIT GETS D[C]
           RIGHT-2:::=3             ;HIGH BITS BOTH GET D[C]
    ;USED IN CONJUNCTION WITH <RIF> FOR SP ADDRESS WHEN AEN/ASPLO OR AEN/ASPHI
           IMMED0:::=0              ;DIRECT ADDRESS, LOW BIT=0
             R00:::=0               ;FOR JOINT USE W/ RIF FIELD
             R02:::=0               ;
             R04:::=0               ;
             R06:::=0               ;
             R10:::=0               ;
             R12:::=0               ;
             R14:::=0               ;
             R16:::=0               ;
           IMMED1:::=1              ;DIRECT ADDRESS, LOW BIT=1
             R01:::=1               ;FOR JOINT USE W/ RIF FIELD
```



```
             R03:::=1               ;
             R05:::=1               ;
             R07:::=1               ;
             R11:::=1               ;
             R13:::=1               ;
             R15:::=1               ;
             R17:::=1               ;
           C000000:::=1             ;ASPHI/BSPHI CONSTANTS
           C177777:::=1             ;
           C125252:::=1             ;
           C052525:::=1             ;
           C000001:::=1             ;
           C100000:::=1             ;
           C000200:::=1             ;
           DF:::=2                  ;DESTINATION FIELD
           SF:::=3                  ;SOURCE FIELD


    .TOC   *     <RIF>-ASP, BSP REGISTER IMMEDIATE FIELD
    ;SPECIFIES ADDRESSES WITH ASP, BSP ALONG WITH AEN, ASEL & BEN, BSEL
    .FIELD RIF:::=<35:33>
           R00-OR-01:::=4           ;LOW BIT IS 0/1, SPECIFIED BY
             R00:::=4               ;
             R01:::=4               ;
           R02-OR-03:::=5           ;USING EITHER IMMED0/IMMED1 MODES
             R02:::=5               ;
             R03:::=5               ;
           R04-OR-05:::=6           ;
             R04:::=6               ;
             R05:::=6               ;
           R06-OR-07:::=7           ;
             R06:::=7               ;
             R07:::=7               ;
           R10-OR-11:::=0           ;
             R10:::=0               ;
             R11:::=0               ;
           R12-OR-13:::=1           ;ADDR<3:0>H = ~RIF<2>H # RIF<1:0>H # A/BSEL<0>H
             R12:::=1               ;
             R13:::=1               ;
           R14-OR-15:::=2           ;
             R14:::=2               ;
             R15:::=2               ;
           R16-OR-17:::=3           ;
             R16:::=3               ;
             R17:::=3               ;

           C000000:::=4             ;ASPHI/BSPHI CONSTANTS
           C177777:::=5             ;
           C125252:::=6             ;

           C052525:::=7             ;
           C000001:::=0             ;
           C100000:::=1             ;
           C000200:::=2             ;
```

```
433
434
435     .TOC    *       <COUT>-CARRY OUT BIT MUX SELECTION
436     !SPECIFY INPUT TO D[C] REGISTER, LOADED WHEN D REGISTER LOADED,  ALWAYS IN EFFECT.
437     .FIELD COUT!!=<32:30>
438             CIN!!=0                 !OUTPUT OF CINMUX (SIC)
439             PS(C)!!=1               !PS C-BIT
440             ALU00!!=2               !ALU OUTPUT BIT 00
441             ALU07!!=3               !ALU OUTPUT BIT 07
442             ALU15!!=4               !ALU OUTPUT BIT 15
443             COUT07!!=5              !BYTE CARRY BIT
444             COUT15!!=6              !WORD CARRY BIT
445             D[C]!!=7                !PROPOGATE (SAVE) LAST D[C]
446
447     !-------------------------------------------------------------------------------
448
449
450
451     .TOC    *   CLOCKS
452
453
454
455     .TOC    *       <WHEN>-D/SR WHEN TO CLOCK
456     !SPECIFY CLOCK D/SR REGISTERS AT P2 T OR P3 T, ALWAYS IN EFFECT.
457     .FIELD WHEN!!=<29>,0
458             AT-P2-T!!=0             !CLOCK D AND/OR SR AT P2 T[100 NS].
459             AT-P3-T!!=1             !CLOCK D AND/OR SR AT P3 T[150 NS].
460
461
462
463     .TOC    *       <CLKD>-ENABLE D-REGISTER CLOCKING
464     !ENABLES CLOCKING OF D-REGISTER, ALWAYS IN EFFECT.
465     .FIELD CLKD!!=<28>,0
466             NO!!=0                  !NOP
467             YES!!=1                 !CLOCK D[C], D-REGISTER AT <WHEN>
468
469
470
471     .TOC    *       <CLKSR>-ENABLE SR-REGISTER CLOCKING
472     !ENABLES CLOCKING OF SR-REGISTER, ALWAYS IN EFFECT.
473     .FIELD CLKSR!!=<27>,0
474             NO!!=0                  !NOP
475             YES!!=1                 !CLOCK SR-REGISTER AT <WHEN>
476
477
478
479     .TOC    *       <CLKBA>-ENABLE CLOCKING OF BA-REGISTER
480     !ENABLES CLOCKING OF BA-REGISTER AT P1 T[60 NS], ALWAYS IN EFFECT.
481     .FIELD CLKBA!!=<26>,0
482             NO!!=0                  !NOP
483             YES!!=1                 !CLOCK BA-REGISTER AT P1 T[60 NS].
484
485
486
```



```
487     .TOC    *       <SCC>-ENABLE SETTING OF PS CONDITION CODES
488     !ENABLE CLOCKING OF PS CONDITION CODES AT P2 T[100 NS] OF NEXT UWORD.  D MUST
489     !BE CLOCKED AT P2 T OR EARLIER OF PREVIOUS MICROWORD.   ALWAYS IN EFFECT.
490     .FIELD SCC!!=<25>,0
491             NO!!=0                  !NOP
492             YES!!=1                 !ENABLE CLOCKING IN NEXT UWORD
493
494     !-------------------------------------------------------------------------------
495
496
497
498     .TOC    *   BUS/UCON & CSP-ADDRESS & SHIFT-TREE CONTROL
499
500
501
502     .TOC    *       BUS/UCON CONTROL
503
504
505     .TOC    *           <BEGIN>-BEGIN BUS/UCON OPERATION
506     !INITIATE BUS XOR UCON OPERATION, ALWAYS IN EFFECT.
507     .FIELD BEGIN!!=<24>,0
508             NO!!=0                  !NOP FOR BUS AND UCON OPERATIONS
509             YES!!=1                 !BEGIN OPERATION SPECIFIED
510
511
512
513     .TOC    *           <SELECT>-SELECT BUS OR UCON
514     !SELECT BUS XOR UCON, ONLY USED IF BEGIN/YES.
515     .FIELD SELECT!!=<23>
516             BUS!!=0                 !SELECT BUS
517             UCON!!=1                !SELECT UCON
518
519
520
521     .TOC    *           BUS CONTROL
522
523
524     .TOC    *             <BUSCODE>-BUS CODE ACTION FIELD
525     !BUS ACTION CODES, ONLY USED IF BEGIN/YES & SELECT/BUS.
526     .FIELD BUSCODE!!=<22:20>
527             DATI-CLKIR!!=0          !DATA IN, LOAD IR
528             DATI-NOINT!!=1          !DATA IN, NO INTERNAL ADDRESS
529             DATO!!=2                !DATA OUT
530             DATIB!!=3               !DATA IN, ALLOW: ODD ADDRESS
531             DATIB[P]!!=3            !DATA IN, ALLOW: ODD ADDRESS, FORCE TO PAUSE
532             DATIP!!=4               !DATA IN, NO CACHE, LOCK BUS

533             DATOB!!=5               !DATA OUT, ALLOW: ODD ADDRESS
534             DATI!!=6                !DATA IN
535             DATI[P]!!=6             !DATA IN, ALLOW: FORCE TO PAUSE
536             INVALIDATE!!=7          !INVALIDATE CACHE  LOCATION FUNCTION
537
538
539
540     .TOC    *           UCON CONTROL
```

```
541
542
543
544     .TOC    *         <FLPGO>-START HOT FLOATING POINT
545     !INITIATES HOT FLOATING POINT FUNCTION,  ONLY USED IF BEGIN/YES & SELECT/UCON.
546     .FIELD FLPGO:=<22>
547             NO:=0                   !NOP
548             YES:=1                  !YELL GO
549
550
551
552     .TOC    *         <UCON-XFER>-UCON OPERATION
553     !EXECUTE A UCON FUNCTION, ONLY USED IF BEGIN/YES & SELECT/UCON.
554     .FIELD UCON-XFER:=<21>
555             NO:=0                   !NOP
556             YES:=1                  !START UCON OPERATION
557
558
559
560     .TOC    *         <UCON-LOAD>-LOAD UCON REGISTER
561     !LOAD UCON CONTROL REGISTER, ONLY USED IF BEGIN/YES & SELECT/UCON.
562     .FIELD UCON-LOAD:=<20>
563             NO:=0                   !NOP
564             YES:=1                  !LOAD UCON CONTROL REGISTER
565
566
567
568     .TOC    *     CSP ADDRESS SPECIFICATION
569
570
571     .TOC    *       <CSPADDR>-CSP IMMEDIATE ADDRESS
572     !SPECIFY CSP 4 BIT ADDRESS, ONLY USED IF BEN/CSP.
573     .FIELD CSPADDR:=<23:20>
574             D00:=17                 !NOTE INVERSION
575             D01:=16                 !
576             D02:=15                 !
577             D03:=14                 !
578             D04:=13                 !
579             D05:=12                 !
580             D06:=11                 !
581             D07:=10                 !
582             D10:=07                 !
583             D11:=06                 !
584             D12:=05                 !
585             D13:=04                 !
586             D14:=03                 !
587             D15:=02                 !
588             D16:=01                 !
589             D17:=00                 !
590             C052525:=07             !CSP/DCS CONSTANTS
591             C125252:=06             !
592             C177777:=05             !
593             C000000:=04             !
594
```



```
595
596
597     .TOC    *     SHIFT CONTROL
598
599
600     .TOC    *       <BMUX>-SECOND LEVEL OF SHIFT TREE
601     !BMUX CONTROLS SHIFT RIGHT OF 0 OR 4, ALWAYS IN EFFECT.
602     .FIELD BMUX:=<23>
603             DIRECT:=0               !AMUX<15:00>
604             RIGHT-4:=1              !4*D[C] # AMUX <15:04>
605
606
607
608     .TOC    *       <AMUX>-FIRST LEVEL OF SHIFT TREE
609     !AMUX CONTROLS INPUT OF D-REG/COUNTER TO TREE, ALWAYS IN EFFECT.
610     .FIELD AMUX:=<22:20>
611             DIRECT:=0               !D<HI> # D<LO>
612             D[LO]#D[LO]:=1          !D<LO> # D<LO>
613             SIGNEXT:=2              !8*D[C] # D<LO>
614             COUNTER#D[LO]:=3        !COUNTER # D<LO>
615             COUNTER:=3              !SAME
616             D[HI]#D[HI]:=4          !D<HI> # D<HI>
617             SWAB:=5                 !D<LO> # D<HI>
618             RIGHT-8:=6              !8*D[C] # D<HI>
619             COUNTER#D[HI]:=7        !COUNTER # D<HI>
620
621     !-----------------------------------------------------------------------------
622
623
624
625     .TOC    *   SP REWRITE & REGISTER CLOCKS
626
627
628
629     .TOC    *     <WRCSP>-WRITE TO CSP
630     !WRITE CSP FROM DMUX (BUSDIN/CACHE), ALWAYS IN EFFECT.
631     .FIELD WRCSP:=<19>,0
632             NO:=0                   !NOP
633             YES:=1                  !ON P3, 120-150 NS.
634
635
636
637     .TOC    *     <MOD>-MODE CONTROL OF FOLLOWING BITS
638     !CONTROLS REDEFINITION OF SP REWRITE/REGISTER CLOCK BITS, ALWAYS IN EFFECT.
639     .FIELD MOD:=<14>,0
640             CLKSP:=0                !CONTROL ASP/BSP CLOCKING

641             LOADREG:=1              !CONTROL RES-REG/COUNTER LOADING
642
643
644
645     .TOC    *     SP REWRITE [A,B] CONTROL
646     !WHEN MOD/CLKSP
647
648
```

```
649     .TOC    *       <HILO>-SP HI/LO SELECT
650     !WHICH HALF OF SP'S TO REWRITE, ONLY IF MOD/CLKSP.
651     .FIELD HILO;;=<18>
652             LO;;=0                  !REWRITE ENABLE A/B SP LO [00-17]
653               L;;=0                 !
654             HI;;=1                  !REWRITE ENABLE A/B SP HI [20-37]
655               H;;=1                 !
656
657
658
659     .TOC    *       <WRSEL>-REWRITE ADDRESS SELECT
660     !WHICH WRITE ADDRESS TO USE ON REWRITE, ONLY IF MOD/CLKSP.
661     .FIELD WRSEL;;=<17>
662             A-ADDR;;=0              !USE A ADDRESS ON REWRITE
663               A;;=0                 !
664             B-ADDR;;=1              !USE B ADDRESS ON REWRITE
665               B;;=1
666
667
668
669     .TOC    *       <WRSP>-REWRITE A/B SELECT
670     !ENABLE REWRITE OF SPECIFIC SP'S, ONLY IF MOD/CLKSP.
671     .FIELD WRSP;;=<16:15>
672             NOP;;=0                 !NO ASP/BSP REWRITE
673             WR-A;;=1                !WRITE ASP ONLY, ON P3 120-150 NS.
674               A;;=1                 !
675               ASP;;=1               !
676             WR-B;;=2                !WRITE BSP ONLY, ON P3 120-150 NS.
677               B;;=2                 !
678               BSP;;=2               !
679             WR-A-AND-B;;=3          !WRITE BOTH ON P3
680               AB;;=3                !
681               BA;;=3                !
682               ABSP;;=3              !
683               BASP;;=3              !
684               BOTH;;=3              !
685
686
687
688     .TOC    *       REGISTER LOADING
689     !WHEN MOD/LOADREG
690
691
692     .TOC    *       <LOADRES>-LOAD RESIDUAL CONTROL REGISTER
693     !ENABLE LOAD OF RESIDUAL CONTROL REGISTER FROM B-BUS, ONLY IF MOD/LOADREG.
694     .FIELD LOADRES;;=<18>
695             NO;;=0                  !NOP
696             YES;;=1                 !LOAD RES WITH B-BUS<14:11>
697                                     !AT P2 T[100 NS], B-BUS<14> COMPLEMENTED
698
699
700
701     .TOC    *       <LOADCOUNT>-LOAD COUNTER
702     !ENABLE LOAD OF COUNTER FROM B-BUS <7:0>, ONLY IF MOD/LOADREG.
```



```
703     .FIELD LOADCOUNT;;=<16>
704             NO;;=0                  !NOP
705             YES;;=1                 !LOAD COUNTER AT P2 T[100 NS].
706
707     !-------------------------------------------------------------------------------
708
709
710
711     .TOC    *   SEQUENCING FIELD
712
713
714
715     .TOC    *       <UBF>-BUT MICROBRANCH FIELD
716     !SPECIFIES CONDITIONS TO MODIFY <UPF>/<J> FIELD DURING BRANCH.  ALWAYS IN EFFECT.
717     .FIELD UBF;;=<13:9>,30
718
719     .TOC    *       NO BUT
720             NULL;;=30                       !SPECIFY NO MODIFICATION = DEFAULT
721
722     .TOC    *       ACTIVE ONLY
723     !PURELY ACTIVE BUTS GENERATE SIDE AFFECTS; THEY DO NOT MODIFY THE <UPF> FIELD
724     !BY THE "OR-ING"-IN-OF-CONDITIONS METHOD.  THEY MAY MODIFY EXPLICITLY THE ENTIRE <UPF> FIELD,
725     !AS IN BUT(RETURN)
726             P-OP-1;;=22                     !FORM R[SF]-IOR-"001
727             CUA-TRACK;;=31                  !RESUME/RESTART CUA TRACKING
728             CLR-FLAG-RES-UCON;;=32          !CLEAR FLAGS<2:0>, EX-FLAG<1>, RES-REGISTER, UCON-REGISTER
729             DIAGNOSE;;=33                   !SPECIAL DIAGNOSTIC BUT
730             SUBRB;;=34                      !RETURN <- EMIT<14:03>, PAGE <- EMIT<02:00>
731               SUBR-B;;=34                   !SYNONYMS ARE:
732               GOTO;;=34                     !
733               GO-TO;;=34                    !
734             SUBRA;;=35                      !RETURN <- D<14:03>, PAGE <- EMIT<02:00>
735               SUBR-A;;=35                   !SYNONYM
736             B#36;;=36                       !TBD
737             RETURN;;=37                     !PAGE <- RETURN<11:09>, MUA <- RETURN<08:00>
738
739     .TOC    *       INACTIVE ONLY
740     !INACTIVE BUTS ONLY CAUSE MODIFICATION OF THE <UPF> FIELD BY THE "OR-ING"-
741     !IN-OF-CONDITIONS METHOD.
742                                             !----UPF MASK-----
743                                             !876 543 210 OCTAL  *=NOT AFFECTED
744             SR3-0;;=00                      !*** **0 000 (000)
745               CASE;;=00                     !
746               SR03;;=00                     !*** **0 111 (007)
747               SR02;;=00                     !*** **1 011 (013)
748               SR01;;=00                     !*** **1 101 (015)
749               SR00;;=00                     !*** **1 110 (016)
750             IR15-12;;=01                    !*** **0 000 (000)
751               DOP;;=01                      !
752             INSTR5;;=02                     !*** *00 000 (000)
753               INSTR-5;;=02                  !
754             IR11#FLTPT3-0;;=03              !*** *00 000 (000)
755               IR11-A;;=03                   !*** *01 111 (017)
756             IR9-6;;=04                      !*** **0 000 (000)
```

```
757             SOP!!=04                        !
758           MOV-DR7#IR5-3!!=05                !*** **0 000 (000)
759             MOV-DR7!!=05                    !*** **0 111 (007)
760             IR5-3!!=05                      !*** **1 000 (010)
761           BGSERV-FPSERV#D[C]#FPRET!!=07     !*** **0 000 (000)
762             BGSERV-FPSERV!!=07              !*** **0 111 (007)
763             D[C]-C!!=07                     !*** **1 011 (013)
764             FPRET1-0!!=07                   !*** **1 100 (014)
765           COUT07#DOUT07#FP805!!=10          !*** *** 000 (000)
766             COUT07!!=10                     !*** *** 011 (003)
767             DOUT07!!=10                     !*** *** 101 (005)
768             COUT07#DOUT07!!=10              !*** *** 001 (001)
769             FP805!!=10                      !*** *** 110 (006)
770           DM0#SM0#BYTE!!=11                 !*** *** 000 (000)
771             DM0!!=11                        !*** *** 011 (003)
772             SM0!!=11                        !*** *** 101 (005)
773             BYTE!!=11                       !*** *** 110 (006)
774           GD3-2!!=12                        !*** *** *00 (000)
775           BG-SERVCE-L#MFSS#MULTIPLE!!=14    !*** *** 000 (000)
776             BG-SERVCE-L!!=14                !*** *** 011 (003)
777             MFSS!!=14                       !*** *** 101 (005)
778             MULTIPLE!!=14                   !*** *** 110 (006)
779               MASKED-PS[T]!!=14             !
780               D00!!=14                      !
781               PS[N]!!=14                    !
782               FLAG7!!=14                    !
783               EXFLAG1!!=14                  !
784               FLTPTS!!=14                   !
785               EXFLAG2!!=14                  !
786               INIT-JAM!!=14                 !
787           D14-00EQ0#D15!!=15                !*** *** *00 (000)
788             D14-00-EQ-0#D15!!=15            !
789             D14-00-EQ-0!!=15                !*** *** *01 (001)
790             D15!!=15                        !*** *** *10 (002)
791           IR11#PS15!!=16                    !*** *** *00 (000)
792             IR11-B!!=16                     !*** *** *01 (001)
793             PS15!!=16                       !*** *** *10 (002)
794           VECTOR-LOAD#DR6-7L!!=21           !*** *** *00 (000)
795             VECTOR-LOAD!!=21                !*** *** *01 (001)
796             DR6-7L!!=21                     !*** *** *10 (002)
797           D[C]#BA00!!=23                    !*** *** *00 (000)
798             D[C]-B!!=23                     !*** *** *01 (001)
799             BA00!!=23                       !*** *** *10 (002)
800           OTHER-JAM#FP-PROC!!=24            !*** *** *00 (000)
801             OTHER-JAM!!=24                  !*** *** *01 (001)
802             FP-PROC!!=24                    !*** *** *10 (002)
803           INTR-HIGH#INSTR-BRANCH-L!!=26     !*** *** *00 (000)
804             INTR-HIGH!!=26                  !*** *** *01 (001)
805             INSTR-BRANCH-L!!=26             !*** *** *10 (002)
806           PREFETCH-JAM#FP-FD!!=27           !*** *** *00 (000)
807             PREFETCH-JAM!!=27               !*** *** *01 (001)
808             FP-FD!!=27                      !*** *** *10 (002)
809
810   .TOC    *       BOTH ACTIVE AND INACTIVE
```



```
811   !THESE BUTS HAVE BOTH ACTIVE AND INACTIVE EFFECTS
812                                           !----UPF MASK-----
813                                           !876 543 210 OCTAL  *=NOT AFFECTED
814           INSTR1!!=06                     !*00 000 000 (000)  BUS CONTROL, SP REWRITE DEFEAT
815             INSTR-1!!=06                  !
816           SP1-0#COUNT-IS-377!!=13         !*** *** 000 (000)  BUMP COUNTER
817             SP1-0!!=13                    !*** *** 001 (001)  STILL BUMP COUNTER
818             COUNT-IS-377-A!!=13           !*** *** 110 (006)  BUMP COUNTER
819           COUNT-IS-377#D[C]!!=17          !*** *** *00 (000)  BUMP COUNTER
820             COUNT-IS-377-B!!=17           !*** *** *01 (001)  BUMP COUNTER
821             D[C]-A!!=17                   !*** *** *10 (002)  STILL BUMP COUNTER
822           COUNT-IS-377!!=25               !*** *** **0 (000)  BUMP COUNTER
823           PREFETCH-L#SERVICE!!=20         !*** *** *00 (000)  TIMING
824             PREFETCH-L!!=20               !*** *** *01 (001)  TIMING
825             SERVICE!!=20                  !*** *** *10 (002)  TIMING
826             LAST!!=20                     !*** *** *11 (003)  TIMING
827
828
829
830
831   .TOC    *     <UPF>-MICRO POINTER FIELD
832   !SPECIFIES EITHER NEXT MICROINSTRUCTION ADDRESS OR BASE TARGET
833   !ADDRESS TO BE USED "UNDER" THE BUT-CODE IN <UBF>.
834   .FIELD          UPF!!=<8!0>,000           !ACTUAL MICROWORD POINTER FIELD
835   .ADDRESS        J!!=<8!0>                 !THIS FIELD ALSO HAS MICROADDRESS QUALITIES
836
837           !BASE MACHINE MICROCODE ENTRY POINTS!
838
839           !THESE ENTRY POINTS HAVE BEEN FIXED AS OF 31-AUGUST-1976.
840           INIT01  !!=  3412       !INITIALIZATION SUBROUTINE
841           CON99   !!=  1040       !FORCE "CONSOLE-MODE HALT"
842           FET01   !!=  0702       !INSTR FETCH, NO OVERLAP
843           FET03   !!=  0700       !INSTR FETCH, OVERLAP
844           SER01   !!=  0701       !SERVICE ENTRY, OVERLAP
845           SER02   !!=  0703       !SERVICE ENTRY, NO OVERLAP
846
847           !ENTRY POINTS INTO BASE MACHINE FOR "BUTA(DIAGNOSE)"!
848           !THESE ENTRY POINTS FIXED AS OF 26-OCT-76!
849           MED23   !!=  3200       !FOR FLPADR!  D_ASPLO[DF]-TOP
850           MED25   !!=  3020       !FOR FLPADR!  D_ASPHI[DF]-TOP
851           MED27   !!=  3210       !FOR FLPADR!  ASPLO[DF]-TOP_D
852           MED29   !!=  3214       !FOR FLPADR!  ASPHI[DF]-TOP_D
853           MED31   !!=  3044       !FOR FLPADR!  D_BSPLO[DF]-TOP
854           MED33   !!=  3230       !FOR FLPADR!  D_BSPHI[DF]-TOP
855           MED35   !!=  3234       !FOR FLPADR!  BSPLO[DF]-TOP_D
856           MED37   !!=  3064       !FOR FLPADR!  BSPHI[DF]-TOP_D
857
858           BYTE01  !!=  0032       !FOR KJENAB!  DATOB*KJENAB
859
860           RTS02   !!=  4034       !FOR SPBYKT!  DATI, BA_SP-A, SP_SP+2
861
862           DST01   !!=  0511       !FOR ALTER!   DATIB[P]
863           DST02   !!=  0512       !
864           DST20   !!=  0527       !
```

```
865           DST22   ::=  0525        !
866
867           LOADNZW4 ::= 4330        !FOR FPSCC#CLKFPSCC:  D_CSP(MD)
868           LOADNZW5 ::= 4332        !                FPS<3:0>_D<3:0>
869
870     !-------------------------------------------------------------------------------
871
872
873
874     .TOC   *   MISCELLANEOUS FIELDS
875
876
877
878     .TOC   *      <NEXT-PAGE>-NEW PAGE ADDRESS LOADED DURING BUT[SUBROUTINE]
879     !THESE 3 BITS ARE CLOCKED INTO PAGE REGISTER DURING A BUT[SUBRA] OR
880     !BUT[SUBRB].  ONLY USED WHEN UBF/BUT[SUBRA] OR UBF/BUT[SUBRB].
881     .FIELD NEXT-PAGE::=<32:30>
882
883
884     .TOC   *      <MULTIPLE>-SELECT CODE FOR BUT[MULTIPLE]
885     !MUST BE SET IN BOTH PREVIOUS AND CURRENT MICROWORDS WHEN BUT[MULTIPLE] IS TO BE EMPLOYED.
886     .FIELD MULTIPLE::=<32:30>
887           MASKED-PS[T]::=0         !
888           D00::=1                  !
889           PS[N]::=2                !
890           FLAG7::=3                !
891           EXFLAG1::=4              !
892           FLTPTS::=5               !
893           EXFLAG2::=6              !
894           INIT-JAM::=7             !
895
896
897
898     .TOC   *      EMIT FIELD - IMMEDIATE DATA FROM MICROWORD
899     !USED WHENEVER LOADING IMMEDIATE DATA FROM MICROWORD
900     .FIELD EMIT::=<47:44>*<41:30>
901     .FIELD EMITH::=<47:44>
902     .FIELD EMITM::=<41:38>
903     .FIELD EMITL::=<37:30>
904     .FIELD EMITML::=<41:30>
905     .FIELD EMIT9-6::=<39:36>
906     .FIELD EMIT15::=<47>
907     .FIELD EMIT14::=<46>
908     .FIELD EMIT13::=<45>
909     .FIELD EMIT12::=<44>
910     .FIELD EMIT11::=<41>
911     .FIELD EMIT10::=<40>
912     .FIELD EMIT09::=<39>
913     .FIELD EMIT08::=<38>
914     .FIELD EMIT07::=<37>
915     .FIELD EMIT06::=<36>
916     .FIELD EMIT05::=<35>
917     .FIELD EMIT04::=<34>
918     .FIELD EMIT03::=<33>
```



```
919     .FIELD EMIT02::=<32>
920     .FIELD EMIT01::=<31>
921     .FIELD EMIT00::=<30>
922
923
924
925     .TOC   *      RETURN ADDRESS - FOR MICROSUBROUTINE CALLS
926     !USED WITH BUT[SUBRA] AND BUT[SUBRA]
927     .FIELD RETURN::=<46:44>*<41:33>        !PAGE # D.I.P.
928
929
930
931     .TOC   *      UCON SELECTION AND CONTROL FIELDS
932
933
934     .TOC   *          SELECTION
935     !SELECT PARTICULAR UCON. ONLY USED IF BEGIN/YES & SELECT/UCON.
936     !FIELD UCON-SEL-EMIT::=<43>            !SELECT EMIT CAN ONLY BE DONE BY USING
937     !      NO::=0                          !  BUTA(CLR-FLAG-RES-UCON) TO ASSERT UCON-SEL-EMIT-L
938     !      YES::=1                         !
939     .FIELD UCON-SEL-I-O::=<46>             !SELECT I-O (BUS) CONTROL
940           NO::=0
941           YES::=1
942     .FIELD UCON-SEL-WCS::=<45>             !SELECT WCS/ECS/DCS
943           NO::=0
944           YES::=1
945     .FIELD UCON-SEL-CACHEKT::=<44>         !SELECT CACHE/KT
946           NO::=0
947           YES::=1
948     .FIELD UCON-SEL-PROC::=<36>            !SELECT PROCESSOR CONTROL
949           NO::=0
950           YES::=1
951     .FIELD UCON-SEL-FLTPT::=<33>           !SELECT HOT FLOATING POINT
952           NO::=0
953           YES::=1
954
955
956
957     .TOC   *          CONTROL
958     !AFTER UCON[S] SELECTED FROM ABOVE, CONTROL COMES FROM HERE.
959     .FIELD UCON::=<32:30>*<35:34>*<47>*<42:38>
960     .FIELD UCONH::=<32:30>
961     .FIELD UCONM::=<35:34>
962     .FIELD UCONL::=<47>*<42:38>
963     .FIELD UCON15::=<32>
964     .FIELD UCON14::=<31>

965     .FIELD UCON13::=<30>
966     .FIELD UCON12::=<35>
967     .FIELD UCON11::=<34>
968     .FIELD UCON10::=<47>
969     .FIELD UCON09::=<42>
970     .FIELD UCON08::=<41>
971     .FIELD UCON07::=<40>
972     .FIELD UCON06::=<39>
```

```
.FIELD UCON05::=<38>

;-----------------------------------------------------------------------------------------------



.TOC	*	BASE MACHINE EXTENSION BITS
;
;	LAYOUT IN BASE MACHINE (NOT DCS) ADDRESS SPACE:
;
;				-------------- PAGE --------------
;	--- NAME ---	0	1	2	3	4
;	ROMEX 00 H	X					X
;	ROMEX 01 H			X	X
;	ROMEX 03 H				X
;
;	FPSEL L		X		X			X
;	SFCC L		X		X			X
;	FLPADR L	X		X	X		X
;
;	SPBYKT L	X					X
;	UDAD01 L	X					X
;	UDAD00 L	X					X
;	UKJCONT L	X					X
;	UKT01 H		X					X
;	UKT00 H		X					X
;	UALTER L	X					X
;	UKTEN L		X					X
;
;
;	NULL BIT DEFINITIONS:
;
.FIELD ROMEX00::=<60>			;ACTIVE HIGH
	ZERO::=0			;
	ONE::=1				;
.FIELD ROMEX01::=<61>			;ACTIVE HIGH
	ZERO::=0			;
	ONE::=1				;
.FIELD ROMEX03::=<62>			;ACTIVE HIGH
	ZERO::=0			;
	ONE::=1				;
.FIELD FPSEL::=<57>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD SFCC::=<58>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD FLPADR::=<59>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD SPBYKT::=<55>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD UDAD01::=<53>			;ACTIVE LOW
```



```
	ZERO::=1			;
	ONE::=0				;
.FIELD UDAD00::=<52>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD UKJCONT::=<54>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD UKT01::=<49>			;ACTIVE HIGH
	ZERO::=0			;
	ONE::=1				;
.FIELD UKT00::=<48>			;ACTIVE HIGH
	ZERO::=0			;
	ONE::=1				;
.FIELD UALTER::=<51>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;
.FIELD UKTEN::=<50>			;ACTIVE LOW
	ZERO::=1			;
	ONE::=0				;

;-----------------------------------------------------------------------------------------------



.TOC	*	SPECIAL DCS FIELDS



.TOC	*	FIELDS USED IN PAGES 4, 5, OR 6 OF DCS


.TOC	*	<LOAD-DCS-CTR>-LOAD DIAGNOSTIC COUNTER FROM EMITH
;THIS CODE LOADS THE 4-BIT DCS COUNTER FROM THE CURRENT
;MICROWORD'S EMITH FIELD.  THIS COUNTER IS CLOCKED AT EVERY P0
;FOLLOWING, UNTIL THE COUNTER REACHES ZERO.  AT THIS POINT, THE
;COMPARE IS ENABLED, CLOCKING THE RESULT OF THE CURRENT ENUA:TNUA
;COMPARE INTO THE ERROR LATCH.
;ONLY USED IN PAGES 4, 5, OR 6 OF DCS.
.FIELD LOAD-DCS-CTR::=<51>,0
	NOP::=0				;NOP
	YES::=1				;LOAD, COUNT, AND ENABLE COMPARE



.TOC	*	<CTR>-4 BIT DCS COUNTER VALUE FROM EMIT

;THIS FOUR BIT VALUE IS LOADED INTO THE COUNTER (DIAGNOSTIC1),
;WHEN LOAD COUNTDOWN/YES.  COMPLEMENT OF ACTUAL VALUE IS USED, FOR COUNT DOWN.
;LOADING COUNTER VALUE OF 17(8) CAUSES COMPARE AT END OF THIS UWORD.
.FIELD CTR::=<47:44>
	C0,::=17
	C1.::=16
	C2.::=15
	C3.::=14
```

```
1081            C4.!!=13
1082            C5.!!=12
1083            C6.!!=11
1084            C7.!!=10
1085            C8.!!=07
1086            C9.!!=06
1087            C10.!!=05
1088            C11.!!=04
1089            C12.!!=03
1090            C13.!!=02
1091            C14.!!=01
1092            C15.!!=00
1093
1094
1095
1096    .TOC    *       <LOAD-ENUA-ERRCOD>-LOAD THE ENUA AND ERRCOD REGISTERS
1097    !THIS CODE LOADS THE 12-BIT ENUA REGISTER FROM THE <EMITH,EMITL> FIELD
1098    !OF THE CURRENT MICROWORD, AND LATCHES THE NUA INTO THE ERRCOD REGISTER.
1099    !ONLY USED IN PAGES 4, 5, OR 6 OF DCS.
1100    .FIELD LOAD-ENUA-ERRCOD!!=<54>,0
1101            NOP!!=0                 !NOP
1102            YES!!=1                 !LOAD REGISTERS AT P0
1103
1104
1105
1106    .TOC    *       <ENUA>-ENUA VALUE FROM EMIT
1107    !THIS 12 BIT FIELD IS LOADED FROM <EMIT> TO THE ENUA REGISTER
1108    !WHEN LOAD ENUA-ERRCOD/YES.
1109    .FIELD ENUA!!=<41!30>
1110
1111
1112
1113    .TOC    *       <VERIFY>-VERIFY BIT FOR SELF CHECK TEST
1114    !WHEN IN SELF TEST MODE OF DCS, SETTING THIS BIT CAUSES THE VERIFY COUNTER TO BE
1115    !BUMPED AT THE START OF THIS MICROWORD.  THE VERIFY BIT IS IMPLICITLY SET FOR
1116    !ANY REFERENCE TO PAGE 7 (IE, THE COUNTER IS AUTOMATICALLY BUMPED ON A REFERENCE
1117    !TO PAGE 7).
1118    !ONLY (EXPLICITLY) USED IN PAGES 4, 5, OR 6 OF DCS, WHEN IN SELF TEST MODE.
1119    .FIELD VERIFY!!=<48>,0
1120            NOP!!=0                 !NO ACTION
1121            BUMP!!=1                !BUMP VERIFY COUNTER AT P0, WHEN IN SELF TEST MODE
1122
1123
1124
1125    .TOC    *     FIELDS USED IN PAGE 7 OF DCS EXTENSION
1126
1127
1128    .TOC    *       <EOP>-SIGNAL SUCCESSFUL END OF PASS
1129    !THIS CODE SETS THE END OF PASS LATCH, LIGHTING THE EOP LED
1130    !ONLY USED IN PAGE 7 OF DCS.
1131    .FIELD EOP!!=<49>,0
1132            NO!!=0                  !NO EOP
1133            SIGNAL!!=1              !SIGNAL SUCCESSFUL EOP AT P0
1134
```



```
1135
1136
1137    .TOC    *       <DAD>-DCS CONTROL OF BASE MACHINE EXTENSION DAD BITS
1138    !THESE BITS ARE WIRE-ANDED INTO THE BASE MACHINE DAD<11:0> BITS.
1139    !MUST BE SPECIFIED IN UWORD BEFORE CSP REFERENCE.
1140    !ONLY USED IN PAGE 7 OF DCS.
1141    .FIELD DAD!!=<53:52>,0
1142            NO-DAD!!=0              !
1143            FIRST-1-OR-2!!=1        !SETUP BYTE-CONST ROM INPUT
1144            SECOND-1-OR-2!!=2       !  "
1145            WRITE-BYTE!!=3          !SETUP FOR BYTE WRITE TO ASP/BSP
1146
1147
1148
1149    .TOC    *     FIELDS USED IN ALL PAGES OF DCS EXTENSION
1150
1151
1152    .TOC    *       <SCOPE>-SCOPE ON ERROR, DIAGNOSTIC BUT
1153    !THIS CODE IS A SPECIAL BUT, THAT, WHEN ENABLED, CHECKS THE ERROR
1154    !LATCH TO SEE IF IT IS SET.  IF IT IS, NUA00 IS FORCED TO A ZERO!
1155    !ELSE IT IS LEFT UNCHANGED.  USED TO IMPLEMENT FORCED SCOPE LOOP ON ERROR.
1156    !USED IN ALL PAGES OF DCS.
1157    .FIELD SCOPE!!=<50>,0
1158            NOP!!=0                 !NOP
1159            ENABLED!!=1             !ENABLE SCOPE LOOPING FACILITY
1160
1161
1162    !-----------------------------------------------------------------------------
1163    !END OF MICROWORD FIELD DEFINITIONS
1164    !-----------------------------------------------------------------------------
1165
1166
1167
1168    !.PAGE=========================================================================================================================
1169
1170    .TOC    * MACRO DEFINITIONS
1171
1172
1173    .TOC    *   PRIMITIVE OPERATIONS
1174
1175
1176    .TOC    *     TIMING
1177    .MACRO P0       !!=  NULL       !0 NS,, UP3 VIEWED AS THE START OF A MICROCYCLE
1178
1179    .MACRO P1       !!=  NULL       !60 NS,, AT P1
1180    .MACRO P1-L     !!=  NULL       !30 NS,, AT P1 LEADING EDGE
1181    .MACRO P1-T     !!=  NULL       !60 NS,, AT P1 TRAILING EDGE
1182
1183    .MACRO P2       !!=  NULL       !100 NS,, AT P2
1184    .MACRO P2-L     !!=  NULL       !70 NS,, AT P2 LEADING EDGE
1185    .MACRO P2-T     !!=  WHEN/AT-P2-T  !100 NS,, AT P2 TRAILING EDGE
1186    .MACRO P2-U     !!=  NULL       !UNSUPPRESSED P2, CLOCK CONTINUOUSLY
1187
1188    .MACRO P3       !!=  NULL       !150 NS,, 120-150 NS,, AT P3
```

```
.MACRO P3-L    ::=  NULL          !120 NS., AT P3 LEADING EDGE
.MACRO P3-T    ::=  WHEN/AT-P3-T  !150 NS., AT P3 TRAILING EDGE
.MACRO P3-U    ::=  NULL          !UNSUPPRESSED P3, CLOCK CONTINUOUSLY

.MACRO UP3     ::=  NULL          !P3 DELAYED BY 5 NS., P0 VIEWED AS THE END OF A
                                  !MICROCYCLE. LATCHES NEW MICROINSTRUCTION INTO
                                  !THE MICROWORD BUFFER REGISTER.

.MACRO DEFER   ::=  NULL          !CONTROL IS ISSUED AT THIS TIME,
                                  !  ANY REQUIRED CLOCKING OCCURS LATER
.MACRO NEXT    ::=  NULL          !WHERE TO GO NEXT, CLOCKED AT UP3
.MACRO SETUP   ::=  NULL          !SETUP DATA/CONTROL
.MACRO SELECT  ::=  NULL          !MAKE A HOT-BOX SELECTION
.MACRO ISSUE   ::=  NULL          !SET/CLEAR HOT-BOX FLAG
.MACRO ENABLE  ::=  NULL          !  DITTO
.MACRO EMITC   ::=  NULL          !SPECIFY AN EMIT-CONSTANT VALUE



!.PAGE=========================================================================================================================

.TOC   *     WRITING THE A AND B SCRATCH PADS
!
!  WRITING THE APPROPRIATE SCRATCH PADS:
!
!                                      (NOP       )
!                                      (A    L    A)
!                                   WR (B  , H   , B)
!                                      (AB        )
!                                      /!\  /!\  /!\
!                                       !    !    !
!       ASP, BSP, BOTH, NEITHER----------    !    !
!       LO[00-17], OR HI[20-37]---------------    !
!       USE "A" SIDE OR "B" SIDE ADDRESS-----------
!
!  WRITES CONTENTS OF D-REGISTER INTO ADDRESSED SCRATCH PADS [SEE
!       BELOW] DURING P3
!
.MACRO WR(AB,HL,ADDR)  ::=  MOD/CLKSP,       !CLOCK SP MODE
                            WRSP/@AB,        !NOP, A, ASP, B, BSP, AB, ABSP, BA, BASP, BOTH ARE CHOICES
                            HILO/@HL,        !HI, LO, H, L ARE CHOICES
                            WRSEL/@ADDR      !A, B, A-ADDR, B-ADDR ARE CHOICES



.TOC   *     ASP AND BSP PHYSICAL REGISTER ADDRESSES
!
!  ENABLE INPUT/OUTPUT [FOR READ AND/OR WRITE] OF THE APPROPRIATE SCRATCH PAD ONTO
!  EITHER BUS-A OR BUS-B VIA EXACT PHYSICAL ADDRESS
!
.MACRO ASPLO(XX)        ::=  AEN/ASPLO,      !SELECT
                             ASEL/@XX,       !REGISTER &
                             RIF/@XX         !ENABLE ON BUS-A
```



```
.MACRO ASPHI(XX)        ::=  AEN/ASPHI,      !SELECT
                             ASEL/@XX,       !REGISTER &
                             RIF/@XX         !ENABLE ON BUS-A

.MACRO ASP(XX)          ::=  ASEL/@XX,       !SELECT REGISTER,
                             RIF/@XX         !NO ENABLE


.MACRO BSPLO(XX)        ::=  BEN/BSPLO,      !SELECT
                             BSEL/@XX,       !REGISTER &
                             RIF/@XX         !ENABLE ON BUS-B

.MACRO BSPHI(XX)        ::=  BEN/BSPHI,      !SELECT
                             BSEL/@XX,       !REGISTER &
                             RIF/@XX         !ENABLE ON BUS-B

.MACRO BSP(XX)          ::=  BSEL/@XX,       !SELECT REGISTER,
                             RIF/@XX         !NO ENABLE





.TOC   *     ASP AND BSP BASE MACHINE FUNCTIONAL REGISTER ADDRESSES
!
!  ENABLE INPUT/OUTPUT [FOR READ AND/OR WRITE] OF THE APPROPRIATE SCRATCH PAD ONTO
!  EITHER BUS-A "-A" OR BUS-B "-B" VIA FUNCTIONAL REGISTER DESIGNATION
!
.MACRO R0-A             ::=  ASPLO(R00)
.MACRO R0-B             ::=  BSPLO(R00)
.MACRO R1-A             ::=  ASPLO(R01)
.MACRO R1-B             ::=  BSPLO(R01)
.MACRO R2-A             ::=  ASPLO(R02)
.MACRO R2-B             ::=  BSPLO(R02)
.MACRO R3-A             ::=  ASPLO(R03)
.MACRO R3-B             ::=  BSPLO(R03)
.MACRO R4-A             ::=  ASPLO(R04)
.MACRO R4-B             ::=  BSPLO(R04)
.MACRO R5-A             ::=  ASPLO(R05)
.MACRO R5-B             ::=  BSPLO(R05)
.MACRO SP-A             ::=  ASPLO(R06)
.MACRO SP-B             ::=  BSPLO(R06)
.MACRO PC-A             ::=  ASPLO(R07)
.MACRO PC-B             ::=  BSPLO(R07)
.MACRO FACA[0]-B        ::=  BSPHI(R10)
.MACRO FACB[0]-A        ::=  ASPHI(R10)

.MACRO FACC[0]-B        ::=  BSPLO(R10)
.MACRO FACD[0]-A        ::=  ASPLO(R10)
.MACRO FACA[1]-B        ::=  BSPHI(R11)
.MACRO FACB[1]-A        ::=  ASPHI(R11)
.MACRO FACC[1]-B        ::=  BSPLO(R11)
.MACRO FACD[1]-A        ::=  ASPLO(R11)
.MACRO FACA[2]-B        ::=  BSPHI(R12)
.MACRO FACB[2]-A        ::=  ASPHI(R12)
```

```
1297    .MACRO FACC[2]-B        ;;=  BSPLO(R12)
1298    .MACRO FACD[2]-A        ;;=  ASPLO(R12)
1299    .MACRO FACA[3]-B        ;;=  BSPHI(R13)
1300    .MACRO FACB[3]-A        ;;=  ASPHI(R13)
1301    .MACRO FACC[3]-B        ;;=  BSPLO(R13)
1302    .MACRO FACD[3]-A        ;;=  ASPLO(R13)
1303    .MACRO FACA[4]-B        ;;=  BSPHI(R14)
1304    .MACRO FACB[4]-A        ;;=  ASPHI(R14)
1305    .MACRO FACC[4]-B        ;;=  BSPLO(R14)
1306    .MACRO FACD[4]-A        ;;=  ASPLO(R14)
1307    .MACRO FACA[5]-B        ;;=  BSPHI(R15)
1308    .MACRO FACB[5]-A        ;;=  ASPHI(R15)
1309    .MACRO FACC[5]-B        ;;=  BSPLO(R15)
1310    .MACRO FACD[5]-A        ;;=  ASPLO(R15)
1311    .MACRO FDSTA-B          ;;=  BSPHI(R17)
1312    .MACRO FDSTB-A          ;;=  ASPHI(R17)
1313    .MACRO FDSTC-B          ;;=  BSPLO(R17)
1314    .MACRO FDSTD-A          ;;=  ASPLO(R17)
1315    .MACRO FPSHI#FEC-A      ;;=  ASPHI(R16)
1316    .MACRO FEA-B            ;;=  BSPHI(R16)
1317    .MACRO USER-SP-A        ;;=  ASPLO(R16)
1318    .MACRO USER-SP-B        ;;=  BSPLO(R16)
1319    .MACRO WHAMI-A          ;;=  ASPHI(R02)
1320    .MACRO R[ZERO]-B        ;;=  BSPHI(R03)
1321    .MACRO R[IR]-A          ;;=  ASPHI(R17)
1322    .MACRO R[SRC]-B         ;;=  BSPHI(R04)
1323    .MACRO R[SRC]-A         ;;=  ASPHI(R04)
1324    .MACRO R[DST]-B         ;;=  BSPHI(R05)
1325    .MACRO R[DST]-A         ;;=  ASPHI(R05)
1326    .MACRO R[VECT]-B        ;;=  BSPHI(R02)
1327    .MACRO WCSB[0]-B        ;;=  BSPHI(R00)
1328    .MACRO WCSB[1]-B        ;;=  BSPHI(R01)
1329    .MACRO WCSA[0]-A        ;;=  ASPHI(R00)
1330    .MACRO WCSA[1]-A        ;;=  ASPHI(R01)
1331    .MACRO FPA-B            ;;=  BSPHI(R06)
1332    .MACRO CNSL-CNTL-B      ;;=  BSPHI(R07)
1333    .MACRO CNSL-CADR-A      ;;=  ASPHI(R07)
1334    .MACRO CNSL-SW-A        ;;=  ASPHI(R06)
1335    .MACRO CNSL-TMPSW-A     ;;=  ASPHI(R03)
1336
1337
1338
1339    .TOC    *       ASP AND BSP INDIRECT REGISTER ADDRESSES
1340    !
1341    !  ENABLE INPUT/OUTPUT (FOR READ AND/OR WRITE) OF THE APPROPRIATE SCRATCH PAD
1342    !  ON BUS-A (A) OR BUS-B (B) USING INDIRECT ADDRESSING WITH THE IR,
1343    !  WHERE:
1344    !
1345    !       SF<3:0>H = (FLPADR H + KTSRCADR53 H) # (FLTPT L * IR6 H) # (IR7 H) # (IR6 H * ROR1 H)
1346    !
1347    !       DF<3:0>H = (FLPADR H + KTDSTADR53 H) # (IR2 H) # (IR1 H) # (IR0 H)
1348    !
1349    .MACRO R[SF]-LO-A       ;;=  AEN/ASPLO,ASEL/SF
1350    .MACRO R[SF]-LO-B       ;;=  BEN/BSPLO,BSEL/SF
```



```
1351    .MACRO R[SF]-HI-A       ;;=  AEN/ASPHI,ASEL/SF
1352    .MACRO R[SF]-HI-B       ;;=  BEN/BSPHI,BSEL/SF
1353    .MACRO R[DF]-LO-A       ;;=  AEN/ASPLO,ASEL/DF
1354    .MACRO R[DF]-LO-B       ;;=  BEN/BSPLO,BSEL/DF
1355    .MACRO R[DF]-HI-A       ;;=  AEN/ASPHI,ASEL/DF
1356    .MACRO R[DF]-HI-B       ;;=  BEN/BSPHI,BSEL/DF
1357    .MACRO R[SF]-A          ;;=  R[SF]-LO-A
1358    .MACRO R[SF]-B          ;;=  R[SF]-LO-B
1359    .MACRO R[DF]-A          ;;=  R[DF]-LO-A
1360    .MACRO R[DF]-B          ;;=  R[DF]-LO-B
1361
1362
1363
1364    .TOC    *       ASP, BSP INDIRECT ADDRESSING
1365    !
1366    !       THESE MACROS ONLY SELECT THE ADDRESS MODE FOR THE ASP AND BSP;
1367    !       THE SELECTED SP IS NOT ENABLED ONTO THE BUS
1368    !
1369    .MACRO ASP-ADDRS-R[DF] ;;=  ASEL/DF
1370    .MACRO ASP-ADDRS-R[SF] ;;=  ASEL/SF
1371    .MACRO BSP-ADDRS-R[DF] ;;=  BSEL/DF
1372    .MACRO BSP-ADDRS-R[SF] ;;=  BSEL/SF
1373
1374
1375
1376
1377    .TOC    *       ASP AND BSP DCS SPECIFIC FUNCTIONAL REGISTER ADDRESSES
1378    !
1379    !  ENABLE INPUT/OUTPUT (FOR READ AND/OR WRITE) OF THE APPROPRIATE SCRATCH PAD ONTO
1380    !  EITHER BUS-A "-A" OR BUS-B "-B" VIA FUNCTIONAL REGISTER DESIGNATION
1381    !
1382    .MACRO C000000-A        ;;=  ASPHI(C000000)     !IN R01
1383    .MACRO C000000-B        ;;=  BSPHI(C000000)     !IN R01
1384    .MACRO C177777-A        ;;=  ASPHI(C177777)     !IN R03
1385    .MACRO C177777-B        ;;=  BSPHI(C177777)     !IN R03
1386    .MACRO C125252-A        ;;=  ASPHI(C125252)     !IN R05
1387    .MACRO C125252-B        ;;=  BSPHI(C125252)     !IN R05
1388    .MACRO C052525-A        ;;=  ASPHI(C052525)     !IN R07
1389    .MACRO C052525-B        ;;=  BSPHI(C052525)     !IN R07
1390    .MACRO C000001-A        ;;=  ASPHI(C000001)     !IN R11
1391    .MACRO C000001-B        ;;=  BSPHI(C000001)     !IN R11
1392    .MACRO C100000-A        ;;=  ASPHI(C100000)     !IN R13
1393    .MACRO C100000-B        ;;=  BSPHI(C100000)     !IN R13
1394    .MACRO C000200-A        ;;=  ASPHI(C000200)     !IN R15
1395    .MACRO C000200-B        ;;=  BSPHI(C000200)     !IN R15
1396

1397
1398
1399    !.PAGE=========================================================================================================
1400
1401    .TOC    *       WRITING THE C SCRATCH PAD
1402    !
1403    !  WRITE DATA ON BUSDIN (ACTUALLY DMUX OUTPUT) INTO ADDRESSED CSP LOCATION
1404    !       (SEE BELOW) DURING P3
```

```
1405    !
1406    .MACRO WR=CSP           !:=  WRCSP/YES
1407
1408
1409
1410    .TOC    *       CSP IMPLIED ADDRESSING
1411    !
1412    !  ENABLE FOR INPUT/OUTPUT [READ AND/OR WRITE] ONTO BUS-B ONLY A SPECIFIC CSP LOCATION,
1413    !  WHERE THE ADDRESS IS DETERMINED AS FOLLOWS:
1414    !
1415    !       CSPADDR<3:0>H = -[ 0 # 0 # BSEL<1>H # BSEL<0>H ]
1416    !
1417    .MACRO CSPB(XX)         !:=  BEN/BASCON,        !USE IMMEDIATE MODE
1418                                 BSEL/@XX           !WHICH ONE
1419
1420
1421
1422    .TOC    *       CSP DIRECT ADDRESSING
1423    !
1424    !  ENABLE FOR INPUT/OUTPUT [READ AND/OR WRITE] ONTO BUS-B ONLY A SPECIFIC CSP LOCATION,
1425    !  WHERE THE ADDRESS IS DETERMINED AS FOLLOWS:
1426    !
1427    !       CSPADDR<3:0>H = -UWORD<23:20> H
1428    !
1429    .MACRO CSPD(XX)         !:=  BEN/CSP,           !USE CSP-ADDR MODE
1430                                 CSPADDR/@XX        !WHICH ONE
1431
1432
1433
1434    !.PAGE=============================================================================================================
1435
1436    .TOC    *       SHIFT TREE SPECIFICATION
1437    !N.B. MAY REQUIRE PRIOR SETUP OF RES-REGISTER FOR SHIFT END MUX SELECTION CONTROL
1438    !  (EG, WHEN ASEL/LEFT=1 IS USED).
1439
1440    .TOC    *       ENABLED ONTO BUS A
1441    .MACRO D=RIGHT=14       !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/RIGHT=4,ASEL/RIGHT=2
1442    .MACRO D=RIGHT=13       !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/RIGHT=4,ASEL/RIGHT=1
1443    .MACRO D=RIGHT=12       !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/RIGHT=4,ASEL/DIRECT
1444    .MACRO D=RIGHT=11       !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/RIGHT=4,ASEL/LEFT=1     !SENDMUX SETUP
1445    .MACRO D=RIGHT=10       !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/DIRECT,ASEL/RIGHT=2
1446    .MACRO D=RIGHT=9        !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/DIRECT,ASEL/RIGHT=1
1447    .MACRO D=RIGHT=8        !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/DIRECT,ASEL/DIRECT
1448    .MACRO D=RIGHT=7        !:=  AEN/CMUX,AMUX/RIGHT=8,BMUX/DIRECT,ASEL/LEFT=1      !SENDMUX SETUP
1449    .MACRO D=RIGHT=6        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/RIGHT=4,ASEL/RIGHT=2
1450    .MACRO D=RIGHT=5        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/RIGHT=4,ASEL/RIGHT=1
1451    .MACRO D=RIGHT=4        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/RIGHT=4,ASEL/DIRECT
1452    .MACRO D=RIGHT=3        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/RIGHT=4,ASEL/LEFT=1      !SENDMUX SETUP
1453    .MACRO D=RIGHT=2        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/DIRECT,ASEL/RIGHT=2
1454    .MACRO D=RIGHT=1        !:=  AEN/CMUX,AMUX/DIRECT,BMUX/DIRECT,ASEL/RIGHT=1
1455    .MACRO D=NO=SHIFT       !:=  AEN/CMUX,AMUX/DIRECT,BMUX/DIRECT,ASEL/DIRECT
1456    .MACRO D=DIRECT         !:=  D=NO=SHIFT
1457    .MACRO D=LEFT=1         !:=  AEN/CMUX,AMUX/DIRECT,BMUX/DIRECT,ASEL/LEFT=1       !SENDMUX SETUP
1458    .MACRO D=SWAB           !:=  AEN/CMUX,AMUX/SWAB,BMUX/DIRECT,ASEL/DIRECT
```



```
1459    .MACRO D=SWAB=RIGHT=3   !:=  AEN/CMUX,AMUX/SWAB,BMUX/RIGHT=4,ASEL/LEFT=1        !SENDMUX SETUP
1460    .MACRO D=SWAB=LEFT=1    !:=  AEN/CMUX,AMUX/SWAB,BMUX/DIRECT,ASEL/LEFT=1         !SENDMUX SETUP
1461    .MACRO D=SIGNEXT        !:=  AEN/CMUX,AMUX/SIGNEXT,BMUX/DIRECT,ASEL/DIRECT
1462    .MACRO D=SIGNEXT=RIGHT=1 !:=  AEN/CMUX,AMUX/SIGNEXT,BMUX/DIRECT,ASEL/RIGHT=1
1463    .MACRO D=SIGNEXT=LEFT=1 !:=  AEN/CMUX,AMUX/SIGNEXT,BMUX/DIRECT,ASEL/LEFT=1      !SENDMUX SETUP
1464    .MACRO NO=SHIFT         !:=  AEN/CMUX,BMUX/DIRECT,ASEL/DIRECT
1465    .MACRO DIRECT           !:=  NO=SHIFT
1466    .MACRO COUNT#D[HI]      !:=  AEN/CMUX,AMUX/COUNTER#D[HI],BMUX/DIRECT,ASEL/DIRECT
1467    .MACRO COUNT#D[LO]      !:=  AEN/CMUX,AMUX/COUNTER#D[LO],BMUX/DIRECT,ASEL/DIRECT
1468
1469
1470
1471    .TOC    *       FIRST TWO LEVELS ONLY [AMUX,BMUX]
1472    !N.B.:  FOR USE WHEN SHIFTING SR RIGHT, SR<15> <= BMUX<00>
1473    .MACRO D=DIRECT[BMUX]   !:=  AMUX/DIRECT,BMUX/DIRECT
1474
1475
1476
1477    !.PAGE=============================================================================================================
1478
1479    .TOC    *       ALU FUNCTIONS
1480    ![SEE FIELD DESCRIPTION OF "ALU" FOR FULL DESCRIPTION]
1481    .MACRO ZERO             !:=  ALU/ZERO
1482    .MACRO A=XOR=B          !:=  ALU/A=XOR=B
1483    .MACRO B                !:=  ALU/B
1484    .MACRO A=AND=B          !:=  ALU/A=AND=B
1485    .MACRO A=IOR=B          !:=  ALU/A=IOR=B
1486    .MACRO A                !:=  ALU/A
1487    .MACRO NOT=A            !:=  ALU/NOT=A
1488    .MACRO NOT=A=AND=B      !:=  ALU/NOT=A=AND=B
1489    .MACRO A=AND=NOT=B      !:=  ALU/A=AND=NOT=B
1490
1491    .MACRO DIVIDE           !:=  ALU/DIVIDE
1492    .MACRO A=PLUS=B         !:=  ALU/A=PLUS=B
1493    .MACRO A=MINUS=B        !:=  ALU/A=MINUS=B
1494    .MACRO A=PLUS=B=PLUS=PS[C]  !:=  ALU/A=PLUS=B=PLUS=PS[C]
1495    .MACRO A=PLUS=B=PLUS=D[C]   !:=  ALU/A=PLUS=B=PLUS=D[C]
1496    .MACRO A=PLUS=NOT=B=PLUS=D[C] !:=  ALU/A=PLUS=NOT=B=PLUS=D[C]
1497    .MACRO A=PLUS=B=PLUS=1  !:=  ALU/A=PLUS=B=PLUS=1
1498
1499
1500    .TOC    *       COUT GENERATION
1501    ![SEE FIELD DESCRIPTION OF "COUT" FOR FULL DESCRIPTION]
1502    .MACRO COUT_CIN         !:=  COUT/CIN
1503    .MACRO COUT_PS[C]       !:=  COUT/PS[C]
1504    .MACRO COUT_ALU00       !:=  COUT/ALU00

1505    .MACRO COUT_ALU07       !:=  COUT/ALU07
1506    .MACRO COUT_ALU15       !:=  COUT/ALU15
1507    .MACRO COUT_COUT07      !:=  COUT/COUT07
1508    .MACRO COUT_COUT15      !:=  COUT/COUT15
1509    .MACRO COUT_D[C]        !:=  COUT/D[C]
1510
1511
1512
```

```
1513    !.PAGE=========================================================================================================================
1514
1515    .TOC    *       CLOCKS
1516
1517
1518
1519    .TOC    *       BASIC REGISTER CLOCKS [D, SR, BA, CC]
1520    .MACRO CLK-D                    ;:=  CLKD/YES   !MUST SPECIFY P2 T OR P3 T
1521    .MACRO CLK-SR                   ;:=  CLKSR/YES  !MUST SPECIFY P2 T OR P3 T
1522    .MACRO CLK-BA                   ;:=  CLKBA/YES  !AT P1 T ONLY
1523    .MACRO SET-CC                   ;:=  SCC/YES    !SETUP HERE, CLOCKED AT P2 T  **OF NEXT UWORD**  ONLY
1524    .MACRO CLK-CC                   ;:=  NULL       !IN NEXT UWORD, FOR DOCUMENTATION
1525
1526
1527
1528    .TOC    *       REDEFINED FROM SP REWRITE FIELD [RES, COUNTER]
1529    .MACRO LOAD-RES                 ;:=  MOD/LOADREG,LOADRES/YES    !AT P2 T ONLY, FROM B-BUS<14:11>
1530    .MACRO LOAD-COUNTER             ;:=  MOD/LOADREG,LOADCOUNT/YES  !DURING ENTIRE UWORD, FROM B-BUS<7:0>
1531
1532
1533
1534    .TOC    *       RES REGISTER CONTROL VALUES [FROM EMIT]
1535    !LOADED VIA:  EMIT<14:11> -> CSP[XX]<14:11> -> B-BUS<14:11> -> RES<3:0>
1536    .MACRO SENDMUX-0123-SEL         ;:=  EMIT14/1                   !FOR SHIFT TREE
1537    .MACRO SENDMUX-4567-SEL         ;:=  EMIT14/0                   !FOR SHIFT TREE
1538    .MACRO SR-LOAD                  ;:=  EMIT13/0,EMIT12/0          !FOR SR/GUARD
1539    .MACRO SR-LEFT                  ;:=  EMIT13/0,EMIT12/1          !FOR SR/GUARD
1540    .MACRO SR-RIGHT                 ;:=  EMIT13/1,EMIT12/0          !FOR SR/GUARD
1541    .MACRO SR-NOP                   ;:=  EMIT13/1,EMIT12/1          !FOR SR/GUARD
1542    .MACRO GUARD-EN                 ;:=  EMIT11/1                   !FOR SR/GUARD
1543    .MACRO GUARD-DIS                ;:=  EMIT11/0                   !FOR SR/GUARD
1544
1545
1546
1547
1548    .TOC    *       CC CONTROL  [FROM EMIT]
1549    !USED VIA: BUS-U37-H -> EMIT07-H -> MODIFY-V(1)-H
1550    .MACRO MODIFY-VBIT              ;:=  EMIT07/1
1551    .MACRO NOT-MODIFY-VBIT          ;:=  EMIT07/0
1552
1553
1554
1555    !.PAGE=========================================================================================================================
1556
1557    .TOC    *     BUS CONTROL MACROS
1558    .MACRO DATI-CLKIR       ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATI-CLKIR
1559    .MACRO DATI-NOINT       ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATI-NOINT
1560    .MACRO DATI             ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATI
1561    .MACRO DATI[P]          ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATI[P]       !WITH ALTER/ALLOWED
1562    .MACRO DATO             ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATO
1563    .MACRO DATIB            ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATIB
1564    .MACRO DATIB[P]         ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATIB[P]      !WITH ALTER/ALLOWED
1565    .MACRO DATIP            ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATIP
1566    .MACRO DATOB            ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/DATOB
```



```
1567    .MACRO INVALIDATE       ;:=  BEGIN/YES,SELECT/BUS,BUSCODE/INVALIDATE
1568
1569
1570
1571    .TOC    *     KT/KJ CONTROL FUNCTIONS
1572
1573          !THESE BITS ACTUALLY ARISE OUT OF THE BASE MACHINE EXTENSION ROMS,
1574          !AND AS SUCH ARENT DIRECTLY ACCESSIBLE FROM THE DCS,  THEY ARE
1575          !INCLUDED HERE ONLY FOR DOCUMENTATION PURPOSES.
1576
1577    .MACRO KJ-ENABLE        ;:=  KJ/ONE
1578
1579    .MACRO MAINTENANCE      ;:=  UKTEN/ONE
1580    .MACRO CURRENT-MODE     ;:=  UKT01/ONE,UKT00/ZERO
1581    .MACRO KERNAL-MODE      ;:=  UKT01/ONE,UKT00/ONE
1582    .MACRO MT-MODE          ;:=  UKT01/ZERO,UKT00/ONE
1583    .MACRO MF-MODE          ;:=  UKT01/ZERO,UKT00/ZERO
1584
1585
1586
1587    !.PAGE=========================================================================================================================
1588
1589    .TOC    *     UCON CONTROL MACROS
1590    .MACRO SET-UCON-CONTROL         ;:=  BEGIN/YES,SELECT/UCON,UCON-LOAD/YES  !LOAD UCON CONTROL REGISTER AT P0
1591    .MACRO UCON-OPERATION           ;:=  BEGIN/YES,SELECT/UCON,UCON-XFER/YES  !PERFORM UCON OPERATION
1592
1593
1594
1595    .TOC    *       PROCESSOR UCON CONTROL SETUP
1596    .MACRO UCON-PROC                ;:=  UCON-SEL-PROC/YES                  !SELECT PROCESSOR
1597    .MACRO EN-CLK-IR[15-00]         ;:=  UCON15/1                           !ENABLE OPERATIONS
1598    .MACRO EN-CLK-PS[15-12]         ;:=  UCON14/1                           !
1599    .MACRO EN-CLK-FLAG[8-0]         ;:=  UCON13/1                           !
1600    .MACRO EN-CLK-FPS[7-4]          ;:=  UCON12/1                           !
1601    .MACRO EN-CLK-PS[7-4]           ;:=  UCON11/1                           !
1602    .MACRO EN-CLK-PS[3-0]           ;:=  UCON10/1                           !
1603    .MACRO EN-CLK-UBREAK[11-00]     ;:=  UCON09/1                           !
1604          !UCON<8:7> ARE NOT USED IN PROCESSOR CONTROL
1605    .MACRO BUSDIN_EMIT[15-00]       ;:=  UCON06/0,UCON05/0                  !MBMUX SELECT
1606    .MACRO BUSDIN_CUA[14-03]        ;:=  UCON06/0,UCON05/1                  !
1607    .MACRO BUSDIN_PS[15-00]         ;:=  UCON06/1,UCON05/0                  !
1608    .MACRO BUSDIN_FLAG[8-0]$FPS[7-0] ;:=  UCON06/1,UCON05/1                 !
1609
1610
1611
1612
1613    .TOC    *       DCS/WCS/ECS CONTROL
1614    .MACRO UCON-DCS                 ;:=  UCON-SEL-WCS/YES                   !SELECT DCS
1615    .MACRO BUSDIN_TNUA[11-00]       ;:=  UCON14/0                           !DCS BUSDIN MUX SEL
1616    .MACRO BUSDIN_ERR$EOP$ERRCOD[11-00]    ;:=  UCON14/1                    !
1617    .MACRO START-DCS                ;:=  UCON15/1                           !
1618
1619
1620
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```
1621    ,TOC    *       CACHE/KT UCON CONTROL
1622    ,MACRO UCON-CACHE-KT                    !!=  UCON-SEL-CACHEKT/YES       !SELECT CACHE / KT UCON FUNCTION
1623          !UCON<15> NOT USED HERE
1624    ,MACRO EN-KT-NO-RELOCATE                !!=  UCON14/1                   !INHIBIT KT FROM ANY RELOCATION OF BA -> PBA
1625    ,MACRO BUSDIN_BUS-INTERNAL-ADDR[15-00]  !!=  UCON13/0,UCON12/1          !FROM INTERNAL ADDR ROM
1626    ,MACRO BUSDIN_CPU-INTERNAL-ADDR[15-00]  !!=  UCON13/1,UCON12/1          ! DITTO ...
1627    ,MACRO BUSDIN_MMR2[15-00]               !!=  UCON11/1,UCON09/0          !VIRTUAL PC
1628    ,MACRO BUSDIN_CACHE-STATUS[15-00]       !!=  UCON11/1,UCON09/1          !CACHE INFO
1629    ,MACRO BUSDIN_KT-SEL                    !!=  UCON10/1                   !FOR PAR-S, PDR-S ETC
1630    ,MACRO KT-WRITE-HIGH                    !!=  UCON08/1                   !WRITE REGISTER <15:08>
1631    ,MACRO KT-WRITE-LOW                     !!=  UCON07/1                   !WRITE REGISTER <07:00>
1632    ,MACRO KT-WRITE                         !!=  UCON08/1,UCON07/1          !WRITE REGISTER <15:00>
1633    ,MACRO KT-SEL-SLR#CCR                   !!=  UCON06/0,UCON05/0          !SELECT KT-MUX OUTPUT
1634    ,MACRO KT-SEL-MMR0                      !!=  UCON06/0,UCON05/1          !
1635    ,MACRO KT-SEL-PDR                       !!=  UCON06/1,UCON05/0          !
1636    ,MACRO KT-SEL-PAR                       !!=  UCON06/1,UCON05/1          !
1637
1638
1639
1640
1641    ,TOC    *       I/O UCON CONTROL
1642    ,MACRO UCON-I-O                 !!=  UCON-SEL-I-O/YES                   !SELECT I-O CONTROL
1643
1644
1645
1646    ,TOC    *         BUS CONTROL
1647    ,MACRO EN-LOAD-DBUF[15-00]      !!=  UCON15/1                           !EN LOAD DBUF AT P3
1648    ,MACRO BUSDIN_DBUF[15-00]       !!=  UCON15/1                           !DBUF ON BUSDIN
1649    ,MACRO EN-STATUS-MUX            !!=  UCON15/0                           !STATUS-MUX ENABLE ON BUSDIN
1650          !UCON<14:11> ARE NOT USED IN UCON BUS CONTROL
1651    ,MACRO BUSDIN_SERVICE[15-00]    !!=  UCON10/0,UCON09/1                  !
1652    ,MACRO BUSDIN_JAM[15-00]        !!=  UCON10/1,UCON09/0                  !
1653    ,MACRO BUSDIN_PBA[15-00]        !!=  UCON10/1,UCON09/1                  !
1654    ,MACRO DMUX_CACHEDATA[15-00]    !!=  UCON08/1                           !
1655    ,MACRO EN-BC-FCN=0              !!=  UCON07/0,UCON06/0,UCON05/0         !SELECT BUS CONTROL FUNCTION
1656    ,MACRO EN-START-DELAY           !!=  UCON07/0,UCON06/0,UCON05/1         !
1657    ,MACRO EN-CLR-JAM-ERRORS        !!=  UCON07/0,UCON06/1,UCON05/0         !
1658    ,MACRO EN-CLR-NPR-TIMEOUT       !!=  UCON07/0,UCON06/1,UCON05/1         !
1659    ,MACRO EN-CLR-PWR-FAIL          !!=  UCON07/1,UCON06/0,UCON05/0         !
1660    ,MACRO EN-CLR-YELLOW-ZONE       !!=  UCON07/1,UCON06/0,UCON05/1         !
1661    ,MACRO EN-ALLOW-BG[1]H          !!=  UCON07/1,UCON06/1,UCON05/0         !
1662    ,MACRO EN-BUS-INIT-UCON         !!=  UCON07/1,UCON06/1,UCON05/1         !
1663
1664
1665
1666    ,TOC    *         CONSOLE I-O
1667    ,MACRO EN-CONSOLE-COMMAND       !!=  UCON15/0,UCON14/0                  !SETS UP UCON I-O BITS FOR CONSOLE COMMANDS
1668                                                                            !ALSO SELECTS STATUS-MUX ON BUSDIN
1669    ,MACRO EN-CNSL-NOP              !!=  UCON13/0,UCON12/0,UCON11/0         !ENABLE CONSOLE NO OPERATION
1670    ,MACRO EN-CLR-COUNTP            !!=  UCON13/0,UCON12/0,UCON11/1         !ENABLE CLEAR DIGIT PAIR COUNTER
1671    ,MACRO EN-INCR-COUNTP           !!=  UCON13/0,UCON12/1,UCON11/0         !ENABLE BUMP TO NEXT DIGIT PAIR
1672    ,MACRO EN-CLR-CNSL-SRVC         !!=  UCON13/0,UCON12/1,UCON11/1         !ENABLE CLEAR CONSOLE SERVICE RQST FLOP
1673    ,MACRO EN-STRB-DISP             !!=  UCON13/1,UCON12/0,UCON11/0         !ENABLE WRITE DIGIT PAIR TO DISPLAY LATCH
1674    ,MACRO EN-CLR-CNSL              !!=  UCON13/1,UCON12/0,UCON11/1         !ENABLE CLEAR CONSOLE LED
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1675    ,MACRO EN-SET-CNSL              !!=  UCON13/1,UCON12/1,UCON11/0         !ENABLE SET CONSOLE LED
1676    ,MACRO EN-SET-DP                !!=  UCON13/1,UCON12/1,UCON11/1         !ENABLE SET ALL DP LEDS
1677    ,MACRO BUSDIN_CONSOLE[06-00]    !!=  UCON10/0,UCON09/0                  !STATUS-MUX SELECT
1678          !UCON<8:5> ARE NOT USED IN UCON CONSOLE CONTROL
1679
1680
1681
1682    ,TOC    *         REMOTE CONSOLE INTERFACE
1683    !N.B.:  "EN CONSOLE COMMAND" DOES NOT APPLY TO REMOTE CONSOLE
1684    ,MACRO EN-REMSTRB               !!=  UCON14/1                           !EN REMOTE CONSOLE STROBE
1685    ,MACRO EN-REMCODE1              !!=  UCON12/1                           !EN SPECIAL CODE 1
1686    ,MACRO EN-REMCODE0              !!=  UCON11/1                           !EN SPECIAL CODE 0
1687
1688
1689
1690    !.PAGE=========================================================================================================================
1691
1692    ,TOC    *     DCS ROM EXTENSION MACROS
1693
1694    ,TOC    *       GENERAL FUNCTIONS
1695    ,MACRO LOAD-ENUA(MICROADDR)     !!=  LOAD-ENUA-ERRCOD/YES,              !SPECIFY LOAD
1696                                            ENUA/@MICROADDR                 !AND VALUE
1697    ,MACRO LOAD-ERROR(MICROADDR)    !!=  LOAD-ENUA-ERRCOD/YES               !FOR EFFECT ONLY - ALWAYS ACCOMPANIES ABOVE
1698    ,MACRO BUMP-VERIFY              !!=  VERIFY/BUMP                        !BUMP VERIFY COUNTER WHEN IN SELF TEST MODE
1699    ,MACRO SIGNAL-EOP               !!=  EOP/SIGNAL                         !SIGNAL END OF PASS
1700    ,MACRO DCS-CTR(XX)              !!=  LOAD-DCS-CTR/YES,                  !SPECIFY LOAD COUNTER (DCS|)
1701                                            CTR/@XX                         !AND VALUE
1702
1703
1704
1705    ,TOC    *       DAD<1:0> BIT FUNCTIONS
1706    ,MACRO NO-DAD                   !!=  DAD/NO-DAD                         !DON'T ASSERT DAD BITS
1707    ,MACRO FIRST-1-OR-2             !!=  DAD/FIRST-1-OR-2                   !SELECT CSP CONSTANT 1/2, FIRST USE
1708    ,MACRO SECOND-1-OR-2            !!=  DAD/SECOND-1-OR-2                  !SELECT CSP CONSTANT 1/2, SECOND USE
1709    ,MACRO WRITE-BYTE               !!=  DAD/WRITE-BYTE                     !BYTE WRITE ENABLE TO ASP/BSP
1710    ,MACRO BYTE-WRITE               !!=  DAD/WRITE-BYTE                     !  "
1711
1712
1713
1714    ,TOC    *       DIAGNOSTIC MODE BUT ENABLES
1715
1716    ,MACRO BUTD[SCOPE]              !!=  SCOPE/ENABLED                      !ENABLE SCOPE LOOPING CHECK
1717    ,MACRO BUTD[ERROR]              !!=  SCOPE/ENABLED                      !FORCES NUA00=0 IF ERROR[1]H SET
1718
1719    ,MACRO BUTD[VERIFY-MODE]        !!=  NULL                               !CHECK IMPLICITLY FOR VERIFY MODE
1720                                                                            !'SIGNAL EOP' MUST BE PRESENT IN SAME WORD
1721                                                                            !FORCES NUA01=0 IF VERIFY SWITCH SET
1722
1723    ,MACRO BUTD[EOP-OVERFLOW]       !!=  NULL                               !AFTER 'SIGNAL EOP' GIVEN, ADDRESS IS FORCED
1724                                                                            !TO (4000) IF HARDWARE EOP/VERIFY COUNTER
1725                                                                            !HAS NOT YET OVERFLOWED, FORCING ANOTHER
1726                                                                            !PASS.  ELSE ADDRESS IN UPF IS TAKEN UNMODIFIED.
1727
1728
```

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!.PAGE==========================================================================================

.TOC    *     MICROBRANCH FIELD MACROS
!(SEE <UBF> FIELD DESCRIPTION FOR FULL INFO)

.MACRO BUT(XX)                  ::=  UBF/@XX                       !INACTIVE, FULL WIDTH
.MACRO BUTR(XX)                 ::=  UBF/@XX                       !INACTIVE, RESTRICTED WIDTH

.MACRO BUTA(XX)                 ::=  UBF/@XX                       !ACTIVE, FULL WIDTH
.MACRO BUTRA(XX)                ::=  UBF/@XX                       !ACTIVE, RESTRICTED WIDTH

.MACRO TEST(XX)                 ::=  MULTIPLE/@XX                  !FOR BUTR(MULTIPLE) SETUP
.MACRO BUTM(XX)                 ::=  MULTIPLE/@XX,UBF/@XX          !A MULTIPLE BUTR



!.PAGE==========================================================================================

.TOC    *      MISCELLANEOUS

.TOC    *        OTHER SOURCES ENABLED FOR A-BUS
.MACRO SR                       ::=  AEN/XMUX,ASELO/SR
.MACRO FLTPT                    ::=  AEN/XMUX,ASELO/FLTPT



.TOC    *        PAGING, RETURN REGISTER

        !PAGE FIELD ONLY:
.MACRO PAGE(X)                  ::=  NEXT-PAGE/@X

        !PAGE FIELD AND BUT[SUBR B]:
.MACRO GOTO-PAGE(X)             ::=  NEXT-PAGE/@X,UBF/SUBR-B

        !RETURN REGISTER <- D<14:03>, PAGE <- EMIT<02:00> ON BUTA(SUBR-A)
.MACRO RETURN_D[14-03]          ::=  UBF/SUBR-A



!.PAGE==========================================================================================

.TOC    *   ADVANCED OPERATIONS



.TOC    *      DATA INTO CSP, AT P3 ONLY

        !N.B.: BUSDIN IS ANY BUT EMIT [OVERLAPS BSEL<1:0>]
.MACRO CSPB[14]_BUSDIN          ::=  CSPB(B14),WR-CSP
.MACRO CSPB[15]_BUSDIN          ::=  CSPB(B15),WR-CSP
.MACRO CSPB[16]_BUSDIN          ::=  CSPB(B16),WR-CSP
.MACRO CSPB[17]_BUSDIN          ::=  CSPB(B17),WR-CSP
```



```
        !N.B.: GETS WHATEVER IS ON BUSDIN
.MACRO CSPD[00]_BUSDIN          ::=  CSPD(D00),WR-CSP
.MACRO CSPD[01]_BUSDIN          ::=  CSPD(D01),WR-CSP
.MACRO CSPD[02]_BUSDIN          ::=  CSPD(D02),WR-CSP
.MACRO CSPD[03]_BUSDIN          ::=  CSPD(D03),WR-CSP
.MACRO CSPD[04]_BUSDIN          ::=  CSPD(D04),WR-CSP
.MACRO CSPD[05]_BUSDIN          ::=  CSPD(D05),WR-CSP
.MACRO CSPD[06]_BUSDIN          ::=  CSPD(D06),WR-CSP
.MACRO CSPD[07]_BUSDIN          ::=  CSPD(D07),WR-CSP
.MACRO CSPD[10]_BUSDIN          ::=  CSPD(D10),WR-CSP
.MACRO CSPD[11]_BUSDIN          ::=  CSPD(D11),WR-CSP
.MACRO CSPD[12]_BUSDIN          ::=  CSPD(D12),WR-CSP
.MACRO CSPD[13]_BUSDIN          ::=  CSPD(D13),WR-CSP
.MACRO CSPD[14]_BUSDIN          ::=  CSPD(D14),WR-CSP
.MACRO CSPD[15]_BUSDIN          ::=  CSPD(D15),WR-CSP
.MACRO CSPD[16]_BUSDIN          ::=  CSPD(D16),WR-CSP
.MACRO CSPD[17]_BUSDIN          ::=  CSPD(D17),WR-CSP

        !N.B.: REQUIRED THAT BUSDIN_EMIT[15-00] PREVIOUSLY SET UP
.MACRO CSPD[00]_EMIT            ::=  CSPD(D00),WR-CSP
.MACRO CSPD[01]_EMIT            ::=  CSPD(D01),WR-CSP
.MACRO CSPD[02]_EMIT            ::=  CSPD(D02),WR-CSP
.MACRO CSPD[03]_EMIT            ::=  CSPD(D03),WR-CSP
.MACRO CSPD[04]_EMIT            ::=  CSPD(D04),WR-CSP
.MACRO CSPD[05]_EMIT            ::=  CSPD(D05),WR-CSP
.MACRO CSPD[06]_EMIT            ::=  CSPD(D06),WR-CSP
.MACRO CSPD[07]_EMIT            ::=  CSPD(D07),WR-CSP
.MACRO CSPD[10]_EMIT            ::=  CSPD(D10),WR-CSP
.MACRO CSPD[11]_EMIT            ::=  CSPD(D11),WR-CSP
.MACRO CSPD[12]_EMIT            ::=  CSPD(D12),WR-CSP
.MACRO CSPD[13]_EMIT            ::=  CSPD(D13),WR-CSP
.MACRO CSPD[14]_EMIT            ::=  CSPD(D14),WR-CSP
.MACRO CSPD[15]_EMIT            ::=  CSPD(D15),WR-CSP
.MACRO CSPD[16]_EMIT            ::=  CSPD(D16),WR-CSP
.MACRO CSPD[17]_EMIT            ::=  CSPD(D17),WR-CSP



.TOC    *      MISC CONSTANTS INTO ASP, BSP, AT P2-T * P3

.MACRO A#BSPHI[C100000]_D       ::=  ASP(C100000),BSP(C100000),WR(AB,H,B)
.MACRO A#BSPHI[C000200]_D       ::=  ASP(C000200),BSP(C000200),WR(AB,H,B)
.MACRO A#BSPHI[C000000]_D       ::=  ASP(C000000),BSP(C000000),WR(AB,H,B)
.MACRO A#BSPHI[C177777]_D       ::=  ASP(C177777),BSP(C177777),WR(AB,H,B)
.MACRO A#BSPHI[C000001]_D       ::=  ASP(C000001),BSP(C000001),WR(AB,H,B)
.MACRO A#BSPHI[C052525]_D       ::=  ASP(C052525),BSP(C052525),WR(AB,H,B)

.MACRO A#BSPHI[C125252]_D       ::=  ASP(C125252),BSP(C125252),WR(AB,H,B)

.MACRO A#BSPHI[C100000]_D-[B]   ::=  BSP(C100000),WR(AB,H,B)
.MACRO A#BSPHI[C000200]_D-[B]   ::=  BSP(C000200),WR(AB,H,B)
.MACRO A#BSPHI[C000000]_D-[B]   ::=  BSP(C000000),WR(AB,H,B)
.MACRO A#BSPHI[C177777]_D-[B]   ::=  BSP(C177777),WR(AB,H,B)
.MACRO A#BSPHI[C000001]_D-[B]   ::=  BSP(C000001),WR(AB,H,B)
.MACRO A#BSPHI[C052525]_D-[B]   ::=  BSP(C052525),WR(AB,H,B)
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1837    .MACRO A*BSPHI[C125252]_D=[B]   ::=  BSP(C125252),WR(AB,H,B)
1838
1839    .MACRO A*BSPHI[C100000]_D=[A]   ::=  ASP(C100000),WR(AB,H,A)
1840    .MACRO A*BSPHI[C000200]_D=[A]   ::=  ASP(C000200),WR(AB,H,A)
1841    .MACRO A*BSPHI[C000000]_D=[A]   ::=  ASP(C000000),WR(AB,H,A)
1842    .MACRO A*BSPHI[C177777]_D=[A]   ::=  ASP(C177777),WR(AB,H,A)
1843    .MACRO A*BSPHI[C000001]_D=[A]   ::=  ASP(C000001),WR(AB,H,A)
1844    .MACRO A*BSPHI[C052525]_D=[A]   ::=  ASP(C052525),WR(AB,H,A)
1845    .MACRO A*BSPHI[C125252]_D=[A]   ::=  ASP(C125252),WR(AB,H,A)
1846
1847
1848
1849    .TOC    *      DATA INTO ASP, BSP, AT P2=T * P3
1850
1851    .MACRO ASPLO[17]_CSPB(XX)       ::=  B,ASPLO(R17),CSPB(@XX),CLK=D,P2=T,WR(A,L,A)
1852    .MACRO ASPLO[17]_CSPD(XX)       ::=  B,ASPLO(R17),CSPD(@XX),CLK=D,P2=T,WR(A,L,A)
1853    .MACRO PC_D                     ::=  PC=A,WR(AB,L,A)
1854    .MACRO R5_D                     ::=  R5=A,WR(AB,L,A)
1855
1856    .MACRO ASPLO[00]_D              ::=  ASP(R00),WR(A,L,A)
1857    .MACRO ASPLO[01]_D              ::=  ASP(R01),WR(A,L,A)
1858    .MACRO ASPLO[02]_D              ::=  ASP(R02),WR(A,L,A)
1859    .MACRO ASPLO[03]_D              ::=  ASP(R03),WR(A,L,A)
1860    .MACRO ASPLO[04]_D              ::=  ASP(R04),WR(A,L,A)
1861    .MACRO ASPLO[05]_D              ::=  ASP(R05),WR(A,L,A)
1862    .MACRO ASPLO[06]_D              ::=  ASP(R06),WR(A,L,A)
1863    .MACRO ASPLO[07]_D              ::=  ASP(R07),WR(A,L,A)
1864    .MACRO ASPLO[10]_D              ::=  ASP(R10),WR(A,L,A)
1865    .MACRO ASPLO[11]_D              ::=  ASP(R11),WR(A,L,A)
1866    .MACRO ASPLO[12]_D              ::=  ASP(R12),WR(A,L,A)
1867    .MACRO ASPLO[13]_D              ::=  ASP(R13),WR(A,L,A)
1868    .MACRO ASPLO[14]_D              ::=  ASP(R14),WR(A,L,A)
1869    .MACRO ASPLO[15]_D              ::=  ASP(R15),WR(A,L,A)
1870    .MACRO ASPLO[16]_D              ::=  ASP(R16),WR(A,L,A)
1871    .MACRO ASPLO[17]_D              ::=  ASP(R17),WR(A,L,A)
1872
1873    .MACRO ASPHI[00]_D              ::=  ASP(R00),WR(A,H,A)
1874    .MACRO ASPHI[01]_D              ::=  ASP(R01),WR(A,H,A)
1875    .MACRO ASPHI[02]_D              ::=  ASP(R02),WR(A,H,A)
1876    .MACRO ASPHI[03]_D              ::=  ASP(R03),WR(A,H,A)
1877    .MACRO ASPHI[04]_D              ::=  ASP(R04),WR(A,H,A)
1878    .MACRO ASPHI[05]_D              ::=  ASP(R05),WR(A,H,A)
1879    .MACRO ASPHI[06]_D              ::=  ASP(R06),WR(A,H,A)
1880    .MACRO ASPHI[07]_D              ::=  ASP(R07),WR(A,H,A)
1881    .MACRO ASPHI[10]_D              ::=  ASP(R10),WR(A,H,A)
1882    .MACRO ASPHI[11]_D              ::=  ASP(R11),WR(A,H,A)
1883    .MACRO ASPHI[12]_D              ::=  ASP(R12),WR(A,H,A)
1884    .MACRO ASPHI[13]_D              ::=  ASP(R13),WR(A,H,A)
1885    .MACRO ASPHI[14]_D              ::=  ASP(R14),WR(A,H,A)
1886    .MACRO ASPHI[15]_D              ::=  ASP(R15),WR(A,H,A)
1887    .MACRO ASPHI[16]_D              ::=  ASP(R16),WR(A,H,A)
1888    .MACRO ASPHI[17]_D              ::=  ASP(R17),WR(A,H,A)
1889
1890    .MACRO BSPLO[00]_D              ::=  BSP(R00),WR(B,L,B)
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1891    .MACRO BSPLO[01]_D              ::=  BSP(R01),WR(B,L,B)
1892    .MACRO BSPLO[02]_D              ::=  BSP(R02),WR(B,L,B)
1893    .MACRO BSPLO[03]_D              ::=  BSP(R03),WR(B,L,B)
1894    .MACRO BSPLO[04]_D              ::=  BSP(R04),WR(B,L,B)
1895    .MACRO BSPLO[05]_D              ::=  BSP(R05),WR(B,L,B)
1896    .MACRO BSPLO[06]_D              ::=  BSP(R06),WR(B,L,B)
1897    .MACRO BSPLO[07]_D              ::=  BSP(R07),WR(B,L,B)
1898    .MACRO BSPLO[10]_D              ::=  BSP(R10),WR(B,L,B)
1899    .MACRO BSPLO[11]_D              ::=  BSP(R11),WR(B,L,B)
1900    .MACRO BSPLO[12]_D              ::=  BSP(R12),WR(B,L,B)
1901    .MACRO BSPLO[13]_D              ::=  BSP(R13),WR(B,L,B)
1902    .MACRO BSPLO[14]_D              ::=  BSP(R14),WR(B,L,B)
1903    .MACRO BSPLO[15]_D              ::=  BSP(R15),WR(B,L,B)
1904    .MACRO BSPLO[16]_D              ::=  BSP(R16),WR(B,L,B)
1905    .MACRO BSPLO[17]_D              ::=  BSP(R17),WR(B,L,B)
1906
1907    .MACRO BSPHI[00]_D              ::=  BSP(R00),WR(B,H,B)
1908    .MACRO BSPHI[01]_D              ::=  BSP(R01),WR(B,H,B)
1909    .MACRO BSPHI[02]_D              ::=  BSP(R02),WR(B,H,B)
1910    .MACRO BSPHI[03]_D              ::=  BSP(R03),WR(B,H,B)
1911    .MACRO BSPHI[04]_D              ::=  BSP(R04),WR(B,H,B)
1912    .MACRO BSPHI[05]_D              ::=  BSP(R05),WR(B,H,B)
1913    .MACRO BSPHI[06]_D              ::=  BSP(R06),WR(B,H,B)
1914    .MACRO BSPHI[07]_D              ::=  BSP(R07),WR(B,H,B)
1915    .MACRO BSPHI[10]_D              ::=  BSP(R10),WR(B,H,B)
1916    .MACRO BSPHI[11]_D              ::=  BSP(R11),WR(B,H,B)
1917    .MACRO BSPHI[12]_D              ::=  BSP(R12),WR(B,H,B)
1918    .MACRO BSPHI[13]_D              ::=  BSP(R13),WR(B,H,B)
1919    .MACRO BSPHI[14]_D              ::=  BSP(R14),WR(B,H,B)
1920    .MACRO BSPHI[15]_D              ::=  BSP(R15),WR(B,H,B)
1921    .MACRO BSPHI[16]_D              ::=  BSP(R16),WR(B,H,B)
1922    .MACRO BSPHI[17]_D              ::=  BSP(R17),WR(B,H,B)
1923
1924    .MACRO A*BSPLO[00]_D            ::=  ASP(R00),BSP(R00),WR(AB,L,A)
1925    .MACRO A*BSPLO[01]_D            ::=  ASP(R01),BSP(R01),WR(AB,L,A)
1926    .MACRO A*BSPLO[02]_D            ::=  ASP(R02),BSP(R02),WR(AB,L,A)
1927    .MACRO A*BSPLO[03]_D            ::=  ASP(R03),BSP(R03),WR(AB,L,A)
1928    .MACRO A*BSPLO[04]_D            ::=  ASP(R04),BSP(R04),WR(AB,L,A)
1929    .MACRO A*BSPLO[05]_D            ::=  ASP(R05),BSP(R05),WR(AB,L,A)
1930    .MACRO A*BSPLO[06]_D            ::=  ASP(R06),BSP(R06),WR(AB,L,A)
1931    .MACRO A*BSPLO[07]_D            ::=  ASP(R07),BSP(R07),WR(AB,L,A)
1932    .MACRO A*BSPLO[10]_D            ::=  ASP(R10),BSP(R10),WR(AB,L,A)
1933    .MACRO A*BSPLO[11]_D            ::=  ASP(R11),BSP(R11),WR(AB,L,A)
1934    .MACRO A*BSPLO[12]_D            ::=  ASP(R12),BSP(R12),WR(AB,L,A)
1935    .MACRO A*BSPLO[13]_D            ::=  ASP(R13),BSP(R13),WR(AB,L,A)
1936    .MACRO A*BSPLO[14]_D            ::=  ASP(R14),BSP(R14),WR(AB,L,A)

1937    .MACRO A*BSPLO[15]_D            ::=  ASP(R15),BSP(R15),WR(AB,L,A)
1938    .MACRO A*BSPLO[16]_D            ::=  ASP(R16),BSP(R16),WR(AB,L,A)
1939    .MACRO A*BSPLO[17]_D            ::=  ASP(R17),BSP(R17),WR(AB,L,A)
1940
1941    .MACRO A*BSPHI[00]_D            ::=  ASP(R00),BSP(R00),WR(AB,H,A)
1942    .MACRO A*BSPHI[01]_D            ::=  ASP(R01),BSP(R01),WR(AB,H,A)
1943    .MACRO A*BSPHI[02]_D            ::=  ASP(R02),BSP(R02),WR(AB,H,A)
1944    .MACRO A*BSPHI[03]_D            ::=  ASP(R03),BSP(R03),WR(AB,H,A)
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1945    .MACRO A*BSPHI[04]_D            ;;=  ASP(R04),BSP(R04),WR(AB,H,A)
1946    .MACRO A*BSPHI[05]_D            ;;=  ASP(R05),BSP(R05),WR(AB,H,A)
1947    .MACRO A*BSPHI[06]_D            ;;=  ASP(R06),BSP(R06),WR(AB,H,A)
1948    .MACRO A*BSPHI[07]_D            ;;=  ASP(R07),BSP(R07),WR(AB,H,A)
1949    .MACRO A*BSPHI[10]_D            ;;=  ASP(R10),BSP(R10),WR(AB,H,A)
1950    .MACRO A*BSPHI[11]_D            ;;=  ASP(R11),BSP(R11),WR(AB,H,A)
1951    .MACRO A*BSPHI[12]_D            ;;=  ASP(R12),BSP(R12),WR(AB,H,A)
1952    .MACRO A*BSPHI[13]_D            ;;=  ASP(R13),BSP(R13),WR(AB,H,A)
1953    .MACRO A*BSPHI[14]_D            ;;=  ASP(R14),BSP(R14),WR(AB,H,A)
1954    .MACRO A*BSPHI[15]_D            ;;=  ASP(R15),BSP(R15),WR(AB,H,A)
1955    .MACRO A*BSPHI[16]_D            ;;=  ASP(R16),BSP(R16),WR(AB,H,A)
1956    .MACRO A*BSPHI[17]_D            ;;=  ASP(R17),BSP(R17),WR(AB,H,A)
1957
1958    .MACRO A*BSPLO[00]_D=[A]        ;;=  ASP(R00),WR(AB,L,A)
1959    .MACRO A*BSPLO[01]_D=[A]        ;;=  ASP(R01),WR(AB,L,A)
1960    .MACRO A*BSPLO[02]_D=[A]        ;;=  ASP(R02),WR(AB,L,A)
1961    .MACRO A*BSPLO[03]_D=[A]        ;;=  ASP(R03),WR(AB,L,A)
1962    .MACRO A*BSPLO[04]_D=[A]        ;;=  ASP(R04),WR(AB,L,A)
1963    .MACRO A*BSPLO[05]_D=[A]        ;;=  ASP(R05),WR(AB,L,A)
1964    .MACRO A*BSPLO[06]_D=[A]        ;;=  ASP(R06),WR(AB,L,A)
1965    .MACRO A*BSPLO[07]_D=[A]        ;;=  ASP(R07),WR(AB,L,A)
1966    .MACRO A*BSPLO[10]_D=[A]        ;;=  ASP(R10),WR(AB,L,A)
1967    .MACRO A*BSPLO[11]_D=[A]        ;;=  ASP(R11),WR(AB,L,A)
1968    .MACRO A*BSPLO[12]_D=[A]        ;;=  ASP(R12),WR(AB,L,A)
1969    .MACRO A*BSPLO[13]_D=[A]        ;;=  ASP(R13),WR(AB,L,A)
1970    .MACRO A*BSPLO[14]_D=[A]        ;;=  ASP(R14),WR(AB,L,A)
1971    .MACRO A*BSPLO[15]_D=[A]        ;;=  ASP(R15),WR(AB,L,A)
1972    .MACRO A*BSPLO[16]_D=[A]        ;;=  ASP(R16),WR(AB,L,A)
1973    .MACRO A*BSPLO[17]_D=[A]        ;;=  ASP(R17),WR(AB,L,A)
1974
1975    .MACRO A*BSPHI[00]_D=[A]        ;;=  ASP(R00),WR(AB,H,A)
1976    .MACRO A*BSPHI[01]_D=[A]        ;;=  ASP(R01),WR(AB,H,A)
1977    .MACRO A*BSPHI[02]_D=[A]        ;;=  ASP(R02),WR(AB,H,A)
1978    .MACRO A*BSPHI[03]_D=[A]        ;;=  ASP(R03),WR(AB,H,A)
1979    .MACRO A*BSPHI[04]_D=[A]        ;;=  ASP(R04),WR(AB,H,A)
1980    .MACRO A*BSPHI[05]_D=[A]        ;;=  ASP(R05),WR(AB,H,A)
1981    .MACRO A*BSPHI[06]_D=[A]        ;;=  ASP(R06),WR(AB,H,A)
1982    .MACRO A*BSPHI[07]_D=[A]        ;;=  ASP(R07),WR(AB,H,A)
1983    .MACRO A*BSPHI[10]_D=[A]        ;;=  ASP(R10),WR(AB,H,A)
1984    .MACRO A*BSPHI[11]_D=[A]        ;;=  ASP(R11),WR(AB,H,A)
1985    .MACRO A*BSPHI[12]_D=[A]        ;;=  ASP(R12),WR(AB,H,A)
1986    .MACRO A*BSPHI[13]_D=[A]        ;;=  ASP(R13),WR(AB,H,A)
1987    .MACRO A*BSPHI[14]_D=[A]        ;;=  ASP(R14),WR(AB,H,A)
1988    .MACRO A*BSPHI[15]_D=[A]        ;;=  ASP(R15),WR(AB,H,A)
1989    .MACRO A*BSPHI[16]_D=[A]        ;;=  ASP(R16),WR(AB,H,A)
1990    .MACRO A*BSPHI[17]_D=[A]        ;;=  ASP(R17),WR(AB,H,A)
1991
1992    .MACRO A*BSPLO[00]_D=[B]        ;;=  BSP(R00),WR(AB,L,B)
1993    .MACRO A*BSPLO[01]_D=[B]        ;;=  BSP(R01),WR(AB,L,B)
1994    .MACRO A*BSPLO[02]_D=[B]        ;;=  BSP(R02),WR(AB,L,B)
1995    .MACRO A*BSPLO[03]_D=[B]        ;;=  BSP(R03),WR(AB,L,B)
1996    .MACRO A*BSPLO[04]_D=[B]        ;;=  BSP(R04),WR(AB,L,B)
1997    .MACRO A*BSPLO[05]_D=[B]        ;;=  BSP(R05),WR(AB,L,B)
1998    .MACRO A*BSPLO[06]_D=[B]        ;;=  BSP(R06),WR(AB,L,B)
```



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1999    .MACRO A*BSPLO[07]_D=[B]        ;;=  BSP(R07),WR(AB,L,B)
2000    .MACRO A*BSPLO[10]_D=[B]        ;;=  BSP(R10),WR(AB,L,B)
2001    .MACRO A*BSPLO[11]_D=[B]        ;;=  BSP(R11),WR(AB,L,B)
2002    .MACRO A*BSPLO[12]_D=[B]        ;;=  BSP(R12),WR(AB,L,B)
2003    .MACRO A*BSPLO[13]_D=[B]        ;;=  BSP(R13),WR(AB,L,B)
2004    .MACRO A*BSPLO[14]_D=[B]        ;;=  BSP(R14),WR(AB,L,B)
2005    .MACRO A*BSPLO[15]_D=[B]        ;;=  BSP(R15),WR(AB,L,B)
2006    .MACRO A*BSPLO[16]_D=[B]        ;;=  BSP(R16),WR(AB,L,B)
2007    .MACRO A*BSPLO[17]_D=[B]        ;;=  BSP(R17),WR(AB,L,B)
2008
2009    .MACRO A*BSPHI[00]_D=[B]        ;;=  BSP(R00),WR(AB,H,B)
2010    .MACRO A*BSPHI[01]_D=[B]        ;;=  BSP(R01),WR(AB,H,B)
2011    .MACRO A*BSPHI[02]_D=[B]        ;;=  BSP(R02),WR(AB,H,B)
2012    .MACRO A*BSPHI[03]_D=[B]        ;;=  BSP(R03),WR(AB,H,B)
2013    .MACRO A*BSPHI[04]_D=[B]        ;;=  BSP(R04),WR(AB,H,B)
2014    .MACRO A*BSPHI[05]_D=[B]        ;;=  BSP(R05),WR(AB,H,B)
2015    .MACRO A*BSPHI[06]_D=[B]        ;;=  BSP(R06),WR(AB,H,B)
2016    .MACRO A*BSPHI[07]_D=[B]        ;;=  BSP(R07),WR(AB,H,B)
2017    .MACRO A*BSPHI[10]_D=[B]        ;;=  BSP(R10),WR(AB,H,B)
2018    .MACRO A*BSPHI[11]_D=[B]        ;;=  BSP(R11),WR(AB,H,B)
2019    .MACRO A*BSPHI[12]_D=[B]        ;;=  BSP(R12),WR(AB,H,B)
2020    .MACRO A*BSPHI[13]_D=[B]        ;;=  BSP(R13),WR(AB,H,B)
2021    .MACRO A*BSPHI[14]_D=[B]        ;;=  BSP(R14),WR(AB,H,B)
2022    .MACRO A*BSPHI[15]_D=[B]        ;;=  BSP(R15),WR(AB,H,B)
2023    .MACRO A*BSPHI[16]_D=[B]        ;;=  BSP(R16),WR(AB,H,B)
2024    .MACRO A*BSPHI[17]_D=[B]        ;;=  BSP(R17),WR(AB,H,B)
2025
2026    .MACRO ASPLO[DF]_D              ;;=  ASP=ADDRS=R[DF],WR(A,L,A)
2027    .MACRO ASPHI[DF]_D              ;;=  ASP=ADDRS=R[DF],WR(A,H,A)
2028    .MACRO BSPLO[DF]_D              ;;=  BSP=ADDRS=R[DF],WR(B,L,B)
2029    .MACRO BSPHI[DF]_D              ;;=  BSP=ADDRS=R[DF],WR(B,H,B)
2030
2031    .MACRO ASPLO[SF]_D              ;;=  ASP=ADDRS=R[SF],WR(A,L,A)
2032    .MACRO ASPHI[SF]_D              ;;=  ASP=ADDRS=R[SF],WR(A,H,A)
2033    .MACRO BSPLO[SF]_D              ;;=  BSP=ADDRS=R[SF],WR(B,L,B)
2034    .MACRO BSPHI[SF]_D              ;;=  BSP=ADDRS=R[SF],WR(B,H,B)
2035
2036    .MACRO A*BSPLO[DF]_D=[A]        ;;=  ASP=ADDRS=R[DF],WR(AB,L,A)
2037    .MACRO A*BSPHI[DF]_D=[A]        ;;=  ASP=ADDRS=R[DF],WR(AB,H,A)
2038    .MACRO A*BSPLO[DF]_D=[B]        ;;=  BSP=ADDRS=R[DF],WR(AB,L,B)
2039    .MACRO A*BSPHI[DF]_D=[B]        ;;=  BSP=ADDRS=R[DF],WR(AB,H,B)
2040
2041    .MACRO A*BSPLO[SF]_D=[A]        ;;=  ASP=ADDRS=R[SF],WR(AB,L,A)
2042    .MACRO A*BSPHI[SF]_D=[A]        ;;=  ASP=ADDRS=R[SF],WR(AB,H,A)
2043    .MACRO A*BSPLO[SF]_D=[B]        ;;=  BSP=ADDRS=R[SF],WR(AB,L,B)
2044    .MACRO A*BSPHI[SF]_D=[B]        ;;=  BSP=ADDRS=R[SF],WR(AB,H,B)
2045
2046    .MACRO A*BSPLO[SF]_D            ;;=  ASP=ADDRS=R[SF],BSP=ADDRS=R[SF],WR(AB,L,A)
2047    .MACRO A*BSPLO[DF]_D            ;;=  ASP=ADDRS=R[DF],BSP=ADDRS=R[DF],WR(AB,L,A)
2048
2049    .MACRO A*BSPHI[SF]_D            ;;=  ASP=ADDRS=R[SF],BSP=ADDRS=R[SF],WR(AB,H,A)
2050    .MACRO A*BSPHI[DF]_D            ;;=  ASP=ADDRS=R[DF],BSP=ADDRS=R[DF],WR(AB,H,A)
2051
2052
```

```
2053    !.PAGE=================================================================================================================
2054
2055    .TOC    *      D AND SR <- (BUS-A FCN BUS-B), AT P2-T OR P3-T
2056
2057            !LOGIC FUNCTIONS:
2058    .MACRO SR_ZERO                  !!= ZERO,CLK-SR
2059    .MACRO SR_A-XOR-B               !!= A-XOR-B,CLK-SR
2060    .MACRO SR_B                     !!= B,CLK-SR
2061    .MACRO SR_A-AND-B               !!= A-AND-B,CLK-SR
2062    .MACRO SR_A-IOR-B               !!= A-IOR-B,CLK-SR
2063    .MACRO SR_A                     !!= A,CLK-SR
2064    .MACRO SR_NOT-A                 !!= NOT-A,CLK-SR
2065    .MACRO SR_NOT-A-AND-B           !!= NOT-A-AND-B,CLK-SR
2066    .MACRO SR_A-AND-NOT-B           !!= A-AND-NOT-B,CLK-SR
2067    .MACRO D_ZERO                   !!= ZERO,CLK-D
2068    .MACRO D_A-XOR-B                !!= A-XOR-B,CLK-D
2069    .MACRO D_B                      !!= B,CLK-D
2070    .MACRO D_A-AND-B                !!= A-AND-B,CLK-D
2071    .MACRO D_A-IOR-B                !!= A-IOR-B,CLK-D
2072    .MACRO D_A                      !!= A,CLK-D
2073    .MACRO D_NOT-A                  !!= NOT-A,CLK-D
2074    .MACRO D_NOT-A-AND-B            !!= NOT-A-AND-B,CLK-D
2075    .MACRO D_A-AND-NOT-B            !!= A-AND-NOT-B,CLK-D
2076
2077            !ARITH FUNCTIONS:
2078    .MACRO D_DIVIDE-STEP                    !!= DIVIDE,CLK-D
2079    .MACRO D_A-PLUS-B                       !!= A-PLUS-B,CLK-D
2080    .MACRO D_A-PLUS-B-PLUS-0                !!= A-PLUS-B,CLK-D
2081    .MACRO D_A-MINUS-B                      !!= A-MINUS-B,CLK-D
2082    .MACRO D_A-PLUS-B-PLUS-PS[C]            !!= A-PLUS-B-PLUS-PS[C],CLK-D
2083    .MACRO D_A-PLUS-B-PLUS-D[C]             !!= A-PLUS-B-PLUS-D[C],CLK-D
2084    .MACRO D_A-PLUS-NOT-B-PLUS-D[C]         !!= A-PLUS-NOT-B-PLUS-D[C],CLK-D
2085    .MACRO D_A-PLUS-B-PLUS-1                !!= A-PLUS-B-PLUS-1,CLK-D
2086    .MACRO SR_DIVIDE-STEP                   !!= DIVIDE,CLK-SR
2087    .MACRO SR_A-PLUS-B                      !!= A-PLUS-B,CLK-SR
2088    .MACRO SR_A-PLUS-B-PLUS-0               !!= A-PLUS-B,CLK-SR
2089    .MACRO SR_A-MINUS-B                     !!= A-MINUS-B,CLK-SR
2090    .MACRO SR_A-PLUS-B-PLUS-PS[C]           !!= A-PLUS-B-PLUS-PS[C],CLK-SR
2091    .MACRO SR_A-PLUS-B-PLUS-D[C]            !!= A-PLUS-B-PLUS-D[C],CLK-SR
2092    .MACRO SR_A-PLUS-NOT-B-PLUS-D[C]        !!= A-PLUS-NOT-B-PLUS-D[C],CLK-SR
2093    .MACRO SR_A-PLUS-B-PLUS-1               !!= A-PLUS-B-PLUS-1,CLK-SR
2094
2095
2096
2097
2098    .TOC    *      D[C] GETS SET
2099
2100    .MACRO D[C]_CINMUX              !!=  CLK-D,COUT_CIN
2101    .MACRO D[C]_1                   !!=  CLK-D,COUT_CIN             !NEEDS SPECIFIC ALU/---
2102    .MACRO D[C]_0                   !!=  CLK-D,COUT_CIN             !NEEDS SPECIFIC ALU/---
2103    .MACRO D[C]_PS[C]               !!=  CLK-D,COUT_PS[C]
2104    .MACRO D[C]_ALU00               !!=  CLK-D,COUT_ALU00
2105    .MACRO D[C]_ALU07               !!=  CLK-D,COUT_ALU07
2106    .MACRO D[C]_ALU15               !!=  CLK-D,COUT_ALU15
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2107    .MACRO D[C]_COUT07              !!=  CLK-D,COUT_COUT07
2108    .MACRO D[C]_COUT15              !!=  CLK-D,COUT_COUT15
2109    .MACRO D[C]_D[C]                !!=  CLK-D,COUT_D[C]
2110    .MACRO SAVE-D[C]                !!=  CLK-D,COUT_D[C]
2111
2112
2113
2114
2115
2116    .TOC    *      D-REGISTER <- [BBUS = ABUS], BITWISE, AT P2-T OR P3-T
2117
2118            !N.B.!  SHIFT TREE ENABLED SEPARATELY
2119    .MACRO D_D-SHIFTED-XOR-CSPB(XX)                 !!=  A-XOR-B,CSPB(@XX),CLK-D
2120    .MACRO D_D-SHIFTED-XOR-BSPHI(XX)                !!=  A-XOR-B,BSPHI(@XX),CLK-D
2121
2122    .MACRO D_FLTPT-XOR-CSPB(XX)                     !!=  A-XOR-B,FLTPT,CSPB(@XX),CLK-D
2123    .MACRO D_FLTPT-XOR-CSPD(XX)                     !!=  A-XOR-B,FLTPT,CSPD(@XX),CLK-D
2124    .MACRO D_FLTPT-XOR-BSPHI(XX)                    !!=  A-XOR-B,FLTPT,BSPHI(@XX),CLK-D
2125
2126    .MACRO D_SR-XOR-CSPB(XX)                        !!=  A-XOR-B,SR,CSPB(@XX),CLK-D
2127    .MACRO D_SR-XOR-CSPD(XX)                        !!=  A-XOR-B,SR,CSPD(@XX),CLK-D
2128    .MACRO D_SR-XOR-BSPHI(XX)                       !!=  A-XOR-B,SR,BSPHI(@XX),CLK-D
2129
2130    .MACRO D_ASPLO[17]-XOR-CSPD(XX)                 !!=  A-XOR-B,ASPLO(R17),CSPD(@XX),CLK-D
2131    .MACRO D_ASPLO[07]-XOR-BSPHI(XX)                !!=  A-XOR-B,ASPLO(R07),BSPHI(@XX),CLK-D
2132    .MACRO D_ASPLO[05]-XOR-BSPHI(XX)                !!=  A-XOR-B,ASPLO(R05),BSPHI(@XX),CLK-D
2133
2134    .MACRO D_SR-XOR-BSPLO[SF]                       !!=  A-XOR-B,SR,R[SF]-LO-B,CLK-D
2135    .MACRO D_SR-XOR-BSPHI[DF]                       !!=  A-XOR-B,SR,R[DF]-HI-B,CLK-D
2136
2137    .MACRO D_ASPLO[DF]-XOR-BSPHI[SF]                !!=  A-XOR-B,R[DF]-LO-A,R[SF]-HI-B,CLK-D
2138    .MACRO D_ASPHI[SF]-XOR-BSPLO[DF]                !!=  A-XOR-B,R[SF]-HI-A,R[DF]-LO-B,CLK-D
2139
2140    .MACRO D_CSPD[05]-XOR-ASPLO(XX)                 !!=  A-XOR-B,CSPD(D05),ASPLO(@XX),CLK-D
2141    .MACRO D_CSPD[05]-XOR-ASPHI(XX)                 !!=  A-XOR-B,CSPD(D05),ASPHI(@XX),CLK-D
2142    .MACRO D_CSPD[06]-XOR-ASPLO(XX)                 !!=  A-XOR-B,CSPD(D06),ASPLO(@XX),CLK-D
2143    .MACRO D_CSPD[06]-XOR-ASPHI(XX)                 !!=  A-XOR-B,CSPD(D06),ASPHI(@XX),CLK-D
2144    .MACRO D_CSPD[17]-XOR-ASPHI(XX)                 !!=  A-XOR-B,CSPD(D17),ASPHI(@XX),CLK-D
2145
2146    .MACRO D_ASPLO[02]-XOR-BSPLO(XX)                !!=  A-XOR-B,ASPLO(R02),BSPLO(@XX),CLK-D
2147    .MACRO D_ASPLO[03]-XOR-BSPLO(XX)                !!=  A-XOR-B,ASPLO(R03),BSPLO(@XX),CLK-D
2148    .MACRO D_ASPLO[04]-XOR-BSPLO(XX)                !!=  A-XOR-B,ASPLO(R04),BSPLO(@XX),CLK-D
2149    .MACRO D_ASPLO[05]-XOR-BSPLO(XX)                !!=  A-XOR-B,ASPLO(R05),BSPLO(@XX),CLK-D
2150
2151
2152
2153    .TOC    *      D-REGISTER <- D-REGISTER THRU SHIFT-TREE
2154
2155    .MACRO D_D-RIGHT-14             !!=  A,D-RIGHT-14,CLK-D
2156    .MACRO D_D-RIGHT-13             !!=  A,D-RIGHT-13,CLK-D
2157    .MACRO D_D-RIGHT-12             !!=  A,D-RIGHT-12,CLK-D
2158    .MACRO D_D-RIGHT-11             !!=  A,D-RIGHT-11,CLK-D
2159    .MACRO D_D-RIGHT-10             !!=  A,D-RIGHT-10,CLK-D
2160    .MACRO D_D-RIGHT-9              !!=  A,D-RIGHT-9,CLK-D
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2161    .MACRO D_D-RIGHT-8              ;;=  A,D-RIGHT-8,CLK-D
2162    .MACRO D_D-RIGHT-7              ;;=  A,D-RIGHT-7,CLK-D
2163    .MACRO D_D-RIGHT-6              ;;=  A,D-RIGHT-6,CLK-D
2164    .MACRO D_D-RIGHT-5              ;;=  A,D-RIGHT-5,CLK-D
2165    .MACRO D_D-RIGHT-4              ;;=  A,D-RIGHT-4,CLK-D
2166    .MACRO D_D-RIGHT-3              ;;=  A,D-RIGHT-3,CLK-D
2167    .MACRO D_D-RIGHT-2              ;;=  A,D-RIGHT-2,CLK-D
2168    .MACRO D_D-RIGHT-1              ;;=  A,D-RIGHT-1,CLK-D
2169    .MACRO D_D-NO-SHIFT             ;;=  A,D-NO-SHIFT,CLK-D
2170    .MACRO D_D-DIRECT               ;;=  A,D-DIRECT,CLK-D
2171    .MACRO D_D                      ;;=  A,D-DIRECT,CLK-D
2172    .MACRO SAVE-D                   ;;=  A,D-DIRECT,CLK-D
2173    .MACRO D_D-LEFT-1               ;;=  A,D-LEFT-1,CLK-D
2174    .MACRO D_D-SWAB                 ;;=  A,D-SWAB,CLK-D
2175    .MACRO D_D-SWAB-RIGHT-3         ;;=  A,D-SWAB-RIGHT-3,CLK-D
2176    .MACRO D_D-SWAB-LEFT-1          ;;=  A,D-SWAB-LEFT-1,CLK-D
2177    .MACRO D_D-SIGNEXT              ;;=  A,D-SIGNEXT,CLK-D
2178    .MACRO D_D-SIGNEXT-RIGHT-1      ;;=  A,D-SIGNEXT-RIGHT-1,CLK-D
2179    .MACRO D_D-SIGNEXT-LEFT-1       ;;=  A,D-SIGNEXT-LEFT-1,CLK-D
2180    .MACRO D_NO-SHIFT               ;;=  A,NO-SHIFT,CLK-D
2181    .MACRO D_DIRECT                 ;;=  A,DIRECT,CLK-D
2182    .MACRO D_COUNT#D[HI]            ;;=  A,COUNT#D[HI],CLK-D
2183    .MACRO D_COUNT#D[LO]            ;;=  A,COUNT#D[LO],CLK-D
2184
2185
2186
2187    .TOC    *       D <= WHATEVER'S LEFT, AT P2-T OR P3-T
2188
2189    .MACRO D_NOT-ASPHI(XX)                  ;;=  NOT-A,ASPHI(@XX),CLK-D
2190    .MACRO D_NOT-ASPLO(XX)                  ;;=  NOT-A,ASPLO(@XX),CLK-D
2191    .MACRO D_NOT-CSPB(XX)                   ;;=  A-AND-NOT-B,C177777-A,CSPB(@XX),CLK-D
2192    .MACRO D_NOT-CSPD(XX)                   ;;=  A-AND-NOT-B,C177777-A,CSPD(@XX),CLK-D
2193
2194    .MACRO D_CSPD(XX)                       ;;=  B,CSPD(@XX),CLK-D
2195    .MACRO D_CSPB(XX)                       ;;=  B,CSPB(@XX),CLK-D
2196    .MACRO D_CSPB(16)#D[C]_1                ;;=  A-IOR-B,C000000-A,CSPB(B16),CLK-D,D[C]_CINMUX
2197
2198    .MACRO D_BSPHI(XX)                      ;;=  B,BSPHI(@XX),CLK-D
2199    .MACRO D_BSPLO(XX)                      ;;=  B,BSPLO(@XX),CLK-D
2200    .MACRO D_ASPHI(XX)                      ;;=  A,ASPHI(@XX),CLK-D
2201    .MACRO D_ASPLO(XX)                      ;;=  A,ASPLO(@XX),CLK-D
2202
2203    .MACRO D_ASPLO[DF]                      ;;=  A,R[DF]-LO-A,CLK-D
2204    .MACRO D_ASPHI[DF]                      ;;=  A,R[DF]-HI-A,CLK-D
2205    .MACRO D_BSPLO[DF]                      ;;=  B,R[DF]-LO-B,CLK-D
2206    .MACRO D_BSPHI[DF]                      ;;=  B,R[DF]-HI-B,CLK-D
2207    .MACRO D_ASPLO[SF]                      ;;=  A,R[SF]-LO-A,CLK-D
2208    .MACRO D_ASPHI[SF]                      ;;=  A,R[SF]-HI-A,CLK-D
2209    .MACRO D_BSPLO[SF]                      ;;=  B,R[SF]-LO-B,CLK-D
2210    .MACRO D_BSPHI[SF]                      ;;=  B,R[SF]-HI-B,CLK-D
2211
2212    .MACRO D_CSPD[14]-AND-ASPHI(XX)                 ;;=  A-AND-B,CSPD(D14),ASPHI(@XX),CLK-D
2213    .MACRO D_CSPD[15]-AND-ASPHI(XX)                 ;;=  A-AND-B,CSPD(D15),ASPHI(@XX),CLK-D
2214
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2215    .MACRO SP_ASPHI[17]-AND-007700          ;;=  A-AND-B,ASPHI(R17),CSPB(B17),CLK-SR
2216    .MACRO D_SR-IOR-170000                  ;;=  A-IOR-B,SR,CSPB(B16),CLK-D
2217    .MACRO SR_ASPHI[17]-AND-000077          ;;=  A-AND-B,ASPHI(R17),CSPB(B15),CLK-SR
2218    .MACRO D_SR-IOR-000100                  ;;=  A-IOR-B,SR,CSPB(B14),CLK-D
2219
2220    .MACRO D_ASPLO[17]-AND-CSPD(XX)         ;;=  A-AND-B,ASPLO(R17),CSPD(@XX),CLK-D
2221    .MACRO D_ASPHI[00]-IOR-CSPD(XX)         ;;=  A-IOR-B,ASPHI(R00),CSPD(@XX),CLK-D
2222    .MACRO D_ASPHI[00]-IOR-CSPB(XX)         ;;=  A-IOR-B,ASPHI(R00),CSPB(@XX),CLK-D
2223
2224    .MACRO D_SP                             ;;=  A,SR,CLK-D
2225    .MACRO D_ALL-ONES                       ;;=  A,C177777-A,CLK-D
2226    .MACRO D_D-PLUS-1                       ;;=  A-PLUS-B,D=DIRECT,C000001-B,CLK-D
2227    .MACRO D_JUNK                           ;;=  ZERO,CLK-D
2228    .MACRO D_TWO                            ;;=  A-PLUS-B,C000001-A,C000001-B,CLK-D
2229
2230
2231
2232    !.PAGE==========================================================================================================
2233
2234    .TOC    *       SP <= DATA, AT P2 T OR P3 T
2235
2236            !N.B.!  THE PARTICULAR FUNCTION SELECTED REQUIRES THE RESIDUAL
2237            !       CONTROL REGISTER ("RES-REG") TO HAVE THE APPROPRIATE
2238            !       FUNCTION SETUP FOR THE SR OPERATION.
2239            !
2240            !       POSSIBLE FUNCTIONS:  LOAD, LEFT, RIGHT, NOP
2241
2242    .MACRO SP_ASPHI(XX)                     ;;=  A,ASPHI(@XX),CLK-SR
2243    .MACRO SR_NOT-ASPHI(XX)                 ;;=  NOT-A,ASPHI(@XX),CLK-SR
2244    .MACRO SR_CSPB(XX)                      ;;=  B,CSPB(@XX),CLK-SR
2245    .MACRO SR_CSPD(XX)                      ;;=  B,CSPD(@XX),CLK-SR
2246    .MACRO SR_NOT-BSPHI(XX)                 ;;=  A-AND-NOT-B,BSPHI(@XX),C177777-A,CLK-SR
2247    .MACRO SR_BSPHI(XX)                     ;;=  B,BSPHI(@XX),CLK-SP
2248    .MACRO SR_SR-PLUS-1                     ;;=  A-PLUS-B,C000001-B,SR,CLK-SR
2249    .MACRO SR_ALL-ONES                      ;;=  A,C177777-A,CLK-SR
2250    .MACRO SR_NOT-CSPB(XX)                  ;;=  A-AND-NOT-B,C177777-A,CSPB(@XX),CLK-SR
2251    .MACRO SR_NOT-CSPD(XX)                  ;;=  A-AND-NOT-B,C177777-A,CSPD(@XX),CLK-SR
2252    .MACRO SR_SR-RIGHT-1                    ;;=  D=DIRECT[BMUX],CLK-SR
2253    .MACRO SR_SR-LEFT-1                     ;;=  CLK-SR
2254    .MACRO SR_JUNK                          ;;=  ZERO,CLK-SR
2255    .MACRO SR_D                             ;;=  A,D-DIRECT,CLK-SR
2256    .MACRO SR_ASPLO[DF]                     ;;=  A,R[DF]-LO-A,CLK-SR
2257    .MACRO SR_ASPHI[DF]                     ;;=  A,R[DF]-HI-A,CLK-SR
2258    .MACRO SR_BSPLO[DF]                     ;;=  B,R[DF]-LO-B,CLK-SR
2259    .MACRO SR_BSPHI[DF]                     ;;=  B,R[DF]-HI-B,CLK-SR
2260    .MACRO SR_ASPLO[SF]                     ;;=  A,R[SF]-LO-A,CLK-SR

2261    .MACRO SR_ASPHI[SF]                     ;;=  A,R[SF]-HI-A,CLK-SR
2262    .MACRO SR_BSPLO[SF]                     ;;=  B,R[SF]-LO-B,CLK-SR
2263    .MACRO SR_BSPHI[SF]                     ;;=  B,R[SF]-HI-B,CLK-SR
2264
2265
2266
2267
2268
```

```
2269    .TOC    *       RES-REG OPERATION MACROS
2270
2271    .MACRO RES_CSPD(XX)             ;;=  CSPD(@XX),LOAD-RES
2272    .MACRO RES_CSPB(XX)             ;;=  CSPB(@XX),LOAD-RES
2273
2274
2275
2276
2277
2278    .TOC    *       BASE MACHINE COUNTER
2279
2280    .MACRO COUNTER_CSPD(XX)         ;;=  LOAD-COUNTER,CSPD(@XX)
2281    .MACRO COUNTER_BSPHI(XX)        ;;=  LOAD-COUNTER,BSPHI(@XX)
2282
2283
2284
2285
2286    .TOC    *       ENABLE ON BUS-A/B ONLY
2287
2288    .MACRO BUS-A_ASPLO[SF]          ;;=  R[SF]-LO-A
2289    .MACRO BUS-A_ASPLO[DF]          ;;=  R[DF]-LO-A
2290    .MACRO BUS-A_ASPHI[SF]          ;;=  R[SF]-HI-A
2291    .MACRO BUS-A_ASPHI[DF]          ;;=  R[DF]-HI-A
2292    .MACRO BUS-A                    ;;=  NULL
2293    .MACRO BUS-A_ASPLO(XX)          ;;=  ASPLO(@XX)
2294    .MACRO BUS-A_ASPHI(XX)          ;;=  ASPHI(@XX)
2295    .MACRO BUS-A_SR                 ;;=  SR
2296    .MACRO BUS-A_FLTPT              ;;=  FLTPT
2297
2298    .MACRO BUS-B_BSPLO[SF]          ;;=  R[SF]-LO-B
2299    .MACRO BUS-B_BSPLO[DF]          ;;=  R[DF]-LO-B
2300    .MACRO BUS-B_BSPHI[SF]          ;;=  R[SF]-HI-B
2301    .MACRO BUS-B_BSPHI[DF]          ;;=  R[DF]-HI-B
2302    .MACRO BUS-B                    ;;=  NULL
2303    .MACRO BUS-B_BSPLO(XX)          ;;=  BSPLO(@XX)
2304    .MACRO BUS-B_BSPHI(XX)          ;;=  BSPHI(@XX)
2305    .MACRO BUS-B_CSPD(XX)           ;;=  CSPD(@XX)
2306    .MACRO BUS-B_CSPB(XX)           ;;=  CSPB(@XX)
2307
2308
2309
2310
2311
2312    .TOC    *       LOADING BA REGISTER
2313    !LOADED AT P1-T ONLY, FROM BUS-B<01:00>!BUS-A<15:00> -> BA<17:00>
2314
2315    .MACRO BA_BSPLO(XX)             ;;=  CLK-BA,BSPLO(@XX)
2316    .MACRO BA_BSPHI(XX)             ;;=  CLK-BA,BSPHI(@XX)
2317    .MACRO BA_SR                    ;;=  CLK-BA,SR
2318    .MACRO BA_ASPLO(XX)             ;;=  CLK-BA,ASPLO(@XX)
2319    .MACRO BA_ASPHI(XX)             ;;=  CLK-BA,ASPHI(@XX)
2320
2321
2322
```



```
2323
2324
2325    .TOC    *       D AND SR TOGETHER
2326
2327    .MACRO SR!D_SR-PLUS-CSPD(XX)    ;;=  A-PLUS-B,SR,CSPD(@XX),CLK-D,CLK-SR
2328
2329
2330
2331    !.PAGE=========================================================================================================
2332
2333    .TOC    *       UCON FUNCTIONS
2334
2335
2336
2337    .TOC    *         PROCESSOR UCON FUNCTIONS
2338
2339          !PREVIOUSLY SET UP (UCON-PROC, SET-UCON-CONTROL, EN "FUNCTION"]
2340    .MACRO IR_EMIT                  ;;=  UCON-OPERATION
2341    .MACRO PS[15-12]_D[15!13]       ;;=  UCON-OPERATION
2342    .MACRO FLAG[8-0]_D[15-8]        ;;=  UCON-OPERATION
2343    .MACRO FPS[7-4]_D[7-4]          ;;=  UCON-OPERATION
2344    .MACRO PS[7-4]_D[7-4]           ;;=  UCON-OPERATION
2345    .MACRO PS[3-0]_D[3-0]           ;;=  UCON-OPERATION
2346    .MACRO PS_D                     ;;=  UCON-OPERATION
2347    .MACRO UBREAK_BUSDIN[11-00]     ;;=  UCON-OPERATION
2348
2349          !SETUP UCON AND EXECUTE IN 1 MICROWORD!
2350    .MACRO PS[15-12]_D[!S!13]-[I]   ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,EN-CLK-PS[15-12]
2351    .MACRO FLAG[8-0]_D[15-8]-[I]    ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,EN-CLK-FLAG[8-0]
2352    .MACRO FPS[7-4]_D[7-4]-[I]      ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,EN-CLK-FPS[7-4]
2353    .MACRO PS[7-4]_D[7-4]-[I]       ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,EN-CLK-PS[7-4]
2354    .MACRO PS[3-0]_D[3-0]-[I]       ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,EN-CLK-PS[3-0]
2355    .MACRO PS_D-[I]                 ;;=  UCON-PROC,SET-UCON-CONTROL,UCON-OPERATION,
2356                                           EN-CLK-PS[15-12],EN-CLK-PS[7-4],EN-CLK-PS[3-0]
2357    .MACRO BUSDIN_CUA-[I]           ;;=  UCON-PROC,SET-UCON-CONTROL,BUSDIN_CUA[14-03]
2358    .MACRO BUSDIN_FLAGS!FPS-[I]     ;;=  UCON-PROC,SET-UCON-CONTROL,BUSDIN_FLAG[8-0]!FPS[7-0]
2359    .MACRO BUSDIN_PS-[I]            ;;=  UCON-PROC,SET-UCON-CONTROL,BUSDIN_PS[15-00]
2360    .MACRO BUSDIN_EMIT-[I]          ;;=  UCON-PROC,SET-UCON-CONTROL,BUSDIN_EMIT[15-00]
2361
2362
2363
2364    .TOC    *       CACHE/KT UCON FUNCTIONS
2365
2366          !SETUP, EXECUTE IN 1 MICROWORD
2367    .MACRO KT-NO-RELOCATE-[I]           ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,EN-KT-NO-RELOCATE
2368    .MACRO BUSDIN_BUS-INTERNAL-ADDR-[I] ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_BUS-INTERNAL-ADDR[15-00]

2369    .MACRO BUSDIN_CPU-INTERNAL-ADDR-[I] ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_CPU-INTERNAL-ADDR[15-00]
2370    .MACRO BUSDIN_MMR2-[I]              ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_MMR2[15-00]
2371    .MACRO BUSDIN_CACHE-STATUS-[I]      ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_CACHE-STATUS[15-00]
2372    .MACRO BUSDIN_SLR!CCR-[I]           ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_KT-SEL,KT-SEL-SLR!CCR
2373    .MACRO BUSDIN_MMR0-[I]              ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_KT-SEL,KT-SEL-MMR0
2374    .MACRO BUSDIN_PDR-[I]               ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_KT-SEL,KT-SEL-PDR
2375    .MACRO BUSDIN_PAR-[I]               ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,BUSDIN_KT-SEL,KT-SEL-PAR
2376    .MACRO SLR[15-08]_D[15-08]-[I]      ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL-SLR!CCR,KT-WRITE-HIGH
```

```
2377    .MACRO CCR[07-02]_D[07-02]-[I]          ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=SLR$CCR,KT-WRITE-LOW
2378    .MACRO MMR0_D-[I]                       ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=MMR0,KT-WRITE
2379    .MACRO MMR0[00]_D[00]-[I]               ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=MMR0,KT-WRITE-LOW
2380    .MACRO MMR0[15-01]_D[15-01]-[I]         ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=MMR0,KT-WRITE-HIGH
2381    .MACRO PDR_D-[I]                        ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PDR,KT-WRITE
2382    .MACRO PDR[03-01]_D[03-01]-[I]          ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PDR,KT-WRITE-LOW
2383    .MACRO PDR[14-08]_D[14-08]-[I]          ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PDR,KT-WRITE-HIGH
2384    .MACRO PAR_D-[I]                        ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PAR,KT-WRITE
2385    .MACRO PAR[07-00]_D[07-00]-[I]          ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PAR,KT-WRITE-LOW
2386    .MACRO PAR[11-08]_D[11-08]-[I]          ;;=  UCON-CACHE-KT,SET-UCON-CONTROL,UCON-OPERATION,KT-SEL=PAR,KT-WRITE-HIGH
2387
2388
2389
2390    .TOC    *       I-O UCON FUNCTIONS
2391
2392            !N.B.!  SETUP IN 1 MICROWORD
2393    .MACRO BUSDIN_JAM-[I]           ;;=  UCON-I-O,EN-STATUS-MUX,SET-UCON-CONTROL,BUSDIN_JAM[15-00]
2394    .MACRO BUSDIN_SERVICE-[I]       ;;=  UCON-I-O,EN-STATUS-MUX,SET-UCON-CONTROL,BUSDIN_SERVICE[15-00]
2395    .MACRO BUSDIN_PBA-[I]           ;;=  UCON-I-O,EN-STATUS-MUX,SET-UCON-CONTROL,BUSDIN_PBA[15-00]
2396    .MACRO BC-FCN-0-[I]             ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-BC-FCN-0
2397    .MACRO START-DELAY-[I]          ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-START-DELAY
2398    .MACRO CLR-JAM-ERRORS-[I]       ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-JAM-ERRORS
2399    .MACRO CLR-NPR-TIMEOUT-[I]      ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-NPR-TIMEOUT
2400    .MACRO CLR-PWR-FAIL-[I]         ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-PWR-FAIL
2401    .MACRO CLR-YELLOW-ZONE-[I]      ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-YELLOW-ZONE
2402    .MACRO ALLOW-BG[1]H-[I]         ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-ALLOW-BG[1]H
2403    .MACRO BUS-INIT-UCON-[I]        ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-BUS-INIT-UCON
2404
2405
2406    .TOC    *       DCS UCON FUNCTIONS
2407
2408            !SETUP IN 1 MICROWORD!
2409    .MACRO BUSDIN_TNUA-[I]          ;;=  UCON-DCS,SET-UCON-CONTROL,BUSDIN_TNUA[11-00]
2410    .MACRO BUSDIN_ERROR-CODE-[I]    ;;=  UCON-DCS,SET-UCON-CONTROL,BUSDIN_ERR$EOP$ERRCOD[11-00]
2411
2412
2413    .TOC    *       CONSOLE UCON FUNCTIONS
2414
2415            !SETS UP AND PERFORMS INDICATED OPERATION IN 1 MICROWORD
2416    .MACRO CONSOLE-NOP                      ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-CNSL-NOP
2417    .MACRO CLEAR-CONSOLE-COUNTER            ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-COUNTR
2418    .MACRO INCREMENT-CONSOLE-COUNTER        ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-INCR-COUNTR
2419    .MACRO CLEAR-CONSOLE-SERVICE            ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-CNSL-SRVC
2420    .MACRO STROBE-CONSOLE-DISPLAY           ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-STRB-DISP
2421    .MACRO CLEAR-CONSOLE-LED                ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-CLR-CNSL
2422    .MACRO SET-CONSOLE-LED                  ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-SET-CNSL
2423    .MACRO SET-CONSOLE-DP-LEDS              ;;=  UCON-I-O,EN-CONSOLE-COMMAND,SET-UCON-CONTROL,UCON-OPERATION,EN-SET-DP
2424    .MACRO BUSDIN_CONSOLE-[I]               ;;=  UCON-I-O,EN-STATUS-MUX,SET-UCON-CONTROL,BUSDIN_CONSOLE[06-00]
2425
2426
2427
2428    .TOC    *       DBUF UCON FUNCTIONS
2429
2430            !PREVIOUSLY SETUP UCON=I-O, EN LOAD DBUF
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2431    .MACRO DBUF_D                   ;;=  UCON-OPERATION
2432
2433            !SETUP AND EXECUTE IN 1 MICROWORD!
2434    .MACRO DBUF_D-[I]               ;;=  UCON-I-O,SET-UCON-CONTROL,UCON-OPERATION,EN-LOAD-DBUF[15-00]
2435
2436
2437    .TOC    *       MULTIPLE UCON FUNCTIONS
2438
2439            !THESE ARE FUNCTIONS OF MORE THAN 1 UCON ENABLED SIMULTANEOUSLY
2440
2441            !PREVIOUSLY SETUP!
2442    .MACRO IR_DBUF                  ;;=  UCON-OPERATION
2443
2444            !SETUP AND EXECUTE IN 1 MICROWORD!
2445    .MACRO IR_DBUF-[I]              ;;=  UCON-PROC,UCON-I-O,SET-UCON-CONTROL,
2446                                            UCON-OPERATION,EN-CLK-IR[15-00],BUSDIN_DBUF[15-00]
2447
2448
2449
2450    !.PAGE=========================================================================================================
2451
2452    .TOC    *       SPECIFIC MACROS FOR PREFETCH/OVERLAP/SP-INHIBIT TESTS
2453
2454    .MACRO CSPD[17]_020010          ;;=  EMIT/020010,CSPD[17]_EMIT
2455    .MACRO A$BSPLO[OVERLAP]_D       ;;=  ASPLO(R10),WR(AB,L,A)
2456    .MACRO A$BSPHI[PATTERN]_D       ;;=  ASPHI(R17),WR(AB,H,A)
2457    .MACRO A$BSPHI[PREFETCH]_D      ;;=  ASPHI(R10),WR(AB,H,A)
2458    .MACRO ASPLO[OVERLAP]_D         ;;=  ASPLO(R10),WR(A,L,A)
2459    .MACRO BSPLO[OVERLAP]_D         ;;=  BSPLO(R10),WR(B,L,B)
2460    .MACRO ASPHI[PREFETCH]_D        ;;=  ASPHI(R10),WR(A,H,A)
2461
2462    .MACRO D_ASPLO[OVERLAP]-PLUS-1          ;;=  A-PLUS-B,ASPLO(R10),C000001-B,CLK-D
2463    .MACRO D_BSPLO[OVERLAP]-PLUS-1          ;;=  A-PLUS-B,BSPLO(R10),C000001-A,CLK-D
2464    .MACRO D_ASPHI[PREFETCH]-PLUS-1         ;;=  A-PLUS-B,ASPHI(R10),C000001-B,CLK-D
2465    .MACRO D_ASPHI[PATTERN]-PLUS-020010-PLUS-1      ;;=  A-PLUS-B-PLUS-1,ASPHI(R17),CSPB(B17),CLK-D
2466    .MACRO D_ASPHI[PATTERN]-AND-NOT-020010          ;;=  A-AND-NOT-B,ASPHI(R17),CSPB(B17),CLK-D
2467
2468    .MACRO D_BSPHI[PREFETCH]                ;;=  B,BSPHI(R10),CLK-D
2469    .MACRO D_ASPLO[OVERLAP]-MINUS-CSPB[EXPEC]       ;;=  A-MINUS-B,ASPLO(R10),CSPB(B17),CLK-D
2470    .MACRO D_ASPHI[PPEFETCH]-MINUS-CSPB[EXPEC]      ;;=  A-MINUS-B,ASPHI(R10),CSPB(B17),CLK-D
2471    .MACRO D_ASPLO[OVERLAP]-MINUS-BSPLO[OVERLAP]    ;;=  A-MINUS-B,ASPLO(R10),BSPLO(R10),CLK-D
2472
2473    .MACRO CSPD[EXPEC]_EMIT                 ;;=  CSPD[17]_EMIT
2474
2475
2476
2477    !.PAGE=========================================================================================================
2478
2479    .TOC    *       SPECIFIC MACROS FOR BYTE/BYTE CONSTANT/D=ZERO TESTS
2480
2481    .MACRO D_ASPLO[DNONZERO]-PLUS-1         ;;=  A-PLUS-B,ASPLO(R11),C000001-B,CLK-D
2482    .MACRO D_BSPLO[DZERO]-PLUS-1            ;;=  A-PLUS-B,C000001-A,BSPLO(R11),CLK-D
2483    .MACRO D_BSPLO[IR-DATA]-PLUS-2          ;;=  A-PLUS-A-PLUS-1,C000001-A,BSPLO(R10),CLK-D
2484    .MACRO D_BSPHI[WORD]-PLUS-1             ;;=  A-PLUS-B,C000001-A,BSPHI(R10),CLK-D
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2485    .MACRO D_BSPLO[IR-DATA]                 !!=  B,BSPLO(R10),CLK-D
2486    .MACRO D_BSPLO[DZERO]                   !!=  B,BSPLO(R11),CLK-D
2487    .MACRO D_SR-MINUS-BSPHI[WORD]           !!=  A-MINUS-B,SR,BSPHI(R10),CLK-D,P3-T
2488    .MACRO D_ASPLO[DNONZERO]-MINUS-CSPD[17]       !!=  A-MINUS-B,ASPLO(R11),CSPD(D17),CLK-D,P3-T
2489    .MACRO D_ASPHI[BYTE-FIRST]-MINUS-CSPD[17]     !!=  A-MINUS-B,ASPHI(R10),CSPD(D17),CLK-D,P3-T
2490    .MACRO D_ASPLO[BYTE-SECOND]-MINUS-CSPD[17]    !!=  A-MINUS-B,ASPLO(R10),CSPD(D17),CLK-D,P3-T
2491    .MACRO D_ASPHI[BYTE-FIRST]-PLUS-CSP[1-0]      !!=  A-PLUS-B,ASPHI(R10),CSPD(D13),CLK-D
2492    .MACRO D_ASPLO[BYTE-SECOND]-PLUS-CSP[1-0]     !!=  A-PLUS-B,ASPLO(R10),CSPD(D13),CLK-D
2493
2494
2495
2496    !.PAGE=============================================================================================================
2497
2498    .TOC    *      SUBROUTINE CALL MACROS
2499
2500    .MACRO CALL[DISPLAY]                !!=  GOTO-PAGE(7),J/DISPLAY
2501
2502    .MACRO CALL[DINTOIR]                !!=  GOTO-PAGE(7),J/DINTOIR
2503    .MACRO CALL[DINTOIR-5]              !!=  GOTO-PAGE(7),J/DINTOIR5
2504    .MACRO CALL[SPINTOIR]               !!=  GOTO-PAGE(7),J/SRINTOIR
2505    .MACRO CALL[SRINTOIR-5]             !!=  GOTO-PAGE(7),J/SRINTOIR5
2506
2507    .MACRO CALL[FLAGFPSTOD]             !!=  GOTO-PAGE(7),J/FLAGFPSTOD
2508    .MACRO CALL[PSTOD]                  !!=  GOTO-PAGE(7),J/PSTOD
2509    .MACRO CALL[CUATOD]                 !!=  GOTO-PAGE(7),J/CUATOD
2510    .MACRO CALL[CLRJAMTOD]              !!=  GOTO-PAGE(7),J/CLRJAMTOD
2511    .MACRO CALL[ODDJAMTOD]              !!=  GOTO-PAGE(7),J/ODDJAMTOD
2512    .MACRO CALL[JAMTOD]                 !!=  GOTO-PAGE(7),J/JAMTOD
2513    .MACRO CALL[CLRSERVICETOD]          !!=  GOTO-PAGE(7),J/CLRSERVICETOD
2514    .MACRO CALL[DATISERVICETOD]         !!=  GOTO-PAGE(7),J/DATISERVICETOD
2515    .MACRO CALL[DATOSERVICETOD]         !!=  GOTO-PAGE(7),J/DATOSERVICETOD
2516    .MACRO CALL[CJESERVICETOD]          !!=  GOTO-PAGE(7),J/CJESERVICETOD
2517    .MACRO CALL[SERVICETOD]             !!=  GOTO-PAGE(7),J/SERVICETOD
2518    .MACRO CALL[PBATOD]                 !!=  GOTO-PAGE(7),J/PBATOD
2519    .MACRO CALL[PSSEQLOD]               !!=  GOTO-PAGE(7),J/PSSEQLOD
2520    .MACRO CALL[FLAGFPSSEQLOD]          !!=  GOTO-PAGE(7),J/FLAGFPSSEQLOD
2521    .MACRO CALL[FLAGLOD]                !!=  GOTO-PAGE(7),J/FLAGFP803
2522    .MACRO CALL[GETPROCDAT]             !!=  GOTO-PAGE(7),J/GETPROCDAT
2523
2524    .MACRO CALL[CLEAR-I-O-A]            !!=  GOTO-PAGE(7),J/CLEAR-I-O-A
2525    .MACRO CALL[CLEAR-I-O-B]            !!=  GOTO-PAGE(7),J/CLEAR-I-O-B
2526
2527    .MACRO CALL[BUSDINXOR125252]        !!=  GOTO-PAGE(7),J/BDX12
2528    .MACRO CALL[BUSDINXOR052525]        !!=  GOTO-PAGE(7),J/BDX05
2529    .MACRO CALL[CSP17XOR125252]         !!=  GOTO-PAGE(7),J/C17X12
2530    .MACRO CALL[CSP17XOR052525]         !!=  GOTO-PAGE(7),J/C17X05
2531
2532    .MACRO CALL[D15-12]                 !!=  GOTO-PAGE(7),J/D[15-12]
2533    .MACRO CALL[D11-06]                 !!=  GOTO-PAGE(7),J/D[11-06]
2534    .MACRO CALL[D05-00]                 !!=  GOTO-PAGE(7),J/D[05-00]
2535    .MACRO CALL[DZERO]                  !!=  GOTO-PAGE(7),J/DZERO
2536
2537    .MACRO CALL[ZEROSF04DF02]           !!=  GOTO-PAGE(7),J/ZEROSF04DF02
2538    .MACRO CALL[ZEROSF02DF04]           !!=  GOTO-PAGE(7),J/ZEROSF02DF04
```



```
2539    .MACRO CALL[ZEROSFDF]               !!=  GOTO-PAGE(7),J/ZEROSFDF
2540    .MACRO CALL[ZERODF]                 !!=  GOTO-PAGE(7),J/ZERODF
2541
2542    .MACRO CALL[SFDFTOSR]               !!=  GOTO-PAGE(8),J/SFDFTOSR
2543
2544    .MACRO CALL[ALUCARRY1]              !!=  GOTO-PAGE(7),J/ALUCARRY1
2545    .MACRO CALL[ALUCARRY2]              !!=  GOTO-PAGE(7),J/ALUCARRY2
2546
2547    .MACRO CALL[LOADFPSCC]              !!=  GOTO-PAGE(7),J/LOADFPSCC
2548    .MACRO XFR-TO-RM[LOADNZW4]          !!=  GOTO-PAGE(4),J/LOADNZW4
2549
2550    .MACRO CALL[SETUPPSCC*DC]           !!=  GOTO-PAGE(7),J/SETUPPSCC*DC
2551    .MACRO CALL[PSCCTOSR3-0]            !!=  GOTO-PAGE(7),J/PSCCTOSR3-0
2552
2553    .MACRO CALL[CSP16XORSRTOIR-5]       !!=  GOTO-PAGE(7),J/CSP16XORSRTOIR5
2554    .MACRO CALL[CSP16XORFLTTOIR-5]      !!=  GOTO-PAGE(7),J/CSP16XORFLTTOIR5
2555
2556    .MACRO CALL[MFSS-TEST]              !!=  GOTO-PAGE(6),J/MFSS01
2557
2558    .MACRO CALL[KTSRCDST]               !!=  GOTO-PAGE(7),J/KTSRCDST01
2559    .MACRO CALL[KTDSTRSP]               !!=  GOTO-PAGE(7),J/KTSRCDST08
2560    .MACRO CALL[KTSRCBSP]               !!=  GOTO-PAGE(7),J/KTSRCDST07
2561
2562    .MACRO CALL[COUNT-TEST]             !!=  GOTO-PAGE(4),J/COUNTER01
2563
2564
2565
2566    !.PAGE=============================================================================================================
2567
2568    .TOC    *      JAM UPP LOG MACROS
2569
2570          !MACROS CONCERNED WITH CSP LOG AFTER UNEXPECTED JAMUPP
2571          !MACROS REQUIRE APPROPRIATE REGISTER ENABLED ON BUSDIN
2572
2573    .MACRO CSPD[00]_LOG-CUA             !!=  CSPD(D00),WR-CSP
2574    .MACRO CSPD[01]_LOG-SERVICE         !!=  CSPD(D01),WR-CSP
2575    .MACRO CSPD[02]_LOG-JAM             !!=  CSPD(D02),WR-CSP
2576
2577
2578
2579    !*****  END OF MACRO DEFINITIONS  *****
2580
2581
2582
2583    !.PAGE=============================================================================================================
2584

2585    .TOC    * - - -  MICRODIAGNOSTIC CODE - - - - - - - - - - - - - - - - - -
2586
2587    .CODE

2588
2589
2590
2591
2592
```

```
2593
2594
2595    !.PAGE=========================================================================================================
2596
2597    !*** VERSION /V10140/ ***
2598
2599    !***** MICRODIAGNOSTIC INITIAL STARTUP LOCATION *****
2600
2601
2602    .TOC    *   TEST001-007:  NUA SEQUENCING
2603
2604    !*************************************************************************************
2605    !*
2606    !*      TESTS:  001 - 007                               UWORDS: 010 + 000
2607    !*
2608    !*      FUNCTIONS:        TESTS 001 - 007 TEST THE NUA SEQUENCING LOGIC.
2609    !*                        PATTERNS ARE RUN THRU THE NUA LOGIC ESTABLISHING
2610    !*                        THAT ALL BITS CAN BE SET AND CLEARED, AND THAT THE
2611    !*                        STATE (SET, CLEARED) OF NO ONE BIT AFFECTS THE
2612    !*                        ABILITY TO SET/CLEAR ANY OTHER BIT.  THE PAGE
2613    !*                        CHANGING FUNCTIONS OF BUTA(SUBR-A) AND BUTA(SUBR-B)
2614    !*                        ARE ALSO TESTED FOR PAGES 4, 5, 6, & 7.  NOTE
2615    !*                        THAT THE RETURN ADDRESS SIMULTANEOUSLY LOADED
2616    !*                        IS NOT CHECKED FOR VALIDITY AT THIS POINT.
2617    !*
2618    !*      NOTES:  TEST[N] DOES THE SETUP FOR TEST[N+1].  THE ACTUAL TEST CONSISTS
2619    !*              OF BEING IN THE RIGHT PLACE (MICROWORD) AT THE RIGHT TIME.
2620    !*
2621    !*************************************************************************************
2622
2623
2624
2625
2626
2627
2628    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
2629
2630    !*** TEST 001 ***
2631    !TEST   NUA LOGIC   WITH PATTERN "100 000 000 000"
2632    4000:
2633    TEST001:
2634            P0,     LOAD=ENUA(6252),                        !LOAD ENUA WITH ADDR(NEXT UWORD)
2635                    LOAD=ERROR(TEST001),                    !ERROR DIRECTORY KEY
2636                    DC8-CTR(C1.),                           !COMPARE AT NEXT UWORD
2637            NEXT,   PAGE(2), BUTA(SUBR-B),                  !CHANGING TO PAGE 2 (ACTUALLY 6), VIA SUBR-B
2638                    J/TEST002                               !NOTE OVERLAP:  NEXTPAGE<2:0>=ENUA<2:0>
    (4000)  DC8[1,00,1,0,0,0]  BM[1110,,00,11,,00,10,,101,,010,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,010]
2639                                                        !NOTE ALSO DC8 MODULE FORCES NUA<11>=1, SO
2640                                                        !PAGES 2/6 ARE EQUIVALENT REFERENCES.
2641
2642
2643
```



```
2644
2645
2646
2647
2648
2649    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
2650
2651    !*** TEST 002 ***
2652    !TEST   NUA LOGIC   WITH PATTERN "010 010 101 010"
2653    6252:
2654    TEST002:
2655            P0,     LOAD=ENUA(6631),                        !LOAD ENUA WITH ADDR(NEXT UWORD)
2656                    LOAD=ERROR(TEST002),                    !ERROR DIRECTORY KEY
2657                    DC8-CTR(C1.),                           !COMPARE AT NEXT UWORD
2658                    BUMP-VERIFY,                            !COUNT
2659            NEXT,   J/TEST003                               !
    (6252)  DC8[1,00,1,0,0,1]  BM[1110,,00,11,,01,10,,011,,001,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,011,001]
2660
2661
2662
2663
2664
2665
2666
2667
2668    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
2669
2670    !*** TEST 003 ***
2671    !TEST   NUA LOGIC   WITH PATTERN "010 110 011 001"
2672    6631:
2673    TEST003:
2674            P0,     LOAD=ENUA(5525),                        !LOAD ENUA WITH ADDR(NEXT UWORD)
2675                    LOAD=ERROR(TEST003),                    !ERROR DIRECTORY KEY
2676                    DC8-CTR(C1.),                           !COMPARE AT NEXT UWORD
2677            NEXT,   PAGE(5), BUTA(SUBR-A),                  !CHANGING TO PAGE 5, VIA SUBR-A
2678                    J/TEST004                               !NOTE OVERLAP:  NEXTPAGE<2:0>=ENUA<2:0>
    (6631)  DC8[1,00,1,0,0,0]  BM[1110,,00,10,,11,01,,010,,101,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,101,,,101,010,101]
2679
2680
2681
2682
2683
2684
2685
2686
2687    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

2688
2689    !*** TEST 004 ***
2690    !TEST   NUA LOGIC   WITH PATTERN "101 101 010 101"
2691    5525:
2692    TEST004:
2693            P0,     LOAD=ENUA(5146),                        !LOAD ENUA WITH ADDR(NEXT UWORD)
2694                    LOAD=ERROR(TEST004),                    !ERROR DIRECTORY KEY
```

```
                DCS-CTR(C1.),                           ;COMPARE AT NEXT UWORD
                BUMP-VERIFY,                            ;COUNT
        NEXT,   J/TEST005                               ;
 (5525) DCS[1,00,1,0,0,1]  BM[1110,,00,10,,10,01,,100,,110,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,110]

 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 ;*** TEST 005 ***
 ;TEST   NUA LOGIC   WITH PATTERN "101 001 100 110"
 5146:
 TEST005:
        PO,     LOAD-ENUA(4474),                        ;LOAD ENUA WITH ADDR[NEXT UWORD]
                LOAD-ERROR(TEST005),                    ;ERROR DIRECTORY KEY
                DCS-CTR(C1.),                           ;COMPARE AT NEXT UWORD
        NEXT,   PAGE(4), BUTA(SUBR-B),                  ;CHANGING TO PAGE 4, VIA SUBR-B
                J/TEST006                               ;NOTE OVERLAP:  NEXTPAGE<2:0>=ENUA<2:0>
 (5146) DCS[1,00,1,0,0,0]  BM[1110,,00,10,,01,00,,111,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,100,111,100]

 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 ;*** TEST 006 ***
 ;TEST   NUA LOGIC   WITH PATTERN "100 100 111 100"
 4474:
 TEST006:
        PO,     LOAD-ENUA(4377),                        ;LOAD ENUA WITH ADDR[NEXT UWORD]
                LOAD-ERROR(TEST006),                    ;ERROR DIRECTORY KEY
                DCS-CTR(C1.),                           ;COMPARE AT NEXT UWORD
                BUMP-VERIFY,                            ;COUNT
        NEXT,   J/TEST007                               ;
 (4474) DCS[1,00,1,0,0,1]  BM[1110,,00,10,,00,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,111]

 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```



```
 ;*** TEST 007 ***
 ;TEST   NUA LOGIC   WITH PATTERN "100 011 111 111"
 4377:
 TEST007:
        PO,     LOAD-ENUA(7303),                        ;LOAD ENUA WITH ADDR[NEXT UWORD]
                LOAD-ERROR(TEST007),                    ;ERROR DIRECTORY KEY
                DCS-CTR(C1.),                           ;COMPARE AT NEXT UWORD
        NEXT,   PAGE(3), BUTA(SUBR-A),                  ;CHANGING TO PAGE 3 (ACTUALLY 7), VIA SUBR-A
                J/NEXT007                               ;NOTE OVERLAP:  NEXTPAGE<2:0>=ENUA<2:0>
 (4377) DCS[1,00,1,0,0,0]  BM[1110,,00,11,,10,11,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,101,,,011,000,011]
                                                        ;NOTE ALSO DCS MODULE FORCES NUA<11>=1, SO
                                                        ;PAGES 3/7 ARE EQUIVALENT REFERENCES.

 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 ;*** TEST 007-1/2 ***
 ;TEST    NUA LOGIC   WITH PATTERN "011 011 000 011"
 7303:
 NEXT007:
        NEXT,   PAGE(4), BUTA(SUBR-B),                  ;CHANGING TO PAGE 4, VIA SUBR B
                J/TEST010                               ;OFF TO NEXT TEST
 (7303) DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,111,111,101]

 ;.PAGE========================================================================================

 .TOC   *   TEST010-011:  MICROSUBROUTINE OPERATION

 ;*************************************************************************
 ;*                                                                       *
 ;*     TESTS:  010 - 011                         UWORDS: 007 + 002       *
 ;*                                                                       *
 ;*     FUNCTIONS:      THESE TWO TESTS DETERMINE THAT THE RETURN REGISTER AND   *
 ;*                     ASSOCIATED DECODE, MUX, AND ENABLING LOGIC IS ABLE TO    *
 ;*                     LOAD THE 12-BIT NUA RETURN REGISTER FROM THE EMIT        *
 ;*                     FIELD, AND THEN ENTER THE REGISTER CONTENTS ONTO THE     *
 ;*                     UWORD ADDRESS BUS [WHEN ENABLED BY A BUTA[RETURN]] IN    *
 ;*                     TIME TO FETCH THE NEXT MICROWORD.  TWO ALTERNATING       *
 ;*                     BIT TESTS ARE USED TO CHECK THAT EACH BIT CAN BE SET     *
 ;*                     AND CLEARED, INDEPENDENT OF ADJACENT BITS.               *

 ;*                                                                       *
 ;*************************************************************************
```

```
	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 010 ***
	!TEST RETURN LOGIC WITH PATTERN "1010 1010 0101" (5245)
	4775:
	TEST010:
		P0,	LOAD-ENUA(NEXT010),			!LOAD ENUA WITH EXPECTED RETURN ADDRESS
			LOAD-ERROR(TEST010),			!ERROR DIRECTORY KEY
			DCS-CTR(C4.),				!COMPARE ENUA:TNUA IN 4. MICROWORDS
		NEXT,	J/LOAD010				!GO LOAD
 (4775)	DCS[1,00,1,0,0,0]  BM[1011,,00,10,,10,10,,100,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,000,000]

	4100:	!(FREE)
	LOAD010:
		SETUP,	RETURN/NEXT010,			!SET RETURN ADDRESS FROM EMIT
		NEXT,	PAGE(7),				!"SUBR" IS ON PAGE 7
			BUTA(SUBR-B),				!WITH B VERSION
			J/SUBR010				!"SUBR" DISP. ON PAGE
 (4100)	DCS[0,00,0,0,0,0]  BM[0101,,00,01,,01,00,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,000,000]

	7000:	!(FREE)
	SUBR010:
		SETUP,	RETURN/ERROR010,			!NOISE BITS IN EMIT-RETURN FIELD
		P3,	BUTA(CLR-FLAG-RES-UCON),		!NOISE IN UBF FIELD
		NEXT,	J/ZTARGET777				!BEFORE DO BUTA[RETURN]
 (7000)	DCS[0,00,0,0,0,0]  BM[0110,,00,10,,11,00,,011,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,010,,,111,111,111]

	!	REMAINDER OF SUBROUTINE IS AT ZTARGET777 [LOCATION 7777[8]], WHICH IMMEDIATELY DOES A BUTA[RETURN]
	!	TO THE ADDRESS IN THE RETURN REGISTER, WHICH SHOULD BE THE VALUE LOADED IN WORD
	!	LOAD010.  THE RETURN REGISTER WAS SET TO POINT TO THE START OF THE NEXT TEST
	!	[NEXT010], AT WHICH POINT THE ENUA:TNUA COMPARE IS SET TO TAKE PLACE.

	6543:
	ERROR010:
		P0,	BUMP-VERIFY,				!COUNT
		NEXT,	PAGE(4),				!IF WE END UP HERE, THE NOISE BITS
			J/TEST010				!WERE LOADED INTO THE RETURN REGISTER INSTEAD
 (6543)	DCS[0,00,0,0,0,1]  BM[0000,,00,00,,00,00,,000,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,111,101]

	5245:
	NEXT010:
		P0,	BUMP-VERIFY,				!COUNT
		NEXT,	J/TEST011				!RETURNED OK, COMPARE ENUA:TNUA DONE HERE
 (5245)	DCS[0,00,0,0,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,111,111]
```



```
	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 011 ***
	!TEST RETURN LOGIC WITH PATTERN "1101 0101 1010" (6532)
	5777:
	TEST011:
		P0,	LOAD-ENUA(INITIALIZE01),		!LOAD ENUA WITH EXPECTED RETURN ADDRESS
			LOAD-ERROR(TEST011),			!ERROR DIRECTORY KEY
			DCS-CTR(C3.),				!COMPARE ENUA:TNUA IN 3. MICROWORDS
		NEXT,	J/LOAD011				!GO LOAD
 (5777)	DCS[1,00,1,0,0,0]  BM[1100,,00,11,,01,01,,011,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,001]

	5001:	!(FREE)
	LOAD011:
		SETUP,	RETURN/INITIALIZE01,			!SET RETURN ADDRESS IN EMIT
		NEXT,	PAGE(7),				!"SUBR" IS ON PAGE 7
			BUTA(SUBR-B),				!VIA B VERSION
			J/RESETUCONP				!"SUBR" DISP. ON PAGE
 (5001)	DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,11,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,001]

	!	"ONE-WORD SUBROUTINE" IS AT LABEL "RESETUCONP", WHICH IMMEDIATELY DOES A BUTA[RETURN]
	!	TO THE ADDRESS IN THE RETURN REGISTER, WHICH SHOULD BE THE VALUE LOADED AT SYMBOLIC LABEL
	!	"LOAD011".  THE RETURN REGISTER WAS SET TO POINT TO THE INITIALIZATION CODE ON THE NEXT PAGE:
	!	"INITIALIZE01", AT WHICH POINT THE ENUA:TNUA COMPARE IS SET TO TAKE PLACE.
	!	THIS SUBROUTINE ALSO 'ATTEMPTS' TO SET THE UCON CONTROL TO:  'PROC', 'BUSDIN_EMIT', AND
	!	'EN-CLK-IR', FOR USE IN THE FOLLOWING INITIALIZATION ROUTINE.



	! + + + + + + + + + + + + + + + + + + + + + + + + + + + + + + +

	!	*** BUTA(RETURN) ERROR LOOP WORDS:
	!
	!	IF AT ANY TIME, A 'BUTA(RETURN)' FAILS, ONE OF THE FOLLOWING MICROWORDS WILL BE
	!	CONTINUOUSLY LOOPED UPON.  THIS IS DUE TO THE FACT THAT FOR EACH MICROWORD THAT
	!	CONTAINS THIS 'BUTA(RETURN)', THE UPF FIELD (WHICH WOULD NORMALLY NOT BE USED IN THIS
	!	MICROWORD EXECUTION), CONTAINS THE VALUE "J/BUTERROR#", WHERE NUMBER (#) IS THE
	!	CURRENT MICROWORD'S PAGE NUMBER (4-7).

	4376:
	BUTERROR4:
		P0,	DCS-CTR(C0.),				!FORCE AN ERROR, ERROR-CODE=LAST LOADED
		NEXT,	J/BUTERROR4				!HANG UP
 (4376)	DCS[0,00,1,0,0,0]  BM[1111,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,110]


	5376:
	BUTERROR5:
		P0,	DCS-CTR(C0.),				!FORCE AN ERROR, ERROR-CODE=LAST LOADED
		NEXT,	J/BUTERROR5				!HANG UP
 (5376)	DCS[0,00,1,0,0,0]  BM[1111,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,110]
```

```
2891    6376:
2892    BUTERROR6:
2893            P0,     DCS-CTR(C0,),                   ;FORCE AN ERROR, ERROR-CODE=LAST LOADED
2894            NEXT,   J/BUTERROR6                     ;HANG UP
     (6376)  DCS[0,00,1,0,0,0]  BM[1111,,00,00,,00,00,,000,,000,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,110]
2895
2896
2897    7376:
2898    BUTERROR7:
2899            P0,     ;DCS-CTR(C0,),                  ;FORCE AN ERROR, ERROR-CODE=LAST LOADED
2900            NEXT,   J/BUTERROR7                     ;HANG UP
     (7376)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,110]
2901
2902
2903
2904    ;.PAGE;=========================================================================================================
2905
2906    .TOC    *   INIT REGISTERS, CONSOLE DEFAULT ERROR DISPLAY, REVISION CODE
2907
2908
2909    ;*************************************************************************************
2910    ;*
2911    ;*      TESTS:  INITIALIZATION                  UWORDS:  011 + 011
2912    ;*
2913    ;*      FUNCTIONS:
2914    ;*
2915    ;*      TRY TO PUT AN OCTAL (000000) IN THE CONSOLE DISPLAY AS AN ERROR INDICATOR
2916    ;*
2917    ;*      PUT REVISION CODE, BIT15 CLEAR, IN GPR R5
2918    ;*
2919    ;*      SET FLAGS, FPS, PS, UBREAK REGISTERS TO ALL ZEROS TO DISABLE AS MUCH
2920    ;*      AS POSSIBLE ANY SPURIOUS HOT FLOATING POINT STARTUPS, UBREAKS, ETC.
2921    ;*
2922    ;*      TURN OFF CACHE (SET BOTH FORCE MISS BITS), AND TURN OFF KT (MEMORY
2923    ;*      MANAGEMENT (BY CLEARING ENABLE BIT).
2924    ;*
2925    ;*************************************************************************************
2926
2927
2928                    ;RETURNED OK, COMPARE OF ENUA:TNUA
2929                    ;FOR PREV TEST DONE HERE
2930    6532:
2931    INITIALIZE01:
2932            SETUP,  RETURN/INITIALIZE03,            ;GO TO SUBR THAT PUTS REVISION NUMBER,
2933            NEXT,   GOTO-PAGE(7),                   ;  WITH B<15>=(0), INTO B.M. GPR "R5"
2934                    J/INSERTREVNO                   ;
     (6532)  DCS[0,00,0,0,0,0]  BM[0111,,00,00,,00,00,,001,,111,,,0,0,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,001,110]
2935
2936    7001:  ;(FREE)
2937    INITIALIZE03:
2938            P3,     CSPD[17]_EMIT, EMIT/000014,     ;EMITCON TO DISABLE CACHE, KT
2939            NEXT,   J/INITIALIZE04                  ;
     (7001)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,00,00,,001,,100,,,0,0,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,000,000,011]
```



```
2940
2941    7003:  ;(FREE)
2942    INITIALIZE04:
2943            P2-T,   D_CSPD(D17), D[C]_0,            ;GET ABOVE CONSTANT INTO D
2944            P2,     RES_CSPD(D17),                  ;BITS<14:11>=0/00/0 FOR SR-LOAD, GUARD-DIS
2945            NEXT,   J/INITIALIZE05                  ;
     (7003)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,1,0,,0,,,0,0000,,,0,,1000,1,,,11,000,,,000,000,100]
2946
2947    7004:  ;(FREE)
2948    INITIALIZE05:
2949            P2-T,   CCR[07-02]_D[07-02]-[I],        ;LOAD CCR, DISABLING CACHE
2950            NEXT,   J/INITIALIZE06                  ;  BITS<3:2> SET FORCE MISS
     (7004)  DCS[0,00,0,0,0,0]  BM[0001,,00,01,,00,00,,000,,000,,,0,0,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,000,000,101]
2951
2952    7005:  ;(FREE)
2953    INITIALIZE06:
2954            P2-T,   MMR0_D-[I],                     ;LOAD MMR0, DISABLING KT11
2955            NEXT,   J/INITIALIZE07                  ;  BIT<00> CLEAR DISABLES KT11
     (7005)  DCS[0,00,0,0,0,0]  BM[0001,,00,11,,01,00,,000,,000,,,0,0,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,000,000,110]
2956
2957    7006:  ;(FREE)
2958    INITIALIZE07:
2959            P2-T,   D_ZERO,                         ;DEFAULT TO ALL ZEROS FOR ERROR
2960                    SR_ZERO,                        ;ZERO SR FOR JAMUPP IS ERROR
2961            NEXT,   GOTO-PAGE(4),                   ;XFER
2962                    J/INITIALIZE10                  ;
     (7006)  DCS[0,00,0,0,0,0]  BM[0011,,00,00,,00,00,,000,,100,,,0,1,1,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,000,001]
2963
2964    4101:  ;(FREE)
2965    INITIALIZE10:
2966            SELECT, UCON-PROC,                      ;ENABLE CLOCKING THE FOLLOWING
2967            ENABLE, EN-CLK-PS[15-12], EN-CLK-PS[7-4],   ;  PROCESSOR REGISTERS:
2968                    EN-CLK-PS[3-0], EN-CLK-FLAG[8-0],   ;
2969                    EN-CLK-FPS[7-4], EN-CLK-UBREAK[11-00],  ;
2970                    BUSDIN_EMIT[15-00],             ;FOR UBREAK CONSTANT
2971            P0,     SET-UCON-CONTROL,               ;WRITE CONTROLS
2972                    BUMP-VERIFY,                    ;COUNT
2973            P3,     BUTA(CUA-TRACK),                ;RESET CUA TRACKING
2974            NEXT,   J/INITIALIZE11                  ;
     (4101)  DCS[0,00,0,0,0,1]  BM[1000,,01,00,,00,01,,110,,011,,,0,0,0,,0,,,1,1001,,,0,,0000,0,,,11,001,,,001,000,010]
2975
2976    4102:  ;(FREE)
2977    INITIALIZE11:
2978            P0,     DCS-CTR(C15,),                  ;DISABLE DCS-CTR FOR NOW
2979            EMITC,  EMIT/000000,                    ;FOR UBREAK REGISTER LOAD
2980            P2,     PS[3-0]_D[3-0],                 ;

2981                    UBREAK_BUSDIN[11-00],           ;
2982            P3,     PS[15-12]_D[15:13], PS[7-4]_D[7-4],     ;
2983                    FPS[7-4]_D[7-4], FLAG[8-0]_D[15-8],     ;
2984            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "INITIALIZE12" (+1, WORDS)
2985                    J/INITIALIZE12                  ;   ERROR:  "TEST001"  (BACK AT START)
     (4102)  DCS[0,00,1,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,000,001]
2986
```

```
2987    4001:
2988    INITIALIZE12:
2989            SETUP,  RETURN/TEST012A,                        ;RETURN TO NEXT TEST START
2990            NEXT,   CALL(DISPLAY)                           ;GO DISPLAY CONTENTS OF D-REGISTER IN LIGHTS
    (4001)  DCS[0,00,0,0,0,0]  BM[0101..00.11..11.11..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.010.001]
2991
2992
2993
2994    ;.PAGE*****************************************************************************************************
2995
2996    .TOC    *   TEST012-050:  IR DECODE (INSTR1, INSTR5, FLTPT, RELATED "BUTS")
2997
2998    ;*************************************************************************************
2999    ;*
3000    ;*      TESTS:  012 - 050                               UWORDS: 274 + 206
3001    ;*
3002    ;*      FUNCTIONS:
3003    ;*
3004    ;*      THE FOLLOWING TESTS EXERCISE THE IR-DECODE RELATED LOGIC:
3005    ;*
3006    ;*              INSTR=1, INSTR=5, FLOATING-POINT DECODE 'BUTS'
3007    ;*              IR<15:12>, IR<11> (TWO), IR<9:6>, IR<5:3> BIT 'BUTS'
3008    ;*              MOV/DR7, BYTE/DM0/SM0, DR6-7 DECODE-RELATED 'BUTS'
3009    ;*
3010    ;*      NOTE ALSO THAT THE FIRST TIME THE PROCESSOR 'UCON':
3011    ;*              BUSDIN_EMIT, AND EN-CLK-IR, IS EMPLOYED IS IN TEST-012-A.
3012    ;*
3013    ;*************************************************************************************
3014
3015
3016
3017
3018
3019
3020
3021    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3022
3023    ;*** TEST 012 ***
3024    ;TEST-012 USES A DATA PATTERN OF:  "1 111 111 111 111 111" (177777)
3025
3026    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3027
3028    ;* PART A *
3029    ;TEST-012-A CHECKS THAT BUT[IR<15:12>] READS THE "1111" IN IR<15:12>H CORRECTLY
3030    5775:
3031    TEST012A:
3032            P0,     LOAD-ENUA(ZTARGET417),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
3033                    LOAD-ERROR(TEST012A),                   ;ERROR DIRECTORY KEY
3034                    DCS-CTR(C5,),                           ;COMPARE ENUA:TNUA IN 5, MICROWORDS
3035            NEXT,   J/SETIRA                                ;SETUP FOR IR TESTS
    (5775)  DCS[1,00,1,0,0,0]  BM[1010..00.11..11.00..001..111...0.0.0..0..0...0.0000...0..0000.0...11.000...111.110.000]
3036
```



```
3037    ;*** SETUP PROCESSOR UCON FOR BUSDIN <- EMIT, CLOCKING INSTRUCTION REGISTER ***
3038    5760:
3039    SETIRA:
3040            SELECT, UCON=PROC,                              ;SELECT PROCESSOR UCON CONTROL:
3041            ENABLE, EN-CLK-IR[15-00],                       ;  ENABLE CLOCK IR OPERATION
3042                    BUSDIN_EMIT[15-00],                     ;  PUT EMIT[15:00] ONTO BUSDIN
3043            P0,     SET-UCON-CONTROL,                       ;LOAD UCON REGISTER AT P0
3044                    BUMP-VERIFY,                            ;COUNT
3045            NEXT,   J/LOAD012A                              ;GO TO FIRST TEST, PART A
    (5760)  DCS[0,00,0,0,0,1]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...000.000.010]
3046
3047
3048    5002:  ;(FREE)
3049    LOAD012A:
3050            P2-U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
3051                    EMIT/177777,                            ;(177777)
3052            NEXT,   J/GOBUT012A                             ;GO SETUP FOR "BUT"
    (5002)  DCS[0,00,0,0,0,0]  BM[1111..00.11..11.11..111..111...0.0.0..0..0...1.1010...0..0000.0...11.000...000.000.011]
3053
3054
3055    5003:  ;(FREE)
3056    GOBUT012A:
3057            SETUP,  RETURN/TEST012B,                        ;RETURN TO START OF NEXT SUBTEST
3058            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3059                    J/BUTIR15-12                            ;GO DO "BUT" ON IR<15:12>H
    (5003)  DCS[0,00,0,0,0,0]  BM[0101..00.11..11.11..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.000]
3060
3061
3062    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3063
3064    ;* PART B *
3065    ;TEST-012-B CHECKS THAT BUT[IR<11>#FLTPT<3:0>] READS THE "1" IN IR<11>H CORRECTLY,
3066    ;AND THE FLTPT DECODE ROM GETS ADDRESS (776), WHICH IS A CMPF/D INSTR;
3067    ;DATA OUTPUT SHOULD BE (17)
3068    5773:
3069    TEST012B:
3070            P0,     LOAD-ENUA(ZTARGET437),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
3071                    LOAD-ERROR(TEST012B),                   ;ERROR DIRECTORY KEY
3072                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
3073            NEXT,   J/GOBUT012B                             ;GO SETUP FOR "BUT"
    (5773)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..011..111...0.0.0..0..0...0.0000...0..0000.0...11.000...000.000.100]
3074
3075
3076    5004:  ;(FREE)
3077    GOBUT012B:
3078            SETUP,  RETURN/TEST012C,                        ;RETURN TO START OF NEXT SUBTEST

3079            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3080                    J/BUTIR11#FLTPT3-0                      ;GO DO "BUT" ON IR<11>H#FLTPT<3:0>H
    (5004)  DCS[0,00,0,0,0,0]  BM[0101..00.11..11.11..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.010]
3081
3082
3083    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
3084
3085    !* PART C *
3086    !TEST-012-C CHECKS THAT BUTR[IR<11>B] READS THE "1" IN IR<11>H CORRECTLY
3087    5771!
3088    TEST012C:
3089            PO,     LOAD-ENUA(ZTARGET403),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3090                    LOAD-ERROR(TEST012C),                   !ERROR DIRECTORY KEY
3091                    DCS-CTR(C3,),                           !COMPARE ENUA;TWUA IN 3, MICROWORDS
3092                    BUMP-VERIFY,                            !COUNT
3093            NEXT,   J/GOBUT012C                             !GO SETUP FOR "BUT"
    (5771)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,011,,0,0,0,,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,101]
3094
3095
3096    5005:  !(FREE)
3097    GOBUT012C:
3098            SETUP,  RETURN/TEST012D,                        !RETURN TO START OF NEXT SUBTEST
3099            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
3100                    J/BUTIR11B                              !GO DO "BUT" ON IR<11>H
    (5005)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,10,,111,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,010]
3101
3102
3103    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3104
3105    !* PART D *
3106    !TEST-012-D CHECKS THAT BUT[IR<9:6>] READS THE "1111" IN IR<9:6>H CORRECTLY
3107    5767!
3108    TEST012D:
3109            PO,     LOAD-ENUA(ZTARGET417),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3110                    LOAD-ERROR(TEST012D),                   !ERROR DIRECTORY KEY
3111                    DCS-CTR(C3,),                           !COMPARE ENUA;TWUA IN 3, MICROWORDS
3112            NEXT,   J/GOBUT012D                             !GO SETUP FOR "BUT"
    (5767)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,110]
3113
3114
3115    5006:  !(FREE)
3116    GOBUT012D:
3117            SETUP,  RETURN/TEST012E,                        !RETURN TO START OF NEXT SUBTEST
3118            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
3119                    J/BUTIR9-6                              !GO DO "BUT" ON IR<9:6>H
    (5006)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,10,,101,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,100]
3120
3121
3122    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3123
3124    !* PART E *
3125    !TEST-012-E CHECKS THAT BUT[MOV-DR7#IR<5:3>] READS THE (-FLTPT*MOV+FLTPT*DR7) AND "111" IN IR<5:3>H CORRECTLY
3126    5765!
3127    TEST012E:
3128            PO,     LOAD-ENUA(ZTARGET417),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3129                    LOAD-ERROR(TEST012E),                   !ERROR DIRECTORY KEY
3130                    DCS-CTR(C3,),                           !COMPARE ENUA;TWUA IN 3, MICROWORDS
3131            NEXT,   J/GOBUT012E                             !GO SETUP FOR "BUT"
```



```
    (5765)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,111]
3132
3133
3134    5007:  !(FREE)
3135    GOBUT012E:
3136            SETUP,  RETURN/TEST012F,                        !RETURN TO START OF NEXT SUBTEST
3137            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
3138                    J/BUTMOVDR7IR5-3                        !GO DO "BUT" ON (-FLTPT*MOV+FLTPT*DR7) # IR<5:3>H
    (5007)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,10,,100,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,101]
3139
3140
3141    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3142
3143    !* PART F *
3144    !TEST-012-F CHECKS THAT BUT[DR6-7 L] READS THE "11" IN IR<2:1> H CORRECTLY
3145    !AND DOES ASSERT THE SIGNAL
3146    5764!
3147    TEST012F:
3148            PO,     LOAD-ENUA(ZTARGET402),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3149                    LOAD-ERROR(TEST012F),                   !ERROR DIRECTORY KEY
3150                    DCS-CTR(C3,),                           !COMPARE ENUA;TWUA IN 3, MICROWORDS
3151            NEXT,   J/GOBUT012F                             !GO SETUP FOR "BUT"
    (5764)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,000]
3152
3153
3154    5010:  !(FREE)
3155    GOBUT012F:
3156            SETUP,  RETURN/TEST012G,                        !RETURN TO START OF NEXT SUBTEST
3157            PO,     BUMP-VERIFY,                            !COUNT
3158            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
3159                    J/BUTDR6-7L                             !GO DO "BUT" ON DR 6/7 L
    (5010)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,11,10,,011,,111,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,111]
3160
3161
3162    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3163
3164    !* PART G *
3165    !TEST-012G CHECKS THAT BUT[INSTR1] READS THE ONES IN IR<15:00>H CORRECTLY
3166    !AS CLASS-A-FLTPT, AND CORRECTLY TARGETS TO INSTR1 FLTPT (474)
3167    !  BIT<1:0> = FLAG<4:5>H = "00" FROM INITIALIZATION CODE
3168    5763!
3169    TEST012G:
3170            PO,     LOAD-ENUA(ZTARGET474),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3171                    LOAD-ERROR(TEST012G),                   !ERROR DIRECTORY KEY
3172                    DCS-CTR(C3,),                           !COMPARE ENUA;TWUA IN 3, MICROWORDS
3173            NEXT,   J/GOBUT012G                             !GO SETUP FOR "BUT"

    (5763)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,111,,100,,,0,0,0,,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,001]
3174
3175
3176    5011:  !(FREE)
3177    GOBUT012G:
3178            SETUP,  RETURN/SCOPE012,                        !RETURN TO SCOPE LOOP TEST WORD
```

```
3179            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
3180                    J/BUTINSTR1                     ;GO DO INSTR; "BUT"
     (5011)  DCS[0,00,0,0,0,0]  BM[0101..00,00..00,01..010..111...0,0,0..0...0,0...0,0000...0..0000,0...11,100...011,000,110]
3181
3182
3183
3184    5012:  ;(FREE)
3185    SCOPE012:
3186            P0,     BUMP-VERIFY,                    ;COUNT
3187            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "TEST013A" [+1, WORDS]
3188                    J/TEST013A                      ;   ERROR:  "SETIRA"   [-16, WORDS]
     (5012)  DCS[0,00,0,1,0,1]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,000...111,110,001]
3189
3190
3191
3192
3193
3194
3195    ;- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3196
3197    ;*** TEST 013 ***
3198    ;TEST-013 USES AN IR DATA PATTERN OF:  "0 000 000 000 000 000" (000000)
3199
3200    ;- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3201
3202    ;* PART A *
3203    ;TEST-013-A CHECKS THAT BUT [IR<15:12>] READS THE "0000" IN IR<15:12>H CORRECTLY
3204    5761:
3205    TEST013A:
3206            P0,     LOAD-ENUA(ZTARGET400),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
3207                    LOAD-ERROR(TEST013A),           ;ERROR DIRECTORY KEY
3208                    DCS-CTR(C4,),                   ;COMPARE ENUA;TNUA IN 4, MICROWORDS
3209            NEXT,   J/LOAD013A                      ;GO LOAD PATTERN
     (5761)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,000...111,100,100]
3210
3211
3212    5744:
3213    LOAD013A:
3214            P2="0,  IR_EMIT,                        ;LOAD IR WITH TEST PATTERN
3215                    EMIT/000000,                    ;(000000)
3216            NEXT,   J/GOBUT013A                     ;GO SETUP FOR "BUT"
     (5744)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...1,1010...0..0000,0...11,000...000,001,011]
3217
3218
3219    5013:  ;(FREF)
3220    GOBUT013A:
3221            SETUP,  RETURN/TEST013B,                ;RETURN TO START OF NEXT SUBTEST
3222            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
3223                    J/BUTIR15-12                    ;GO DO "BUT" ON IR<15:12>H
     (5013)  DCS[0,00,0,0,0,0]  BM[0101..00,11..11,01..111..111...0,0,0..0...0,0000...0..0000,0...11,100...011,000,000]
3224
3225
```



```
3226    ;- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3227
3228    ;* PART B *
3229    ;TEST-013-B CHECKS THAT BUT[IR<11>#FLTPT<3:0>] READS THE "0" IN IR<11>H CORRECTLY,
3230    ;AND THE FLTPT DECODE ROM GETS ADDRESS (000), WHICH IS A SETF/SETI/CFCC INSTR;
3231    ;DATA OUTPUT SHOULD BE (00)
3232    5757:
3233    TEST013B:
3234            P0,     LOAD-ENUA(ZTARGET400),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
3235                    LOAD-ERROR(TEST013B),           ;ERROR DIRECTORY KEY
3236                    DCS-CTR(C3,),                   ;COMPARE ENUA-TNUA IN 3, MICROWORDS
3237                    BUMP-VERIFY,                    ;COUNT
3238            NEXT,   J/GOBUT013B                     ;GO SETUP FOR "BUT"
     (5757)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,000...000,001,100]
3239
3240
3241    5014:  ;(FREF)
3242    GOBUT013B:
3243            SETUP,  RETURN/TEST013C,                ;RETURN TO START OF NEXT SUBTEST
3244            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
3245                    J/BUTIR11FLTPT3=0               ;GO DO "BUT" ON IR<11>H#FLTPT<3:0>H
     (5014)  DCS[0,00,0,0,0,0]  BM[0101..00,11..11,01..101..111...0,0,0..0...0,0...0,0000...0..0000,0...11,100...011,000,010]
3246
3247
3248    ;- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3249
3250    ;* PART C *
3251    ;TEST-013-C CHECKS THAT BUTR[IR<11>B] READS THE "0" IN IR<11>H CORRECTLY
3252    5755:
3253    TEST013C:
3254            P0,     LOAD-ENUA(ZTARGET401),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
3255                    LOAD-ERROR(TEST013C),           ;ERROR DIRECTORY KEY
3256                    DCS-CTR(C3,),                   ;COMPARE ENUA;TNUA IN 3, MICROWORDS
3257            NEXT,   J/GOBUT013C                     ;GO SETUP FOR "BUT"
     (5755)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..001...0,0,0..0...0,0...0,0000...0..0000,0...11,000...000,001,101]
3258
3259
3260    5015:  ;(FREE)
3261    GOBUT013C:
3262            SETUP,  RETURN/TEST013D,                ;RETURN TO START OF NEXT SUBTEST
3263            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
3264                    J/BUTIR11B                      ;GO DO BUT ON IR<11>H
     (5015)  DCS[0,00,0,0,0,0]  BM[0101..00,11..11,01..011..111...0,0,0..0...0,0...0,0000...0..0000,0...11,100...011,100,010]
3265
3266
3267    ;- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

3268
3269    ;* PART D *
3270    ;TEST-013-D CHECKS THAT BUT[IR<9:6>] READS THE "0000" IN IR<9:6>H CORRECTLY

3271    5753:
3272    TEST013D:
3273            P0,     LOAD-ENUA(ZTARGET400),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
```

```
                LOAD-ERROR(TEST013D),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
        NEXT,   J/GOBUT013D                             !GO SETUP FOR "BUT"
(5753) DCS[1,00,1,0,0,0] BM[1100,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,110]


5016: !(FREE)
GOBUT013D:
        SETUP,  RETURN/TEST013E,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTIR9-6                              !GO DO "BUT" ON IR<9:6>H
(5016) DCS[0,00,0,0,0,0] BM[0101,,00,11,,11,01,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,100]


! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!* PART E *
!TEST-013-E CHECKS THAT BUT[MOV-DR7#IR<5:3>] READS THE -(-FLTPT*MOV+FLTPT*DR7) AND "000" IN IR<5:3>H CORRECTLY
5751:
TEST013E:
        P0,     LOAD-ENUA(ZTARGET400),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST013E),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
        NEXT,   J/GOBUT013E                             !GO SETUP FOR "BUT"
(5751) DCS[1,00,1,0,0,0] BM[1100,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,111]


5017: !(FREE)
GOBUT013E:
        SETUP,  RETURN/TEST013F,                        !RETURN TO START OF NEXT SUBTEST
        P0,     BUMP-VERIFY,                            !COUNT
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTMOVDR7IR5-3                        !GO DO "BUT" ON (-FLTPT*MOV+FLTPT*DR7) # IR<5:3>H
(5017) DCS[0,00,0,0,0,1] BM[0101,,00,11,,11,01,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,101]


! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!* PART F *
!TEST-013-F CHECKS THAT BUT[INSTR5] READS THE ZEROS IN IR<15:00>H CORRECTLY
!AS (000000)=HALT, AND CORRECTLY TARGETS TO (434)
5750:
TEST013F:
        P0,     LOAD-ENUA(ZTARGET434),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST013F),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
        NEXT,   J/GOBUT013F                             !GO SETUP FOR "BUT"
(5750) DCS[1,00,1,0,0,0] BM[1100,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,010,000]


5020: !(FREE)
GOBUT013F:
```



```
        SETUP,  RETURN/TEST013G,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTINSTR5                             !GO DO INSTR5 "BUT"
(5020) DCS[0,00,0,0,0,0] BM[0101,,00,11,,11,00,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,001]

! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!* PART G *
!TEST-013-G CHECKS THAT BUT[INSTR1] READS THE ZEROS IN IR<15:00>H CORRECTLY
!AS NOT(CLASS-A THRU G), AND CORRECTLY TARGETS TO (417) [OTHER]
5747:
TEST013G:
        P0,     LOAD-ENUA(ZTARGET417),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST013G),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
        NEXT,   J/GOBUT013G                             !GO SETUP FOR "BUT"
(5747) DCS[1,00,1,0,0,0] BM[1100,,00,11,,11,00,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,010,001]


5021: !(FREE)
GOBUT013G:
        SETUP,  RETURN/SCOPE013,                        !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                             !GO DO INSTR1 "BUT"
(5021) DCS[0,00,0,0,0,0] BM[0101,,00,00,,00,10,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]



5022: !(FREE)
SCOPE013:
        NEXT,   BUTO[SCOPE],                            !NO ERROR:  "TEST014A" [+1, WORD]
                J/TEST014A                              !   ERROR:  "LOAD013A" [-14, WORDS]
(5022) DCS[0,00,0,1,0,0] BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,100,101]






! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 014 ***
!TEST-014 USES AN IR DATA PATTERN OF:  "0 000 000 001 010 101" (000125)

! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!* PART A *
!TEST-014-A CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
!AS ROM ADDRESS=(125) ON THE INSTR5 E88 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
!OF (12), TARGETING TO (432) AFTER THE DECODE
5745:
TEST014A:
```

```
3369            P0,     LOAD=ENUA(ZTARGET432),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
3370                    LOAD=ERROR(TEST014A),                   ;ERROR DIRECTORY KEY
3371                    DCS=CTR(C4.),                           ;COMPARE ENUA;TNUA IN 4, MICROWORDS
3372            NEXT,   J/LOAD014A                              ;GO LOAD PATTERN
    (5745)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,011,,010...0,0,0,,0...0...0,0000...0,,0000,0,,,11,000,,,111,100,010]
3373
3374
3375    5742;
3376    LOAD014A;
3377            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
3378                    EMIT/000125,                            ;(000125)
3379            NEXT,   J/GOBUT014A                             ;GO SETUP FOR "BUT"
    (5742)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,010,,101...0,0,0,,0...0...0,...1,1010...0,,0000,0,,,11,000,,,000,010,011]
3380
3381    5023;  !(FREE)
3382    GOBUT014A;
3383            SETUP,  RETURN/TEST014B,                        ;RETURN TO START OF NEXT SUBTEST
3384            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3385                    J/BUTINSTR5                             ;GO DO INSTR5 "BUT"
    (5023)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,01,,010,,111...0,0,0,,0...0...0,0000...0,,0000,0,,,11,100,,,011,000,001]
3386
3387
3388    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3389
3390    !* PART B *
3391    !TEST=014-B CHECKS THAT BUT[DR6-7 L] READS THE "10" IN IR<2:1> H CORRECTLY
3392    !AND DOES NOT ASSERT THE SIGNAL
3393    5752;
3394    TEST014B;
3395            P0,     LOAD=ENUA(ZTARGET403),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
3396                    LOAD=ERROR(TEST014B),                   ;ERROR DIRECTORY KEY
3397                    DCS=CTR(C3.),                           ;COMPARE ENUA;TNUA IN 3, MICROWORDS
3398                    BUMP=VERIFY,                            ;COUNT
3399            NEXT,   J/GOBUT014B                             ;GO SETUP FOR "BUT"
    (5752)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,011...0,0,0,,0...0...0,0000...0,,0000,0,,,11,000,,,000,010,100]
3400
3401
3402    5024;  !(FREE)
3403    GOBUT014B;
3404            SETUP,  RETURN/TEST014C,                        ;RETURN TO START OF NEXT SUBTEST
3405            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3406                    J/BUTDR6-7L                             ;GO DO DR 6-7 L "BUT"
    (5024)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,10,,010,,111...0,0,0,,0...0...0,0000...0,,0000,0,,,11,100,,,011,100,111]
3407
3408    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3409
3410    !* PART C *
3411    !TEST=014-C CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3412    !AS CLASS-E=JMP, IR<5:3>H="010", AND TARGETS TO (652)
3413    5762;
3414    TEST014C;
3415            P0,     LOAD=ENUA(ZTARGET652),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
```



```
3416                    LOAD=ERROR(TEST014C),                   ;ERROR DIRECTORY KEY
3417                    DCS=CTR(C3.),                           ;COMPARE ENUA;TNUA IN 3, MICROWORDS
3418            NEXT,   J/GOBUT014C                             ;GO SETUP FOR "BUT"
    (5762)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,10,,101,,010...0,0,0,,0...0...0,0000...0,,0000,0,,,11,000,,,000,010,101]
3419
3420
3421    5025;  !(FREE)
3422    GOBUT014C;
3423            SETUP,  RETURN/TEST014D,                        ;RETURN TO START OF NEXT SUBTEST
3424            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3425                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5025)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,01,,000,,111...0,0,0,,0...0...0,0000...0,,0000,0,,,11,100,,,011,000,110]
3426
3427
3428
3429    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3430
3431    !* PART D *
3432    !TEST=014-D CHECKS THAT BUT[IR<11>#FLTPT<3:0>] READS THE "0" IN IR<11>H CORRECTLY,
3433    !AND THE FLTPT DECODE ROM GETS ADDRESS (020), WHICH IS A STST INSTR;
3434    !DATA OUTPUT SHOULD BE (01)
3435    5710;
3436    TEST014D;
3437            P0,     LOAD=ENUA(ZTARGET401),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
3438                    LOAD=ERROR(TEST014D),                   ;ERROR DIRECTORY KEY
3439                    DCS=CTR(C3.),                           ;COMPARE ENUA;TNUA IN 3, MICROWORDS
3440            NEXT,   J/GOBUT014D                             ;GO SETUP FOR "BUT"
    (5710)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001...0,0,0,,0...0...0,0000...0,,0000,0,,,11,000,,,000,010,110]
3441
3442
3443    5026;  !(FREE)
3444    GOBUT014D;
3445            SETUP,  RETURN/SCOPE014,                        ;RETURN TO SCOPE LOOP TEST WORD
3446            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
3447                    J/BUTIR!1FLTPT3-0                       ;GO DO "BUT" ON IR<11>H#FLTPT<3:0>H
    (5026)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,00,10,,111,,111...0,0,0,,0...0...0,0000...0,,0000,0,,,11,100,,,011,000,010]
3448
3449
3450
3451    5027;  !(FREE)
3452    SCOPE014;
3453            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST015A" [+1, WORD]
3454                    J/TEST015A                              ;   ERROR:  "LOAD014A" [-8, WORD8]
    (5027)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0...0...0,0000...0,,0000,0,,,11,000,,,111,100,011]
3455
3456
3457
3458
3459
3460
3461    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3462
```

```
3463    !*** TEST 015 ***
3464    !TEST-015 USES AN IR DATA PATTERN OF:  "0 000 000 001 101 010" (000152)
3465
3466    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3467
3468    !* PART A *
3469    !TEST-015-A CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
3470    !AS ROM ADDRESS=(152) ON THE INSTR5 E88 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
3471    !OF (05), TARGETING TO (425) AFTER THE DECODE
3472    5743:
3473    TEST015A:
3474            P0,     LOAD=ENUA(ZTARGET425),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3475                    LOAD=ERROR(TEST015A),                   !ERROR DIRECTORY KEY
3476                    DCS=CTR(C4,),                           !COMPARE ENUA:TNUA IN 4, MICROWORDS
3477            NEXT,   J/LOAD015A                              !GO LOAD PATTERN
    (5743)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,010,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,111,100,000]
3478
3479
3480    5740:
3481    LOAD015A:
3482            P0,     BUMP=VERIFY,                            !COUNT
3483            P2=U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
3484                    EMIT/000152,                            !(000152)
3485            NEXT,   J/GOBUT015A                             !GO SETUP FOR "BUT"
    (5740)  DCS[0,00,0,0,0,1]  BM[0000,,00,00,,00,01,,101,,010...0,0,0,,0,,0...1,1010...0,,0000,0,,,11,000,,,000,011,000]
3486
3487    5030:  !(FREE)
3488    GOBUT015A:
3489            SETUP,  RETURN/TEST015B,                        !RETURN TO START OF NEXT SUBTEST
3490            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3491                    J/BUTINSTR5                             !GO DO INSTR5 "BUT"
    (5030)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,11,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,000,001]
3492
3493
3494    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3495
3496    !* PART B *
3497    !TEST-015-B CHECKS THAT BUT[DR6-7 L] READS THE "01" IN IR<2:1> H CORRECTLY
3498    !AND DOES NOT ASSERT THE SIGNAL
3499    5772:
3500    TEST015B:
3501            P0,     LOAD=ENUA(ZTARGET403),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3502                    LOAD=ERROR(TEST015B),                   !ERROR DIRECTORY KEY
3503                    DCS=CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
3504            NEXT,   J/GOBUT015B                             !GO SETUP FOR "BUT"
    (5772)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,011,001]
3505
3506
3507    5031:  !(FREE)
3508    GOBUT015B:
3509            SETUP,  RETURN/TEST015C,                        !RETURN TO START OF NEXT SUBTEST
3510            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3511                    J/BUTDR6=7L                             !GO DO DR 6=7 L "BUT"
```



```
    (5031)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,10,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,111]
3512
3513    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3514
3515    !* PART C *
3516    !TEST-015-C CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3517    !AS CLASS-E=JMP, IR<5:3>H="101", AND TARGETS TO (656)
3518    5722:
3519    TEST015C:
3520            P0,     LOAD=ENUA(ZTARGET655),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3521                    LOAD=ERROR(TEST015C),                   !ERROR DIRECTORY KEY
3522                    DCS=CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
3523            NEXT,   J/GOBUT015C                             !GO SETUP FOR "BUT"
    (5722)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,10,,101,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,011,010]
3524
3525
3526    5032:  !(FREE)
3527    GOBUT015C:
3528            SETUP,  RETURN/SCOPE015,                        !RETURN TO SCOPE LOOP TEST WORD
3529            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3530                    J/BUTINSTR1                             !GO DO INSTR1 "BUT"
    (5032)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,00,11,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,000,110]
3531
3532    5033:  !(FREE)
3533    SCOPE015:
3534            P0,     BUMP=VERIFY,                            !COUNT
3535            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST016A" [+1, WORD]
3536                    J/TEST016A                              !   ERROR:  "LOAD015A" [-6, WORDS]
    (5033)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,111,100,001]
3537
3538
3539
3540
3541
3542
3543    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3544
3545    !*** TEST 016 ***
3546    !TEST-016 USES AN IR DATA PATTERN OF:  "1 000 000 000 000 000" (100000)
3547
3548    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3549
3550    !* PART A *
3551    !TEST-016-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3552    !AS CLASS-F=BRANCH, IR<14:11>H="0000", IR<15#10:08>H#"0000",
3553    !AND TARGETS TO (757)

3554    5741:
3555    TEST016A:
3556            P0,     LOAD=ENUA(ZTARGET757),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3557                    LOAD=ERROR(TEST016A),                   !ERROR DIRECTORY KEY
3558                    DCS=CTR(C4,),                           !COMPARE ENUA:TNUA IN 4, MICROWORDS
3559            NEXT,   J/LOAD016A                              !GO LOAD PATTERN
```

```
	(5741)	DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,011,110]

	57361
	LOAD016A:
		P2-U,	IR_EMIT,				;LOAD IR WITH TEST PATTERN
			EMIT/100000,				;(100000)
		NEXT,	J/GOBUT016A				;GO SETUP FOR "BUT"
	(5736)	DCS[0,00,0,0,0,0]  BM[1000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,011,100]

	5034:	;(FREE)
	GOBUT016A:
		SETUP,	RETURN/SCOPE016,			;RETURN TO SCOPE LOOP TEST WORD
		P0,	BUMP-VERIFY,				;COUNT
		NEXT,	GOTO-PAGE(7),				;BUT TABLE IS ON PAGE 7
			J/BUTINSTR1				;GO DO INSTR1 "BUT"
	(5034)	DCS[0,00,0,0,0,1]  BM[0101,,00,00,,00,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]

	5035:	;(FREE)
	SCOPE016:
		NEXT,	BUTD[SCOPE],				;NO ERROR:  "TEST017A" [+1, WORD]
			J/TEST017A				;   ERROR:  "LOAD016A" [-2, WORDS]
	(5035)	DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,011,111]




	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;*** TEST 017 ***
	;TEST-017 USES A DATA PATTERN OF:  "0 000 000 101 010 010" (000522)

	;  -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -

	;* PART A *
	;TEST-017-A CHECKS THAT BUT[IR<9:6>] READS THE ALTERNATING PATTERN "0101"
	;IN IR<9:6>H CORRECTLY
	5737:
	TEST017A:
		P0,	LOAD-ENUA(ZTARGET405),			;LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST017A),			;ERROR DIRECTORY KEY
			DCS-CTR(C4,),				;COMPARE ENUA:TNUA IN 4, MICROWORDS
		NEXT,	J/LOAD017A				;GO LOAD PATTERN
	(5737)	DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,011,010]

	5732:
	LOAD017A:
		P2-U,	IR_EMIT,				;LOAD IR WITH TEST PATTERN
```



```
			EMIT/000522,				;(000522)
		NEXT,	J/GOBUT017A				;GO SETUP FOR "BUT"
	(5732)	DCS[0,00,0,0,0,0]  BM[0000,,00,00,,01,01,,010,,010,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,011,110]

	5036:	;(FREE)
	GOBUT017A:
		SETUP,	RETURN/TEST017B,			;RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				;BUT TABLE IS ON PAGE 7
			J/BUTIR9-6				;GO DO "BUT" ON IR<9:6>H
	(5036)	DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,100]

	;  -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -

	;* PART B *
	;TEST-017-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
	;AS CLASS-F=BRANCH, IR<14:11>H="0000", IR<15#10:08>H#"0000",
	;AND TARGETS TO (757)
	5735:
	TEST017B:
		P0,	LOAD-ENUA(ZTARGET757),			;LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST017B),			;ERROR DIRECTORY KEY
			DCS-CTR(C3,),				;COMPARE ENUA:TNUA IN 3, MICROWORDS
			BUMP-VERIFY,				;COUNT
		NEXT,	J/GOBUT017B				;GO SETUP FOR "BUT"
	(5735)	DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,011,111]

	5037:	;(FREE)
	GOBUT017B:
		SETUP,	RETURN/SCOPE017,			;RETURN TO SCOPE LOOP TEST WORD
		NEXT,	GOTO-PAGE(7),				;BUT TABLE IS ON PAGE 7
			J/BUTINSTR1				;GO DO INSTR1 "BUT"
	(5037)	DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]

	5040:	;(FREE)
	SCOPE017:
		NEXT,	BUTD[SCOPE],				;NO ERROR:  "TEST020A" [+1, WORD]
			J/TEST020A				;   ERROR:  "LOAD017A" [-4, WORDS]
	(5040)	DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,011,011]




	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;*** TEST 020 ***
	;TEST-020 USES A DATA PATTERN OF:  "0 000 001 010 101 111" (001257)
```

```
3655
3656    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3657
3658    !* PART A *
3659    !TEST-020-A CHECKS THAT BUT[IR<9:6>] READS THE ALTERNATING PATTERN "1010"
3660    !IN IR<9:6>H CORRECTLY
3661    5733:
3662    TEST020A:
3663            P0,     LOAD=ENUA(ZTARGET412),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3664                    LOAD=ERROR(TEST020A),                   !ERROR DIRECTORY KEY
3665                    DCS=CTR(C4,),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
3666            NEXT,   J/LOAD020A                              !GO LOAD PATTERN
    (5733)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..001..010...0.0.0...0...0...0.0000...0..0000.0...11.000...111.010.100]
3667
3668
3669    5724:
3670    LOAD020A:
3671            P2=0,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
3672                    EMIT/001257,                            !(001257)
3673            NEXT,   J/GOBUT020A                             !GO SETUP FOR "BUT"
    (5724)  DCS[0,00,0,0,0,0]  BM[0000..00.00..10.10..101..111...0.0.0...0...0...1.1010...0..0000.0...11.000...000.100.001]
3674
3675
3676    5041:  !(FREE)
3677    GOBUT020A:
3678            SETUP,  RETURN/TEST020B,                        !RETURN TO START OF NEXT SUBTEST
3679            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3680                    J/BUTIR9=6                              !GO DO "BUT" ON IR<9:6>H
    (5041)  DCS[0,00,0,0,0,0]  BM[0101..00.11..10.11..001..111...0.0.0...0...0...0.0000...0..0000.0...11.100...011.000.100]
3681
3682
3683    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3684
3685    !* PART B *
3686    !TEST-020-B CHECKS THAT BUT[MOV=DR7*IR<5:3>] READS THE -(-FLTPT*MOV+FLTPT*DR7) AND
3687    !ALTERNATING PATTERN "101" IN IR<5:3>H CORRECTLY
3688    5731:
3689    TEST020B:
3690            P0,     LOAD=ENUA(ZTARGET405),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3691                    LOAD=ERROR(TEST020B),                   !ERROR DIRECTORY KEY
3692                    DCS=CTR(C3,),                           !COMPARE ENUA:TNUA IN 3. MICROWORDS
3693            NEXT,   J/GOBUT020B                             !GO SETUP FOR "BUT"
    (5731)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..101...0.0.0...0...0...0.0000...0..0000.0...11.000...000.100.010]
3694
3695
3696    5042:  !(FREE)
3697    GOBUT020B:
3698            SETUP,  RETURN/TEST020C,                        !RETURN TO START OF NEXT SUBTEST
3699            P0,     BUMP=VERIFY,                            !COUNT
3700            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3701                    J/BUTMOVDR7IR5=3                        !GO DO "BUT"
    (5042)  DCS[0,00,0,0,0,1]  BM[0101..00.11..10.10..111..111...0.0.0...0...0...0.0000...0..0000.0...11.100...011.000.101]
```



```
3702
3703
3704    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3705
3706    !* PART C *
3707    !TEST-020-C CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3708    !AS CLASS=F=BRANCH, IR<14:11>H="0000", IR<15*10:08>H="0000",
3709    !AND TARGETS TO (757)
3710    5727:
3711    TEST020C:
3712            P0,     LOAD=ENUA(ZTARGET757),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3713                    LOAD=ERROR(TEST020C),                   !ERROR DIRECTORY KEY
3714                    DCS=CTR(C3,),                           !COMPARE ENUA:TNUA IN 3. MICROWORDS
3715            NEXT,   J/GOBUT020C                             !GO SETUP FOR "BUT"
    (5727)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.11..101..111...0.0.0...0...0...0.0000...0..0000.0...11.000...000.100.011]
3716
3717
3718    5043:  !(FREE)
3719    GOBUT020C:
3720            SETUP,  RETURN/SCOPE020,                        !RETURN TO SCOPE LOOP TEST WORD
3721            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3722                    J/BUTINSTR1                             !GO DO INSTR1 "BUT"
    (5043)  DCS[0,00,0,0,0,0]  BM[0101..00.00..01.00..100..111...0.0.0...0...0...0.0000...0..0000.0...11.100...011.000.110]
3723
3724
3725    5044:  !(FREE)
3726    SCOPE020:
3727            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST021A" [+1, WRD]
3728                    J/TEST021A                              !   ERROR:  "LOAD020A" [-6, WORDS]
    (5044)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0...0.0000...0..0000.0...11.000...111.010.101]
3729
3730
3731
3732
3733
3734
3735    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3736
3737    !*** TEST 021 ***
3738    !TEST-021 USES A DATA PATTERN OF:  "0 000 010 011 001 101" (002315)
3739
3740    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3741
3742    !* PART A *
3743    !TEST-021-A CHECKS THAT BUT[DM0*SM0*BYTE],
3744    !DM=IR<5:3>H="001", DM0H=0; SM=IR<11:9>H="010", SM0H=0; BYTE H=0

3745    5725:
3746    TEST021A:
3747            P0,     LOAD=ENUA(ZTARGET400),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3748                    LOAD=ERROR(TEST021A),                   !ERROR DIRECTORY KEY
3749                    DCS=CTR(C4,),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
3750            NEXT,   J/LOAD021A                              !GO LOAD PATTERN
    (5725)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..000...0.0.0...0...0...0.0000...0..0000.0...11.000...111.010.000]
```

```
	5720:
	LOAD021A:
		P0,	BUMP-VERIFY,				!COUNT
		P2-U,	IR_EMIT,				!LOAD IR WITH TEST PATTERN
			EMIT/002315,				!(002315)
		NEXT,	J/GOBUT021A				!GO SETUP FOR "BUT"
  (5720)  DCS[0,00,0,0,0,1]  BM[0000,,00,01,,00,11,,001,,101,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,100,101]


	5045:	!(FREE)
	GOBUT021A:
		SETUP,	RETURN/TEST021B,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTDNSMBYTE				!GO DO "BUT" ON DN0$SM0$BYTE
  (5045)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,011]


	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!* PART B *
	!TEST-021-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
	!AS CLASS-F=BRANCH, IR<14:11>H="0000", IR<15#10:08>H="0000",
	!AND TARGETS TO (757)
	5723:
	TEST021B:
		P0,	LOAD-ENUA(ZTARGET757),			!LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST021B),			!ERROR DIRECTORY KEY
			DCS-CTR(C3,),				!COMPARE ENUA:TNUA IN 3, MICROWORDS
		NEXT,	J/GOBUT021B				!GO SETUP FOR "BUT"
  (5723)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,110]


	5046:	!(FREE)
	GOBUT021B:
		SETUP,	RETURN/TEST021C,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTINSTR1				!GO DO INSTR1 "BUT"
  (5046)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,11,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]



	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!* PART C *
	!TEST-021-C CHECKS THAT BUT[IR<11>#FLTPT<3:0>] READS THE "0" IN IR<11>H CORRECTLY,
	!AND THE FLTPT DECODE ROM GETS ADDRESS (462), WHICH IS A ADDF/D MODE1-7 INSTR;
	!DATA OUTPUT SHOULD BE (11)
	5774:
	TEST021C:
		P0,	LOAD-ENUA(ZTARGET411),			!LOAD EXPECTED ADDRESS AFTER "BUT"
```



```
			LOAD-ERROR(TEST021C),			!ERROR DIRECTORY KEY
			DCS-CTR(C3,),				!COMPARE ENUA:TNUA IN 3, MICROWORDS
		NEXT,	J/GOBUT021C				!GO SETUP FOR "BUT"
  (5774)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,111]


	5047:	!(FREE)
	GOBUT021C:
		SETUP,	RETURN/SCOPE021,			!RETURN TO SCOPE LOOP TEST WORD
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTIR11FLTPT3-0			!GO DO "BUT" ON IR<11>H#FLTPT<3:0>H
  (5047)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,01,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,010]


	5050:	!(FREE)
	SCOPE021:
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST022A" [+1, WORDS]
			J/TEST022A				!    ERROR:  "LOAD021A" [-6, WORDS]
  (5050)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,010,001]






	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 022 ***
	!TEST-022 USES A DATA PATTERN OF:  "0 000 011 000 110 011" (003063)

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!* PART A *
	!TEST-022-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
	!AS CLASS-F=BRANCH, IR<14:11>H="0000", IR<15#10:08>H="0000",
	!AND TARGETS TO (757)
	5721:
	TEST022A:
		P0,	LOAD-ENUA(ZTARGET757),			!LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST022A),			!ERROR DIRECTORY KEY
			DCS-CTR(C4,),				!COMPARE ENUA:TNUA IN 4, MICROWORDS
		NEXT,	J/LOAD022A				!GO LOAD PATTERN
  (5721)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,001,110]


	5716:

	LOAD022A:
		P2-U,	IR_EMIT,				!LOAD IR WITH TEST PATTERN
			EMIT/003063,				!(003063)
		NEXT,	J/GOBUT022A				!GO SETUP FOR "BUT"
  (5716)  DCS[0,00,0,0,0,0]  BM[0000,,00,01,,10,00,,110,,011,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,101,001]
```

```
	5051:	!(FREE)
	GOBUT022A:
		SETUP,	RETURN/SCOPE022,			!RETURN TO SCOPE LOOP TEST WORD
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTINSTR1				!GO DO INSTR1 "BUT"
 (5051)	DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]



	5052:	!(FREE)
	SCOPE022:
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST023A" [+1, WORD]
			J/TEST023A				!   ERROR:  "LOAD022A" [-2, WORDS]
 (5052)	DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,001,111]






	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 023 ***
	!TEST-023 USES A DATA PATTERN OF:  "1 000 110 000 000 100" (106004)

	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

	!* PART A *
	!TEST-023-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
	!AS CLASS-D=SOP*DM0; IR<14:06>H="000 110 000"; IR<15>H="1";
	!DM=IR<5:3>H="000", DM0H=1; AND TARGETS TO (560)
	5717:
	TEST023A:
		P0,	LOAD-ENUA(ZTARGET560),			!LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST023A),			!ERROR DIRECTORY KEY
			DCS-CTR(C4,),				!COMPARE ENUA:TNUA IN 4, MICROWORDS
		NEXT,	J/LOAD023A				!GO LOAD PATTERN
 (5717)	DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,01,,110,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,001,100]


	5714:
	LOAD023A:
		P2-U,	IR_EMIT,				!LOAD IR WITH TEST PATTERN
			EMIT/106004,				!(106004)
		NEXT,	J/GOBUT023A				!GO SETUP FOR "BUT"
 (5714)	DCS[0,00,0,0,0,0]  BM[1000,,00,11,,00,00,,000,,100,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,101,011]


	5053:	!(FREE)
	GOBUT023A:
		SETUP,	RETURN/SCOPE023,			!RETURN TO SCOPE LOOP TEST WORD
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTINSTR1				!GO DO INSTR1 "BUT"
```



```
 (5053)	DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]


	5054:	!(FREE)
	SCOPE023:
		P0,	BUMP-VERIFY,				!COUNT
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST024A" [+1, WORD]
			J/TEST024A				!   ERROR:  "LOAD023A" [-2, WORDS]
 (5054)	DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,001,101]






	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 024 ***
	!TEST-024 USES A DATA PATTERN OF:  "0 000 101 111 000 110" (005706)

	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

	!* PART A *
	!TEST-024-A CHECKS THAT BUT[DR6-7 L] READS THE "11" IN IR<2:1> H CORRECTLY
	!AND DOES ASSERT THE SIGNAL
	5715:
	TEST024A:
		P0,	LOAD-ENUA(ZTARGET402),			!LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST024A),			!ERROR DIRECTORY KEY
			DCS-CTR(C4,),				!COMPARE ENUA:TNUA IN 4, MICROWORDS
		NEXT,	J/LOAD024A				!
 (5715)	DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,110]


	5706:
	LOAD024A:
		P0,	BUMP-VERIFY,				!COUNT
		P2-U,	IR_EMIT,				!LOAD IR WITH TEST PATTERN
			EMIT/005706,				!(005706)
		NEXT,	J/GOBUT024A				!GO SETUP FOR "BUT"
 (5706)	DCS[0,00,0,0,0,1]  BM[0000,,00,10,,11,11,,000,,110,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,101,101]


	5055:	!(FREE)
	GOBUT024A:
		SETUP,	RETURN/TEST024B,			!RETURN TO START OF NEXT SUBTEST

		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTDR6-7L				!GO DO "BUT" ON DR 6/7 L
 (5055)	DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,01,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,111]


	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
```

```
3943
3944    !* PART B *
3945    !TEST-024-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3946    !AS CLASS-D=SOP*DMO; IR<14:06>H="000 101 111"; IR<15>H="0";
3947    !DM=IR<5:3>H="000", DMOH=1; AND TARGETS TO (587)
3948    5711:
3949    TEST024B:
3950            P0,     LOAD=ENUA(ZTARGET587),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3951                    LOAD=ERROR(TEST024B),                   !ERROR DIRECTORY KEY
3952                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
3953            NEXT,   J/GOBUT024B                             !GO SETUP FOR "BUT"
    (5711)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.01..101..111...0.0.0..0..0...0.0000...0..0000.0...11.000...000.101.110]
3954
3955
3956    5056:  !(FREE)
3957    GOBUT024B:
3958            SETUP,  RETURN/SCOPE024,                        !RETURN TO SCOPE LOOP TEST WORD
3959            P0,     BUMP=VERIFY,                            !COUNT
3960            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
3961                    J/BUTINSTR1                             !GO DO INSTR1 "BUT"
    (5056)  DCS[0,00,0,0,0,1]  BM[0101..00.00..01.01..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]
3962
3963
3964    5057:  !(FREE)
3965    SCOPE024:
3966            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST025A" (+1, WORD)
3967                    J/TEST025A                              !   ERROR:  "LOAD024A" (-4, WORDS)
    (5057)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...111.000.111]
3968
3969
3970
3971
3972
3973
3974    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3975
3976    !*** TEST 025 ***
3977    !TEST-025 USES A DATA PATTERN OF:  "0 000 110 011 000 011" (006303)
3978
3979    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
3980
3981    !* PART A *
3982    !TEST-025-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
3983    !AS CLASS-D=SOP*DMO; IR<14:06>H="000 110 011"; IR<15>H="0";
3984    !DM=IR<5:3>H="000", DMOH=1; AND TARGETS TO (543)
3985    5707:
3986    TEST025A:
3987            P0,     LOAD=ENUA(ZTARGET543),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
3988                    LOAD=ERROR(TEST025A),                   !ERROR DIRECTORY KEY
3989                    DCS-CTR(C4,),                           !COMPARE ENUA:TNUA IN 4, MICROWORDS
3990            NEXT,   J/LOAD025A                              !GO LOAD PATTERN
    (5707)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.01..100..011...0.0.0..0..0...0.0000...0..0000.0...11.000...111.000.100]
3991
```



```
3992
3993    5704:
3994    LOAD025A:
3995            P2=U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
3996                    EMIT/006303,                            !(006303)
3997            NEXT,   J/GOBUT025A                             !GO SETUP FOR "BUT"
    (5704)  DCS[0,00,0,0,0,0]  BM[0000..00.11..00.11..000..011...0.0.0..0..0...1.1010...0..0000.0...11.000...000.110.000]
3998
3999
4000    5060:  !(FREE)
4001    GOBUT025A:
4002            SETUP,  RETURN/SCOPE025,                        !RETURN TO SCOPE LOOP TEST WORD
4003            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
4004                    J/BUTINSTR1                             !GO DO INSTR1 "BUT"
    (5060)  DCS[0,00,0,0,0,0]  BM[0101..00.00..01.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]
4005
4006
4007    5061:  !(FREE)
4008    SCOPE025:
4009            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST026A" (+1, WORD)
4010                    J/TEST026A                              !   ERROR:  "LOAD025A" (-2, WORDS)
    (5061)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...111.000.101]
4011
4012
4013
4014
4015
4016
4017    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4018
4019    !*** TEST 026 ***
4020    !TEST-026 USES A DATA PATTERN OF:  "1 000 101 100 000 011" (105403)
4021
4022    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4023
4024    !* PART A *
4025    !TEST-026-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4026    !AS CLASS-D=SOP*DMO; IR<14:06>H="000 101 100"; IR<15>H="1";
4027    !DM=IR<5:3>H="000", DMOH=1; AND TARGETS TO (574)
4028    5705:
4029    TEST026A:
4030            P0,     LOAD=ENUA(ZTARGET574),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4031                    LOAD=ERROR(TEST026A),                   !ERROR DIRECTORY KEY
4032                    DCS-CTR(C4,),                           !COMPARE ENUA:TNUA IN 4, MICROWORDS
4033                    BUMP=VERIFY,                            !COUNT
4034            NEXT,   J/LOAD026A                              !GO LOAD PATTERN

    (5705)  DCS[1,00,1,0,0,1]  BM[1011..00.11..11.01..111..100...0.0.0..0..0...0.0000...0..0000.0...11.000...111.000.010]
4035
4036
4037    5702:
4038    LOAD026A:
4039            P2=U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
4040                    EMIT/105403,                            !(105403)
```

```
        NEXT,   J/GOBUT026A                              !GO SETUP FOR "BUT"
 (5702) DCS[0,00,0,0,0,0]  BM[1000,,00,10,,11,00,,000,,011,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,110,010]


   5062: !(FREE)
   GOBUT026A:
        SETUP,  RETURN/SCOPE026,                         !RETURN TO SCOPE LOOP TEST WORD
        P0,     BUMP-VERIFY,                             !COUNT
        NEXT,   GOTO-PAGE(7),                            !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                              !GO DO INSTR1 "BUT"
 (5062) DCS[0,00,0,0,0,1]  BM[0101,,00,00,,01,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]


   5063: !(FREE)
   SCOPE026:
        NEXT,   BUTD[SCOPE],                             !NO ERROR:  "TEST027A" [+1, WORD]
                J/TEST027A                               !   ERROR:  "LOAD026A" [-2, WORDS]
 (5063) DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,011]






   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !*** TEST 027 ***
   !TEST-027 USES A DATA PATTERN OF:  "1 000 110 001 000 010" (106102)

   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !* PART A *
   !TEST-027-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
   !AS CLASS-D=SOP*DM0; IR<14:06>H="000 110 001"; IR<15>H="1";
   !DM=IR<5:3>H="000", DM0H=1; AND TARGETS TO (561)
   5703:
   TEST027A:
        P0,     LOAD-ENUA(ZTARGET561),                   !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST027A),                    !ERROR DIRECTORY KEY
                DCS-CTR(C4,),                            !COMPARE ENUA:TNUA IN 4, MICROWORDS
        NEXT,   J/LOAD027A                               !GO LOAD PATTERN
 (5703) DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,01,,110,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,000]


   5700:
   LOAD027A:
        P2-U,   IR_EMIT,                                 !LOAD IR WITH TEST PATTERN
                EMIT/106102,                             !(106102)
        NEXT,   J/GOBUT027A                              !GO SETUP FOR "BUT"
 (5700) DCS[0,00,0,0,0,0]  BM[1000,,00,11,,00,01,,000,,010,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,110,100]


   5064: !(FREE)
```



```
   GOBUT027A:
        SETUP,  RETURN/SCOPE027,                         !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                            !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                              !GO DO INSTR1 "BUT"
 (5064) DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]

   5065: !(FREE)
   SCOPE027:
        P0,     BUMP-VERIFY,                             !COUNT
        NEXT,   BUTD[SCOPE],                             !NO ERROR:  "TEST030A" [+1, WORD]
                J/TEST030A                               !   ERROR:  "LOAD027A" [-2, WORDS]
 (5065) DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,001]






   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !*** TEST 030 ***
   !TEST-030 USES A DATA PATTERN OF:  "0 000 101 010 000 100" (005204)

   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !* PART A *
   !TEST-030-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
   !AS CLASS-D=SOP*DM0; IR<14:06>H="000 101 010"; IR<15>H="0";
   !DM=IR<5:3>H="000", DM0H=1; AND TARGETS TO (552)
   5701:
   TEST030A:
        P0,     LOAD-ENUA(ZTARGET552),                   !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST030A),                    !ERROR DIRECTORY KEY
                DCS-CTR(C4,),                            !COMPARE ENUA:TNUA IN 4, MICROWORDS
        NEXT,   J/LOAD030A                               !GO LOAD PATTERN
 (5701) DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,01,,101,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,111,110]


   5676:
   LOAD030A:
        P2-U,   IR_EMIT,                                 !LOAD IR WITH TEST PATTERN
                EMIT/005204,                             !(005204)
        NEXT,   J/GOBUT030A                              !GO SETUP FOR "BUT"
 (5676) DCS[0,00,0,0,0,0]  BM[0000,,00,10,,10,10,,000,,100,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,000,110,110]


   5066: !(FREE)
   GOBUT030A:
        SETUP,  RETURN/TEST030B,                         !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                            !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                              !GO DO INSTR1 "BUT"
 (5066) DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]
```

```
4136
4137
4138
4139
4140    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4141
4142    !* PART B *
4143    !TEST-030-B CHECKS THAT BUT[IR<11>&FLTPT<3:0>] READS THE "1" IN IR<11>H CORRECTLY,
4144    !AND THE FLTPT DECODE ROM GETS ADDRESS (240), WHICH IS A NULL/MODE-0 INSTR.
4145    !DATA SHOULD BE (04)
4146    5712:
4147    TEST030B:
4148            PO,     LOAD-ENUA(ZTARGET424),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4149                    LOAD-ERROR(TEST030B),                   !ERROR DIRECTORY KEY
4150                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
4151            NEXT,   J/GOBUT030B                             !
    (5712)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,010,,100...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,110,111]
4152
4153
4154    5067:  !(FREE)
4155    GOBUT030B:
4156            SETUP,  RETURN/TEST030C,                        !RETURN TO START OF NEXT SUBTEST
4157            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4158                    J/BUTIR11&FLTPT3=0                      !GO DO "BUT" ON IR<11>H&FLTPT<3:0>H
    (5067)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,01,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,000,010]
4159
4160
4161    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4162
4163    !* PART C *
4164    !TEST-030-C CHECKS THAT BUTR[IR<11>B] READS THE "1" IN IR<11>H CORRECTLY
4165    5713:
4166    TEST030C:
4167            PO,     LOAD-ENUA(ZTARGET403),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4168                    LOAD-ERROR(TEST030C),                   !ERROR DIRECTORY KEY
4169                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
4170            NEXT,   J/GOBUT030C                             !GO SETUP FOR "BUT"
    (5713)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,111,000]
4171
4172
4173    5070:  !(FREE)
4174    GOBUT030C:
4175            SETUP,  RETURN/TEST030D,                        !RETURN TO START OF NEXT SUBTEST
4176            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4177                    J/BUTIR11B                              !GO DO "BUT" ON IR<11>H
    (5070)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,11,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,010]
4178
4179
4180
4181
4182    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4183
```



```
4184    !* PART D *
4185    !TEST-030-D CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
4186    !AS ROM ADDRESS=(452) ON THE INSTR5 E78 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
4187    !OF (05), TARGETING TO (405) AFTER THE DECODE
4188    5734:
4189    TEST030D:
4190            PO,     LOAD-ENUA(ZTARGET405),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4191                    LOAD-ERROR(TEST030D),                   !ERROR DIRECTORY KEY
4192                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3, MICROWORDS
4193            NEXT,   J/GOBUT030D                             !GO SETUP FOR "BUT"
    (5734)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,111,001]
4194
4195
4196    5071:  !(FREE)
4197    GOBUT030D:
4198            SETUP,  RETURN/SCOPE030,                        !RETURN TO SCOPE LOOP TEST WORD
4199            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4200                    J/BUTINSTR5                             !GO DO "BUT" ON INSTR5<4:0>H
    (5071)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,01,11,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,000,001]
4201
4202
4203    5072:  !(FREE)
4204    SCOPE030:
4205            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST031A" [+1, WORD]
4206                    J/TEST031A                              !   ERROR:  "LOAD030A" [-8, WORDS]
    (5072)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,111,111]
4207
4208
4209
4210
4211
4212
4213    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4214
4215    !*** TEST 031 ***
4216    !TEST-031 USES A DATA PATTERN OF:   "0 001 000 010 100 010" (040212)
4217
4218    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4219
4220    !* PART A *
4221    !TEST-031-A CHECKS THAT BUT[DMO&SMO&BYTE]
4222    !DM=IR<5:3>H="100", DMOH=0; SM=IR<11:9>H="000", SMOH=1; BYTE H=0
4223    5677:
4224    TEST031A:
4225            PO,     LOAD-ENUA(ZTARGET402),                  !LOAD EXPECTED ADDRESS AFTEP "BUT"
4226                    LOAD-ERROR(TEST031A),                   !ERROR DIRECTORY KEY

4227                    DCS-CTR(C4,),                           !COMPARE ENUA:TNUA IN 4, MICROWORDS
4228            NEXT,   J/LOAD031A                              !GO LOAD PATTERN
    (5677)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,111,010]
4229
4230
4231    5672:
4232    LOAD031A:
```

```
4233            P0,     BUMP=VERIFY,                            ;COUNT
4234            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
4235                    EMIT/010242,                            ;(010242)
4236            NEXT,   J/GOBUT031A                             ;GO SETUP FOR "BUT"
    (5672)  DCS[0,00,0,0,0,1]  BM[0001..00,00..00,10..100..010...0,0,0...0...0...1,1010...0..0000,0...11,000...000,111,011]
4237
4238
4239    5073:  ;(FREE)
4240    GOBUT031A:
4241            SETUP,  RETURN/TEST031B,                        ;RETURN TO START OF NEXT SUBTEST
4242            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4243                    J/BUTDMSMBYTE                           ;GO DO "BUT"
    (5073)  DCS[0,00,0,0,0,0]  BM[0101..00,11..01,11..101..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,001,011]
4244
4245
4246    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4247
4248    ;* PART B *
4249    ;TEST=031-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4250    ;AS CLASS=C=MOV*SM0*-DM0; IR<14:9>H="001 000"; IR<15>H="0";
4251    ;DM=IR<5:3>H="100"; AND TARGETS TO (604)
4252    5675:
4253    TEST031B:
4254            P0,     LOAD=ENUA(ZTARGET604),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4255                    LOAD=ERROR(TEST031B),                   ;ERROR DIRECTORY KEY
4256                    DCS=CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4257            NEXT,   J/GOBUT031B                             ;GO SETUP FOR "BUT"
    (5675)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,10..000..100...0,0,0...0...0...0,0000...0..0000,0...11,000...000,111,100]
4258
4259
4260    5074:  ;(FREE)
4261    GOBUT031B:
4262            SETUP,  RETURN/SCOPE031,                        ;RETURN TO SCOPE LOOP TEST WORD
4263            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4264                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5074)  DCS[0,00,0,0,0,0]  BM[0101..00,00..01,11..101..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,000,110]
4265
4266
4267    5075:  ;(FREE)
4268    SCOPE031:
4269            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST032A" (+1, WORDS)
4270                    J/TEST032A                              ;   ERROR:  "LOAD031A" (-4, WORDS)
    (5075)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..000...0,0,0...0...0...0,0000...0..0000,0...11,000...110,111,011]
4271
4272
4273
4274
4275
4276
4277    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4278
4279    ;*** TEST 032 ***
```



```
4280    ;TEST-032 USES A DATA PATTERN OF: "1 001 000 001 010 101" (110125)
4281
4282    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4283
4284    ;* PART A *
4285    ;TEST-032-A CHECKS THAT BUT[MOV-DR7*IR<5:3>] READS THE (-FLTPT*MOV+FLTPT*DR7) AND
4286    ;ALTERNATING PATTERN "010" IN IR<5:3>H CORRECTLY
4287    5673:
4288    TEST032A:
4289            P0,     LOAD=ENUA(ZTARGET412),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4290                    LOAD=ERROR(TEST032A),                   ;ERROR DIRECTORY KEY
4291                    DCS=CTR(C4,),                           ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4292                    BUMP=VERIFY,                            ;COUNT
4293            NEXT,   J/LOAD032A                              ;GO LOAD PATTERN
    (5673)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..001..010...0,0,0...0...0...0,0000...0..0000,0...11,000...110,110,110]
4294
4295
4296    5666:
4297    LOAD032A:
4298            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
4299                    EMIT/110125,                            ;(110125)
4300            NEXT,   J/GOBUT032A                             ;GO SETUP FOR "BUT"
    (5666)  DCS[0,00,0,0,0,0]  BM[1001..00,00..00,01..010..101...0,0,0...0...0...0,1,1010...0..0000,0...11,000...000,111,110]
4301
4302
4303    5076:  ;(FREE)
4304    GOBUT032A:
4305            SETUP,  RETURN/TEST032B,                        ;RETURN TO START OF NEXT SUBTEST
4306            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4307                    J/BUTMOVDR7IR5=3                        ;GO DO "BUT"
    (5076)  DCS[0,00,0,0,0,0]  BM[0101..00,11..01,11..001..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,000,101]
4308
4309
4310    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4311
4312    ;* PART B *
4313    ;TEST-032-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4314    ;AS CLASS=C=MOV*SM0*-DM0; IR<14:9>H="001 000"; IR<15>H="1";
4315    ;DM=IR<5:3>H="010"; AND TARGETS TO (612)
4316    5671:
4317    TEST032B:
4318            P0,     LOAD=ENUA(ZTARGET612),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4319                    LOAD=ERROR(TEST032B),                   ;ERROR DIRECTORY KEY
4320                    DCS=CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4321            NEXT,   J/GOBUT032B                             ;GO SETUP FOR "BUT"
    (5671)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,10..001..010...0,0,0...0...0...0,0000...0..0000,0...11,000...000,111,111]

4322
4323
4324    5077:  ;(FREE)
4325    GOBUT032B:
4326            SETUP,  RETURN/SCOPE032,                        ;RETURN TO SCOPE LOOP TEST WORD
4327            P0,     BUMP=VERIFY,                            ;COUNT
4328            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE IS ON PAGE 7
```

```
                J/BUTINSTR1                                 !GO DO INSTR1 "BUT"
    (5077)  DCS[0,00,0,0,0,1]  BM[0101,,00,00,,10,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]


    5100:  !(FREE)
    SCOPE032:
         NEXT,  BUTD[SCOPE],                                !NO ERROR:  "TEST033A" [+1, WORDS]
                J/TEST033A                                  !   ERROR:  "LOAD032A" [-4, WORDS]
    (5100)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,110,111]






    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 033 ***
    !TEST-033 USES A DATA PATTERN OF:  "1 000 110 010 111 100" (106274)

    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

    !* PART A *
    !TEST-033-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
    !AS CLASS-B=SOP*-DM0; IR<14:08>H="000 110 0";
    !DM=IR<5:3>H="111", DM0H=0; AND TARGETS TO (517)
    5667:
    TEST033A:
         P0,    LOAD-ENUA(ZTARGET517),                      !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST033A),                       !ERROR DIRECTORY KEY
                DCS-CTR(C4.),                               !COMPARE ENUA:TNUA IN 4. MICROWORDS
                BUMP-VERIFY,                                !COUNT
         NEXT,  J/LOAD033A                                  !GO LOAD PATTERN
    (5667)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,01,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,110,100]


    5664:
    LOAD033A:
         P2-U,  IR_EMIT,                                    !LOAD IR WITH TEST PATTERN
                EMIT/106274,                                !(106274)
         NEXT,  J/GOBUT033A                                 !GO SETUP FOR "BUT"
    (5664)  DCS[0,00,0,0,0,0]  BM[1000,,00,11,,00,10,,111,,100,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,001,000,001]


    5101:  !(FREE)
    GOBUT033A:
         SETUP, RETURN/SCOPE033,                            !RETURN TO SCOPE LOOP TEST WORD
         P0,    BUMP-VERIFY,                                !COUNT
         NEXT,  GOTO-PAGE(7),                               !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                                 !GO DO INSTR1 "BUT"
    (5101)  DCS[0,00,0,0,0,1]  BM[0101,,00,00,,10,00,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]
```



```
    5102:  !(FREE)
    SCOPE033:
         NEXT,  BUTD[SCOPE],                                !NO ERROR:  "TEST034A" [+1, WORD]
                J/TEST034A                                  !   ERROR:  "LOAD033A" [-2, WORDS]
    (5102)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,110,101]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 034 ***
    !TEST-034 USES A DATA PATTERN OF:  "0 000 101 001 001 010" (005112)

    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

    !* PART A *
    !TEST-034-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
    !AS CLASS-B=SOP*-DM0; IR<14:09>H="000 101";
    !DM=IR<5:3>H="001", DM0H=0; AND TARGETS TO (511)
    5665:
    TEST034A:
         P0,    LOAD-ENUA(ZTARGET511),                      !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST034A),                       !ERROR DIRECTORY KEY
                DCS-CTR(C4.),                               !COMPARE ENUA:TNUA IN 4. MICROWORDS
         NEXT,  J/LOAD034A                                  !GO LOAD PATTERN
    (5665)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,01,,001,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,110,010]


    5662:
    LOAD034A:
         P0,    BUMP-VERIFY,                                !COUNT
         P2-U,  IR_EMIT,                                    !LOAD IR WITH TEST PATTERN
                EMIT/005112,                                !(005112)
         NEXT,  J/GOBUT034A                                 !GO SETUP FOR "BUT"
    (5662)  DCS[0,00,0,0,0,1]  BM[0000,,00,10,,10,01,,001,,010,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,001,000,011]


    5103:  !(FREE)
    GOBUT034A:
         SETUP, RETURN/SCOPE034,                            !RETURN TO SCOPE LOOP TEST WORD
         NEXT,  GOTO-PAGE(7),                               !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                                 !GO DO INSTR1 "BUT"
    (5103)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,10,00,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]


    5104:  !(FREE)
    SCOPE034:
         NEXT,  BUTD[SCOPE],                                !NO ERROR:  "TEST035A" [+1, WORD]
                J/TEST035A                                  !   ERROR:  "LOAD034A" [-2, WORDS]
    (5104)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,110,011]
```

```
!- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 035 ***
!TEST-035 USES A DATA PATTERN OF:  "0 011 000 111 000 001" (030701)

!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!* PART A *
!TEST-035-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
!AS CLASS-A=DOP*SMO*DMO; IR<15:12>H="0011";
!SM=IR<11:9>H="000", SMOH=1; DM=IR<5:3>H="000", DMOH=1; AND TARGETS TO (443)
5663:
TEST035A:
        P0,     LOAD-ENUA(ZTARGET443),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST035A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C4.),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
        NEXT,   J/LOAD035A                              !GO LOAD PATTERN
(5663)  DCS[1.00.1.0.0.0]  BM[1011..00.11..11.00..100..011...0.0.0..0..0...0.0000...0..0000.0...11.000...110.110.000]


5660:
LOAD035A:
        P2-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
                EMIT/030701,                            !(030701)
        NEXT,   J/GOBUT035A                             !GO SETUP FOR "BUT"
(5660)  DCS[0.00.0.0.0.0]  BM[0011..00.00..01.11..000..001...0.0.0..0..0...1.1010...0..0000.0...11.000...001.000.101]


5105: !(FREE)
GOBUT035A:
        SETUP,  RETURN/SCOPE035,                        !RETURN TO SCOPE LOOP TEST WORD
        P0,     BUMP-VERIFY,                            !COUNT
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                             !GO DO INSTR1 "BUT"
(5105)  DCS[0.00.0.0.0.1]  BM[0101..00.00..10.00..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]


5106: !(FREE)
SCOPE035:
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST036A" [+1. WORD]
                J/TEST036A                              !   ERROR:  "LOAD035A" [-2. WORDS]
(5106)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.110.001]
```



```
!- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 036 ***
!TEST-036 USES A DATA PATTERN OF:  "1 101 000 101 000 110" (150506)

!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!* PART A *
!TEST-036-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
!AS CLASS-A=DOP*SMO*DMO; IR<15:12>H="1101";
!SM=IR<11:9>H="000", SMOH=1; DM=IR<5:3>H="000", DMOH=1; AND TARGETS TO (455)
5661:
TEST036A:
        P0,     LOAD-ENUA(ZTARGET455),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
                LOAD-ERROR(TEST036A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C4.),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
        NEXT,   J/LOAD036A                              !GO LOAD PATTERN
(5661)  DCS[1.00.1.0.0.0]  BM[1011..00.11..11.00..101..101...0.0.0..0..0...0.0000...0..0000.0...11.000...110.101.110]


5656:
LOAD036A:
        P0,     BUMP-VERIFY,                            !COUNT
        P2-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
                EMIT/150506,                            !(150506)
        NEXT,   J/GOBUT036A                             !GO SETUP FOR "BUT"
(5656)  DCS[0.00.0.0.0.1]  BM[1101..00.00..01.01..000..110...0.0.0..0..0...1.1010...0..0000.0...11.000...001.000.111]


5107: !(FREE)
GOBUT036A:
        SETUP,  RETURN/SCOPE036,                        !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
                J/BUTINSTR1                             !GO DO INSTR1 "BUT"
(5107)  DCS[0.00.0.0.0.0]  BM[0101..00.00..10.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]


5110: !(FREE)
SCOPE036:
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST037A" [+1. WORD]
                J/TEST037A                              !   ERROR:  "LOAD036A" [-2. WORDS]
(5110)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.101.111]




!- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 037 ***
```

```
4522    ;TEST-037 USES A DATA PATTERN OF:  "0 110 000 010 000 101" (060205)
4523
4524    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4525
4526    ;* PART A *
4527    ;TEST-037-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4528    ;AS CLASS=A=DOP=SMO=DMO; IR<15:12>H="0110";
4529    ;SM=IR<11:9>H="000", SMOH=1; DM=IR<5:3>H="000", DMO=1; AND TARGETS TO (446)
4530    5657:
4531    TEST037A:
4532            P0,     LOAD=ENUA(ZTARGET446),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4533                    LOAD=ERROR(TEST037A),                   ;ERROR DIRECTORY KEY
4534                    DCS-CTR(C4,),                           ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4535            NEXT,   J/LOAD037A                              ;GO LOAD PATTERN
    (5657)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..100..110...0.0.0..0...0...0....0.0000...0..0000.0...11.000...110.101.100]
4536
4537
4538    5654:
4539    LOAD037A:
4540            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
4541                    EMIT/060205,                            ;(060205)
4542            NEXT,   J/GOBUT037A                             ;GO SETUP FOR "BUT"
    (5654)  DCS[0,00,0,0,0,0]  BM[0110..00.00..00.10..000..101...0.0.0..0...0....1.1010...0..0000.0...11.000...001.001.001]
4543
4544
4545    5111:  !(FREE)
4546    GOBUT037A:
4547            SETUP,  RETURN/SCOPE037,                        ;RETURN TO SCOPE LOOP TEST WORD
4548            P0,     BUMP=VERIFY,                            ;COUNT
4549            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4550                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5111)  DCS[0,00,0,0,0,1]  BM[0101..00.00..10.01..010..111...0.0.0..0...0....0.0000...0..0000.0...11.100...011.000.110]
4551
4552
4553    5112:  !(FREE)
4554    SCOPE037:
4555            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST040A" (+1, WORD)
4556                    J/TEST040A                              ;   ERROR:  "LOAD037A" (+2, WORDS)
    (5112)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0....0.0000...0..0000.0...11.000...110.101.101]
4557
4558
4559
4560
4561
4562
4563    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4564
4565    ;*** TEST 040 ***
4566    ;TEST-040 USES A DATA PATTERN OF:  "0 101 000 111 111 111 " (050777)
4567
4568    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4569
4570    ;* PART A *
```



```
4571    ;TEST-040-A CHECKS THAT BUT (IR<15:12>] READS THE
4572    ;ALTERNATING PATTERN "0101" IN IR<15:12>H CORRECTLY
4573    5655:
4574    TEST040A:
4575            P0,     LOAD=ENUA(ZTARGET405),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4576                    LOAD=ERROR(TEST040A),                   ;ERROR DIRECTORY KEY
4577                    DCS-CTR(C4,),                           ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4578            NEXT,   J/LOAD040A                              ;GO LOAD PATTERN
    (5655)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..101...0.0.0..0...0....0.0000...0..0000.0...11.000...110.101.000]
4579
4580
4581    5650:
4582    LOAD040A:
4583            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
4584                    EMIT/050777,                            ;(050777)
4585            NEXT,   J/GOBUT040A                             ;GO SETUP FOR "BUT"
    (5650)  DCS[0,00,0,0,0,0]  BM[0101..00.00..01.11..111..111...0.0.0..0...0....1.1010...0..0000.0...11.000...001.001.011]
4586
4587
4588    5113:  !(FREE)
4589    GOBUT040A:
4590            SETUP,  RETURN/TEST040B,                        ;RETURN TO START OF NEXT SUBTEST
4591            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4592                    J/BUTIR15-12                            ;GO DO "BUT"
    (5113)  DCS[0,00,0,0,0,0]  BM[0101..00.11..01.01..011..111...0.0.0..0...0....0.0000...0..0000.0...11.100...011.000.000]
4593
4594
4595    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4596
4597    ;* PART B *
4598    ;TEST-040-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4599    ;AS CLASS=B=DOP=-MOV=SMO=-DMO; DM=IR<5:3>H="111";
4600    ;DOP=IR<14:12>H="101"; TARGETS TO (517)
4601    5653:
4602    TEST040B:
4603            P0,     LOAD=ENUA(ZTARGET517),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4604                    LOAD=ERROR(TEST040B),                   ;ERROR DIRECTORY KEY
4605                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4606                    BUMP=VERIFY,                            ;COUNT
4607            NEXT,   J/GOBUT040B                             ;GO SETUP FOR "BUT"
    (5653)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.01..001..111...0.0.0..0...0....0.0000...0..0000.0...11.000...001.001.100]
4608
4609
4610    5114:  !(FREE)
4611    GOBUT040B:
4612            SETUP,  RETURN/SCOPE040,                        ;RETURN TO SCOPE LOOP TEST WORD

4613            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4614                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5114)  DCS[0,00,0,0,0,0]  BM[0101..00.00..10.01..101..111...0.0.0..0...0....0.0000...0..0000.0...11.100...011.000.110]
4615
4616
4617    5115:  !(FREE)
```

```
4618    SCOPE040:
4619            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "TEST041A" [+1, WORDS]
4620                    J/TEST041A                      ;   ERROR:  "LOAD040A" [-4, WORDS]
     (5115)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..000...0,0,0...0...0,0...0,0000...0..0000,0...11,000...110,101,001]
4621
4622
4623
4624
4625
4626
4627    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4628
4629    ;*** TEST 041 ***
4630    ;TEST-041 USES A DATA PATTERN OF:  "1 010 000 111 111 111 " (120777)
4631
4632    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4633
4634    ;* PART A *
4635    ;TEST-041-A CHECKS THAT BUT[IR<15:12>] READS THE
4636    ;ALTERNATING PATTERN "1010" IN IR<15:12>H CORRECTLY
4637    5651:
4638    TEST041A:
4639            P0,     LOAD-ENUA(ZTARGET412),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
4640                    LOAD-ERROR(TEST041A),           ;ERROR DIRECTORY KEY
4641                    DCS-CTR(C4,),                   ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4642            NEXT,   J/LOAD041A                      ;GO LOAD PATTERN
     (5651)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..001..010...0,0,0...0...0,0...0,0000...0..0000,0...11,000...110,100,100]
4643
4644
4645    5644:
4646    LOAD041A:
4647            P0,     BUMP-VERIFY,                    ;COUNT
4648            P2-U,   IR_EMIT,                        ;LOAD IR WITH TEST PATTERN
4649                    EMIT/120777,                    ;(120777)
4650            NEXT,   J/GOBUT041A                     ;GO SETUP FOR "BUT"
     (5644)  DCS[0,00,0,0,0,1]  BM[1010..00,00..01,11..111..111...0,0,0...0...0,0...1,1010...0..0000,0...11,000...001,001,110]
4651
4652
4653    5116:  ;(FREE)
4654    GOBUT041A:
4655            SETUP,  RETURN/TEST041B,                ;RETURN TO START OF NEXT SUBTEST
4656            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
4657                    J/BUTIR15-12                    ;GO DO "BUT"
     (5116)  DCS[0,00,0,0,0,0]  BM[0101..00,11..01,00..111..111...0,0,0...0...0,0...0,0000...0..0000,0...11,100...011,000,000]
4658
4659
4660    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4661
4662    ;* PART B *
4663    ;TEST041-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4664    ;AS CLASS=B=DOP=-MOV=SM0=-DM0; DM=IR<5:3>H="111";
4665    ;DOP=IR<14:12>H="010"; TARGETS TO (517)
4666    5647:
```



```
4667    TEST041B:
4668            P0,     LOAD-ENUA(ZTARGET517),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
4669                    LOAD-ERROR(TEST041B),           ;ERROR DIRECTORY KEY
4670                    DCS-CTR(C3,),                   ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4671                    BUMP-VERIFY,                    ;COUNT
4672            NEXT,   J/GOBUT041B                     ;GO SETUP FOR "BUT"
     (5647)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,01..001..111...0,0,0...0...0,0...0,0000...0..0000,0...11,000...001,001,111]
4673
4674
4675    5117:  ;(FREE)
4676    GOBUT041B:
4677            SETUP,  RETURN/SCOPE041,                ;RETURN TO SCOPE LOOP TEST WORD
4678            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE IS ON PAGE 7
4679                    J/BUTINSTR1                     ;GO DO INSTR1 "BUT"
     (5117)  DCS[0,00,0,0,0,0]  BM[0101..00,00..10,10..000..111...0,0,0...0...0,0...0,0000...0..0000,0...11,100...011,000,110]
4680
4681
4682    5120:  ;(FREE)
4683    SCOPE041:
4684            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "TEST042A" [+1, WORDS]
4685                    J/TEST042A                      ;   ERROR:  "LOAD041A" [-4, WORDS]
     (5120)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..000...0,0,0...0...0,0...0,0000...0..0000,0...11,000...110,100,101]
4686
4687
4688
4689
4690
4691
4692    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4693
4694    ;*** TEST 042 ***
4695    ;TEST-042 USES A DATA PATTERN OF:  "1 100 100 000 010 000" (144020)
4696
4697    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4698
4699    ;* PART A *
4700    ;TEST-042-A CHECKS THAT BUT[DM0#SM0#BYTE]
4701    ;DM=IR<5:3>H="010", DM0H=0; SM=IR<11:9>H="100", SM0H=0; BYTE H=1
4702    5645:
4703    TEST042A:
4704            P0,     LOAD-ENUA(ZTARGET401),          ;LOAD EXPECTED ADDRESS AFTER "BUT"
4705                    LOAD-ERROR(TEST042A),           ;ERROR DIRECTORY KEY
4706                    DCS-CTR(C4,),                   ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4707            NEXT,   J/LOAD042A                      ;GO LOAD PATTERN
     (5645)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..001...0,0,0...0...0,0...0,0000...0..0000,0...11,000...110,100,000]
4708
4709
4710    5640:
4711    LOAD042A:
4712            P2-U,   IR_EMIT,                        ;LOAD IR WITH TEST PATTERN
4713                    EMIT/144020,                    ;(144020)
4714            NEXT,   J/GOBUT042A                     ;GO SETUP FOR "BUT"
     (5640)  DCS[0,00,0,0,0,0]  BM[1100..00,10..00,00..010..000...0,0,0...0...0,0...1,1010...0..0000,0...11,000...001,010,001]
```

```
4715
4716
4717    5121:  ;(FREE)
4718    GOBUT042A:
4719            SETUP,  RETURN/TEST042B,                        ;RETURN TO START OF NEXT SUBTEST
4720            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4721                    J/BUTDM8M8BYTE                          ;GO DO "BUT"
    (5121)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,01,00,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,011,001,011]
4722
4723
4724    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4725
4726    ;* PART B *
4727    ;TEST-042-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4728    ;AS CLASS-G=DOP=-SM0; DOP=IR<14:12>H="100";
4729    ;SM=IR<11:9>H="100"; TARGETS TO (714)
4730    5643:
4731    TEST042B:
4732            PO,     LOAD-ENUA(ZTARGET714),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4733                    LOAD-ERROR(TEST042B),                   ;ERROR DIRECTORY KEY
4734                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4735            NEXT,   J/GOBUT042B                             ;GO SETUP FOR "BUT"
    (5643)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,11,,001,,100...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,001,010,010]
4736
4737
4738    5122:  ;(FREE)
4739    GOBUT042B:
4740            SETUP,  RETURN/SCOPE042,                        ;RETURN TO SCOPE LOOP TEST WORD
4741            PO,     BUMP=VERIFY,                            ;COUNT
4742            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4743                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5122)  DCS[0,00,0,0,0,1]  BM[0101,,00,00,,10,10,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,011,000,110]
4744
4745
4746    5123:  ;(FREE)
4747    SCOPE042:
4748            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST043A" [+1, WORDS]
4749                    J/TEST043A                              ;   ERROR:  "LOAD042A" [-4, WORDS]
    (5123)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,110,100,001]
4750
4751
4752
4753
4754
4755
4756    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4757
4758    ;*** TEST 043 ***
4759    ;TEST-043 USES A DATA PATTERN OF:  "1 110 001 111 000 111" (161707)
4760
4761    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4762
```



```
4763    ;* PART A *
4764    ;TEST-043-A CHECKS THAT BUT[DM0#SM0#BYTE]
4765    ;DM=IR<5:3>H="000", DM0H=1; SM=IR<11:9>H="001", SM0H=0; BYTE H=0
4766    5641:
4767    TEST043A:
4768            PO,     LOAD-ENUA(ZTARGET404),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4769                    LOAD-ERROR(TEST043A),                   ;ERROR DIRECTORY KEY
4770                    DCS-CTR(C4,),                           ;COMPARE ENUA:TNUA IN 4, MICROWORDS
4771            NEXT,   J/LOAD043A                              ;GO LOAD PATTERN
    (5641)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,100...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,110,011,100]
4772
4773
4774    5634:
4775    LOAD043A:
4776            PO,     BUMP=VERIFY,                            ;COUNT
4777            P2-U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
4778                    EMIT/161707,                            ;(161707)
4779            NEXT,   J/GOBUT043A                             ;GO SETUP FOR "BUT"
    (5634)  DCS[0,00,0,0,0,1]  BM[1110,,00,00,,11,11,,000,,111...0,0,0,,0,,0...1,1010...0,,0000,0...11,000,,001,010,100]
4780
4781
4782    5124:  ;(FREE)
4783    GOBUT043A:
4784            SETUP,  RETURN/TEST043B,                        ;RETURN TO START OF NEXT SUBTEST
4785            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4786                    J/BUTDM8M8BYTE                          ;GO DO "BUT"
    (5124)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,11,,111,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,011,001,011]
4787
4788
4789    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4790
4791    ;* PART B *
4792    ;TEST-043-B CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4793    ;AS CLASS-G=DOP=-SM0; DOP=IR<14:12>H="110";
4794    ;SM=IR<11:9>H="001"; TARGETS TO (711)
4795    5637:
4796    TEST043B:
4797            PO,     LOAD-ENUA(ZTARGET711),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
4798                    LOAD-ERROR(TEST043B),                   ;ERROR DIRECTORY KEY
4799                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
4800            NEXT,   J/GOBUT043B                             ;GO SETUP FOR "BUT"
    (5637)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,11,,001,,001...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,001,010,101]
4801
4802
4803    5125:  ;(FREE)
4804    GOBUT043B:
4805            SETUP,  RETURN/SCOPE043,                        ;RETURN TO SCOPE LOOP TEST WORD
4806            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
4807                    J/BUTINSTR1                             ;GO DO INSTR1 "BUT"
    (5125)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,10,10,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,011,000,110]
4808
4809
```

```
4810    5126:  !(FREE)
4811    SCOPE043:
4812            P0,     BUMP-VERIFY,                            !COUNT
4813            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST044A" (+1, WORDS)
4814                    J/TEST044A                              !   ERROR:  "LOAD043A" (-4, WORDS)
    (5126)  DCS[0,00,0,1,0,1]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.101]
4815
4816
4817
4818
4819
4820
4821
4822    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4823
4824    !*** TEST 044 ***
4825    !TEST-044 USES A DATA PATTERN OF:  "0 111 110 010 101 000" (076250)
4826
4827    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4828
4829    !* PART A *
4830    !TEST-044-A CHECKS THAT BUT[INSTR1] READS THE IR CORRECTLY
4831    !AS CLASS-A=XFC; IR<15:9>H="0 111 110"; AND TARGETS TO (447)
4832    5635:
4833    TEST044A:
4834            P0,     LOAD-ENUA(ZTARGET447),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4835                    LOAD-ERROR(TEST044A),                   !ERROR DIRECTORY KEY
4836                    DCS-CTR(C4.),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
4837            NEXT,   J/LOAD044A                              !GO LOAD PATTERN
    (5635)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..100..111...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.010]
4838
4839
4840    5632:
4841    LOAD044A:
4842            P?-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
4843                    EMIT/076250,                            !(076250)
4844            NEXT,   J/GOBUT044A                             !GO SETUP FOR "BUT"
    (5632)  DCS[0,00,0,0,0,0]  BM[0111..00.11..00.10..101..000...0.0.0..0..0...1.1010...0..0000.0...11.000...001.010.111]
4845
4846
4847    5127:  !(FREE)
4848    GOBUT044A:
4849            SETUP,  RETURN/SCOPE044,                        !RETURN TO SCOPE LOOP TEST WORD
4850            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4851                    J/BUTINSTR1                             !GO DO INSTR1 "BUT"
    (5127)  DCS[0,00,0,0,0,0]  BM[0101..00.00..10.11..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]
4852
4853
4854    5130:  !(FREE)
4855    SCOPE044:
4856            P0,     BUMP-VERIFY,                            !COUNT
4857            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST045A" (+1, WORD)
4858                    J/TEST045A                              !   ERROR:  "LOAD044A" (-2, WORDS)
```



```
    (5130)  DCS[0,00,0,1,0,1]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.011]
4859
4860
4861
4862
4863
4864
4865
4866    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4867
4868    !*** TEST 045 ***
4869    !TEST-045 USES A DATA PATTERN OF:  "0 000 100 011 000 000" (004300)
4870
4871    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4872
4873    !* PART A *
4874    !TEST-045-A CHECKS THAT BUT[DM#SM#BYTE] READS THE IR CORRECTLY AS:
4875    !DM H="000", DMOH=1;  SM H="100", SMOH=0;  BYTE H=1  (IR=SWAB, SORT OF)
4876    !CHECKS THAT SWAB INSTR ASSERTS BYTE H
4877    5633:
4878    TEST045A:
4879            P0,     LOAD-ENUA(ZTARGET405),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4880                    LOAD-ERROR(TEST045A),                   !ERROR DIRECTORY KEY
4881                    DCS-CTR(C4.),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
4882            NEXT,   J/LOAD045A                              !GO LOAD PATTERN
    (5633)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.000]
4883
4884
4885    5630:
4886    LOAD045A:
4887            P2-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
4888                    EMIT/004300,                            !(004300)
4889            NEXT,   J/GOBUT045A                             !GO SETUP FOR "BUT"
    (5630)  DCS[0,00,0,0,0,0]  BM[0000..00.10..00.11..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...001.011.001]
4890
4891
4892    5131:  !(FREE)
4893    GOBUT045A:
4894            SETUP,  RETURN/SCOPE045,                        !RETURN TO SCOPE LOOP TEST WORD
4895            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4896                    J/BUTDMSMBYTE                           !GO DO BUT ON DM#SM#BYTE
    (5131)  DCS[0,00,0,0,0,0]  BM[0101..00.00..10.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.011]
4897
4898
4899    5132:  !(FREF)
4900    SCOPE045:

4901            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST046A"  (+1, WORD)
4902                    J/TEST046A                              !   ERROR:  "LOAD045A" (-2, WORDS)
    (5132)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.001]
4903
4904
4905
4906
```

```
4907
4908    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4909
4910    !*** TEST 046 ***
4911    !TEST-046 USES A DATA PATTERN OF:  "0 000 000 010 000 000" (000200)
4912
4913    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4914
4915    !* PART A *
4916    !TEST-046-A CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
4917    !AS ROM ADDRESS=(426) ON THE INSTR5 E68 ROM, AND RECEIVES THE VALUE
4918    !OF (06), TARGETING TO (426) AFTER THE DECODE
4919    5631:
4920    TEST046A:
4921            P0,     LOAD-ENUA(ZTARGET426),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4922                    LOAD-ERROR(TEST046A),                   !ERROR DIRECTORY KEY
4923                    DCS-CTR(C4,),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
4924            NEXT,   J/LOAD046A                              !GO LOAD PATTERN
     (5631)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..010..110...0,0,0..0...0.0000...0..0000,0...11,000...101,110,000]
4925
4926
4927    5560:
4928    LOAD046A:
4929            P2-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN
4930                    EMIT/000200,                            !(000200)
4931            NEXT,   J/GOBUT046A                             !GO SETUP FOR "BUT"
     (5560)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,10..000..000...0,0,0..0...1.1010...0..0000,0...11,000...001,011,011]
4932
4933
4934    5133:  !(FREE)
4935    GOBUT046A:
4936            SETUP,  RETURN/TEST046B,                        !RETURN TO START OF NEXT SUBTEST
4937            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4938                    J/BUTINSTR5                             !GO DO INSTR5 "BUT"
     (5133)  DCS[0,00,0,0,0,0]  BM[0101..00,11..11,11..000..111...0,0,0..0...0.0000...0..0000,0...11,100...011,000,001]
4939
4940
4941
4942
4943    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4944
4945    !* PART B *
4946    !TEST-046-B CHECKS THAT BUT[IR<11>#FLTPT<3:0>] READS THE "0" IN IR<11>H CORRECTLY,
4947    !AND THE FLTPT DECODE ROM GETS ADDRESS (040), WHICH IS A $TST INSTR,
4948    !DATA SHOULD BE (01)
4949    5770:
4950    TEST046B:
4951            P0,     LOAD-ENUA(ZTARGET401),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4952                    LOAD-ERROR(TEST046B),                   !ERROR DIRECTORY KEY
4953                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA IN 3. MICROWORDS
4954            NEXT,   J/GOBUT046B                             !
     (5770)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..001...0,0,0..0...0.0000...0..0000,0...11,000...001,011,100]
4955
```



```
4956
4957    5134:  !(FREE)
4958    GOBUT046B:
4959            SETUP,  RETURN/SCOPE046,                        !RETURN TO SCOPE LOOP TEST WORD
4960            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
4961                    J/BUTIR11FLTPT3-0                       !GO DO "BUT" ON IR<11>H#FLTPT<3:0>H
     (5134)  DCS[0,00,0,0,0,0]  BM[0101..00,00..10,11..101..111...0,0,0..0...0.0000...0..0000,0...11,100...011,000,010]
4962
4963
4964
4965
4966    5135:  !(FREE)
4967    SCOPE046:
4968            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST047A" [+1. WORD]
4969                    J/TEST047A                              !   ERROR:  "LOAD046A" [-4. WORDS]
     (5135)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0.0000...0..0000,0...11,000...101,110,001]
4970
4971
4972
4973
4974
4975
4976    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4977
4978    !*** TEST 047 ***
4979    !TEST-047 USES A DATA PATTERN OF:  "1 010 010 101 110 110" (122566)
4980
4981    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
4982
4983    !* PART A *
4984    !TEST-047-A CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
4985    !AS ROM ADDRESS=(325) ON THE INSTR5 E78 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
4986    !OF (12), TARGETING TO (412) AFTER THE DECODE
4987    5561:
4988    TEST047A:
4989            P0,     LOAD-ENUA(ZTARGET412),                  !LOAD EXPECTED ADDRESS AFTER "BUT"
4990                    LOAD-ERROR(TEST047A),                   !ERROR DIRECTORY KEY
4991                    DCS-CTR(C4,),                           !COMPARE ENUA:TNUA IN 4. MICROWORDS
4992                    BUMP-VERIFY,                            !COUNT
4993            NEXT,   J/LOAD047A                              !GO LOAD PATTERN
     (5561)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..001..010...0,0,0..0...0.0000...0..0000,0...11,000...101,101,000]
4994
4995
4996    5550:
4997    LOAD047A:
4998            P2-U,   IR_EMIT,                                !LOAD IR WITH TEST PATTERN

4999                    EMIT/122566,                            !(122566)
5000            NEXT,   J/GOBUT047A                             !GO SETUP FOR "BUT"
     (5550)  DCS[0,00,0,0,0,0]  BM[1010..00,01..01,01..110..110...0,0,0..0...0.0...1.1010...0..0000,0...11,000...001,011,110]

5001
5002
5003    5136:  !(FREE)
5004    GOBUT047A:
```

```
5005            SETUP,  RETURN/TEST047B,                        ;RETURN TO START OF NEXT SUBTEST
5006            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
5007                    J/BUTINSTR5                             ;GO DO INSTR5 "BUT"
     (5136)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,01,11,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,011,000,001]
5008
5009
5010
5011
5012    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5013
5014    ;* PART B *
5015    ;TEST-047-B CHECKS THAT BUT[IR<11>$FLTPT<3:0>] READS THE "0" IN IR<11>H CORRECTLY,
5016    ;AND THE FLTPT DECODE ROM GETS ADDRESS (534), WHICH IS A LOAD/MODE=6 INSTR,
5017    ;DATA SHOULD BE (13)
5018    5670:
5019    TEST047B:
5020            P0,     LOAD-ENUA(ZTARGET413),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
5021                    LOAD-ERROR(TEST047B),                   ;ERROR DIRECTORY KEY
5022                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
5023            NEXT,   J/GOBUT047B                             ;
     (5670)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,011...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,001,011,111]
5024
5025
5026    5137:  ;(FREE)
5027    GOBUT047B:
5028            P0,     BUMP-VERIFY,                            ;COUNT
5029            SETUP,  RETURN/TEST047C,                        ;RETURN TO START OF NEXT SUBTEST
5030            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
5031                    J/BUTIR11FLTPT3=0                       ;GO DO "BUT" ON IR<11>H$FLTPT<3:0>H
     (5137)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,10,11,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,011,000,010]
5032
5033
5034    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5035
5036    ;* PART C *
5037    ;TEST-047-C CHECKS THAT BUT[MOV=DR7$IR<5:3>] READS THE -(-FLTPT*MOV+FLTPT*DR7), IR<5:3>="110"
5038    5730:
5039    TEST047C:
5040            P0,     LOAD-ENUA(ZTARGET406),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
5041                    LOAD-ERROR(TEST047C),                   ;ERROR DIRECTORY KEY
5042                    DCS-CTR(C3,),                           ;COMPARE ENUA:TNUA IN 3, MICROWORDS
5043            NEXT,   J/GOBUT047C                             ;GO SETUP FOR "BUT"
     (5730)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,110...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,001,100,000]
5044
5045
5046    5140:  ;(FREE)
5047    GOBUT047C:
5048            SETUP,  RETURN/SCOPE047,                        ;RETURN TO SCOPE LOOP TEST WORD
5049            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
5050                    J/BUTMOVDR7IR5=3                        ;GO DO "BUT" ON (MOV/DR7)$IR<5:3>H
     (5140)  DCS[0,00,0,0,0,0]  BM[0101,,00,00,,11,00,,001,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,011,000,101]
```



```
5051
5052
5053
5054
5055    5141:  ;(FREE)
5056    SCOPE047:
5057            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST050A" (+1, WORD)
5058                    J/TEST050A                              ;   ERROR:  "LOAD047A" (-6, WORDS)
     (5141)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,101,101,001]
5059
5060
5061
5062
5063
5064    ; - - ,- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5065
5066    ;*** TEST 050 ***
5067    ;TEST-050-A USES A DATA PATTERN OF:  "1 111 010 101 000 000" (172500)
5068    ;TEST-050-B USES A DATA PATTERN OF:  "1 111 101 010 000 000" (175200)
5069
5070    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5071
5072    ;* PART A *
5073    ;TEST-050-A CHECKS THAT BUT[INSTR5] READS THE IR CORRECTLY
5074    ;AS ROM ADDRESS=(725) ON THE INSTR5 E78 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
5075    ;OF (05), TARGETING TO (405) AFTER THE DECODE
5076    5551:
5077    TEST050A:
5078            P0,     LOAD-ENUA(ZTARGET405),                  ;LOAD EXPECTED ADDRESS AFTER "BUT"
5079                    LOAD-ERROR(TEST050A),                   ;ERROR DIRECTORY KEY
5080                    DCS-CTR(C4,),                           ;COMPARE ENUA:TNUA IN 4, MICROWORDS
5081                    BUMP-VERIFY,                            ;COUNT
5082            NEXT,   J/LOAD050A                              ;GO LOAD PATTERN
     (5551)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,00,,000,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,101,101,010]
5083
5084
5085    5552:
5086    LOAD050A:
5087            P2=U,   IR_EMIT,                                ;LOAD IR WITH TEST PATTERN
5088                    EMIT/172500,                            ;(172500)
5089            NEXT,   J/GOBUT050A                             ;GO SETUP FOR "BUT"
     (5552)  DCS[0,00,0,0,0,0]  BM[1111,,00,01,,01,01,,000,,000...0,0,0,,0,,0...1,1010...0,,0000,0,,,11,000,,001,100,010]
5090
5091
5092    5142:  ;(FREE)
5093    GOBUT050A:

5094            SETUP,  RETURN/TEST050B,                        ;RETURN TO START OF NEXT SUBTEST
5095            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
5096                    J/BUTINSTR5                             ;GO DO INSTR5 "BUT"
     (5142)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,10,10,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,011,000,001]
5097
5098
5099
```

```
	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!* PART B *
	!TEST-050-B CHECKS THAT BUT[INSTR-5] READS THE IR CORRECTLY
	!AS ROM ADDR=(752) ON THE INSTRS E78 ROM, AND RECEIVES THE DIAGNOSTIC VALUE
	!OF (12), TARGETING TO (412) AFTER THE DECODE
	5726:
	TEST050B:
		P0,	LOAD-ENUA(ZTARGET412),			!LOAD EXPECTED ADDRESS AFTER "BUT"
			LOAD-ERROR(TEST050B),			!ERROR DIRECTORY KEY
			DCS-CTR(C4.),				!COMPARE ENUA:TNUA IN 4. MICROWORDS
		NEXT,	J/LOAD050B				!
   (5726)  DCS[1.00.1.0.0.0]  BM[1011..00.11..11.00..001..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.100.011]


	5143:	!(FREE)
	LOAD050B:
		P2-U,	IR_EMIT,				!LOAD IR WITH TEST PATTERN
			EMIT/175200,				!(175200)
		NEXT,	J/GOBUT050B				!GO SETUP FOR "BUT"
   (5143)  DCS[0.00.0.0.0.0]  BM[1111..00.10..10.10..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...001.100.100]

	5144:	!(FREE)
	GOBUT050B:
		SETUP,	RETURN/SCOPE050,			!RETURN TO SCOPE LOOP TEST WORD
		NEXT,	GOTO-PAGE(7),				!BUT TABLE IS ON PAGE 7
			J/BUTINSTRS				!DO INSTRS BUT
   (5144)  DCS[0.00.0.0.0.0]  BM[0101..00.00..11.00..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.001]


	5145:	!(FREE)
	SCOPE050:
		P0,	BUSDIN_EMIT-[I],			!RESET PROC UCON
			EN-CLK-IR[15-00],			!
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST101A"  [+1, WORD]
			J/TEST101A				!   ERROR:  "LOAD050A" [-5, WORDS]
   (5145)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...101.101.011]



	!.PAGE==========================================================================================

	.TOC	*	TEST101:  D -> DBUF -> IR PATH


	!**********************************************************************************
	!*
	!*	TESTS:  101 - 104				UWORDS:  057 + 067
	!*
	!*	FUNCTIONS:
	!*
	!*	THESE TESTS VERIFY THE "EMIT -> CSP -> SBUS -> D -> DBUF -> IR" DATAPATH.
```



```
	!*
	!*	TEST 101 FIRST VERIFIES THE "D -> DBUF -> IR" DATA PATH, INSURING THAT THE
	!*	DBUF LATCH CAN BE WRITTEN WITH ZEROES, AND ENABLED ONTO BUSDIN, TO BE PUT
	!*	INTO THE IR AND VERIFIED (VIA INSTRS DECODE, AS A HALT INSTRUCTION).
	!*
	!*	TESTS 102-104 THEN GO ON TO FURTHER TEST THE FULL DATAPATH FROM EMIT TO
	!*	IR, VIA THE EXTENDED ROUTE.  THESE TESTS THEN VERIFY THE CSP WRITE, ADDRESSING AND
	!*	DATAPATHS LOGIC.
	!*
	!**********************************************************************************

	5553:
	TEST101A:
		P0,	LOAD-ENUA(ZTARGET434),			!INSTRS E88 OUTPUT FOR IR=(000000)
			LOAD-ERROR(TEST101A),			!ERROR DIRECTORY KEY
			DCS-CTR(C7.),				!COMPARE AT TARGET
		NEXT,	J/LOADD101A				!
   (5553)  DCS[1.00.1.0.0.0]  BM[1000..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...101.010.000]

	5520:
	LOADD101A:
		P2-T,	D_ZERO,					!PUT (000000) IN D
		NEXT,	J/GOTEST101A				!
   (5520)  DCS[0.00.0.0.0.0]  BM[0011..00.00..00.00..000..000...0.1.0..0..0...0.0000...0..0000.0...11.000...001.100.111]

	5147:	!(FREE)
	GOTEST101A:
		SETUP,	RETURN/SCOPE101,			!GOT TO SUBR THAT:
		NEXT,	CALL[DINTOIR-5]				!D -> DBUF -> IR, THEN BUT(INSTRS)
   (5147)  DCS[0.00.0.0.0.0]  BM[0101..00.00..11.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]



	5150:	!(FREE)
	SCOPE101:
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST102A"  (+1, WORDS)
			J/TEST102A				!   ERROR:  "LOADCSP101A"  (-3, WORDS)
   (5150)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...101.010.001]


	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


	.TOC	*	TEST102-104:  TESTING CSP ADDRESS/READ/WRITE FUNCTIONS

	!THE FOLLOWING SET OF FOUR TESTS VERIFIES THAT THE CSP, AND THE CSP ADDRESS FIELD "CSPADDR"

	!HAS NO STUCK ZERO BITS, AND THAT THE EMIT -> CSP -> D -> DBUF -> IR DATAPATH
	!IS FULLY FUNCTIONAL.
	!

	!	AFTER TEST 104B COMPLETES, THE CSP WILL LOOK AS FOLLOWS:
	!
	!	"BAS-CON"	"CSP-ADR"	CSP		INSTRS
	!	U<41:40>H	U<23:20>H	LOCT	-DATA-	TARGET
```

```
 5198    !      ----------       ----------      ----    ------  ------
 5199    !                         1111          00      000000  E78/434
 5200    !                         1110          01      000152  E78/425
 5201    !                         1101          02      000125  E78/432
 5202    !                         1100          03      ------
 5203    !                         1011          04      125200  E88/412
 5204    !                         1010          05      ------
 5205    !                         1001          06      ------
 5206    !                         1000          07      152500  E88/405
 5207    !                         0111          10      125200  E88/405
 5208    !                         0110          11      ------
 5209    !                         0101          12      ------
 5210    !                         0100          13      125200  E88/412
 5211    !          11             0011          14      ------
 5212    !          10             0010          15      000125  E78/432
 5213    !          01             0001          16      000152  E78/425
 5214    !          00             0000          17      000000  E78/434
 5215    !
 5216
 5217
 5218    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 5219
 5220
 5221    !TEST 102A VERIFIES THAT CSPD(02) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
 5222    !  (000125), E78 TARGET (432).  LOOKING FOR CSP ADDRESS BIT<01> STUCK ONE/ZERO,
 5223    !  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU=B -> D -> DBUF -> IR.
 5224    5521:
 5225    TEST102A:
 5226            P0,     LOAD=ENUA(ZTARGET432),                  !INSTR5 E78 OUTPUT
 5227                    LOAD=ERROR(TEST102A),                   !ERROR DIRECTORY KEY
 5228                    DC5=CTR(C12,),                          !COMPARE AT TARGET
 5229            NEXT,   J/LOAD01=102A                           !
     (5521)  DC5[1,00,1,0,0,0]  BM[0011..00.11..11.00..011..010...0.0.0..0..0...0.0000...0..0000.0...11.000...101.011.000]
 5230
 5231    5530:
 5232    LOAD01=102A:
 5233            P3,     CSPD[01]_EMIT, EMIT/000152,             !INSTR5 DATA PATTERN:
 5234            NEXT,   J/LOAD02=102A                           !  (000152)=E78(425)
     (5530)  DC5[0,00,0,0,0,0]  BM[0000..10.00..00.01..101..010...0.0.0..0..0...0.1110...1..0000.0...11.000...001.101.001]
 5235
 5236    5151:  !(FREE)
 5237    LOAD02=102A:
 5238            P3,     CSPD[02]_EMIT, EMIT/000125,             !INSTR5 DATA PATTERN:
 5239            NEXT,   J/LOAD04=102A                           !  (000125)=E78(432)
     (5151)  DC5[0,00,0,0,0,0]  BM[0000..10.00..00.01..010..101...0.0.0..0..0...0.1101...1..0000.0...11.000...001.101.010]
 5240
 5241    5152:  !(FREE)
 5242    LOAD04=102A:
 5243            P3,     CSPD[04]_EMIT, EMIT/125200,             !INSTR5 DATA PATTERN:
 5244            NEXT,   J/LOAD10=102A                           !  (125200)=E88(412)
     (5152)  DC5[0,00,0,0,0,0]  BM[1010..10.10..10.10..000..000...0.0.0..0..0...0.1011...1..0000.0...11.000...001.101.011]
 5245
 5246    5153:  !(FREE)
 5247    LOAD10=102A:
```



```
 5248            P3,     CSPD[10]_EMIT, EMIT/152500,             !INSTR5 DATA PATTERN:
 5249            NEXT,   J/LOAD00=102A                           !  (152500)=E88(405)
     (5153)  DC5[0,00,0,0,0,0]  BM[1101..10.01..01.01..000..000...0.0.0..0..0...0.0111...1..0000.0...11.000...001.101.100]
 5250
 5251    5154:  !(FREE)
 5252    LOAD00=102A:
 5253            P3,     CSPD[00]_EMIT, EMIT/000000,             !INSTR5 DATA PATTERN:
 5254                                                            !  (000000)=E78(434)
 5255            NEXT,   J/LOAD00102A                            !IF THIS DATA USED, CSP ADDRESSING ERROR
     (5154)  DC5[0,00,0,0,0,0]  BM[0000..10.00..00.00..000..000...0.0.0..0..0...0.1111...1..0000.0...11.000...001.101.101]
 5256
 5257    5155:  !(FREE)
 5258    LOAD00102A:
 5259            P2=T,   D_CSPD(D02), BSEL/B17,                  !GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
 5260            NEXT,   J/GOTEST102A                            !
     (5155)  DC5[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0.1.0..0..0...0.1101...0..0000.0...11.000...001.101.110]
 5261
 5262    5156:  !(FREE)
 5263    GOTEST102A:
 5264            SETUP,  RETURN/TEST102B,                        !GO TO SUBR WHICH:
 5265            NEXT,   CALL[DINTOIR=5]                         ! D => DBUF => IR, THEN BUT(INSTR5)
     (5156)  DC5[0,00,0,0,0,0]  BM[0101..00.10..11.11..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]
 5266
 5267
 5268
 5269
 5270
 5271    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 5272
 5273    !TEST 102B VERIFIES THAT CSPD(10) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
 5274    !  (152500), E88 TARGET (405).  LOOKING FOR CSP ADDRESS BIT<03> STUCK ONE/ZERO,
 5275    !  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU=B -> D -> DBUF -> IR.
 5276    5574:
 5277    TEST102B:
 5278            P0,     LOAD=ENUA(ZTARGET405),                  !INSTR5 E88 OUTPUT
 5279                    LOAD=ERROR(TEST102B),                   !ERROR DIRECTORY KEY
 5280                    DC5=CTR(C7,),                           !COMPARE AT TARGET
 5281            NEXT,   J/LOAD00102B                            !
     (5574)  DC5[1,00,1,0,0,0]  BM[1000..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...001.101.111]
 5282
 5283    5157:  !(FREE)
 5284    LOAD00102B:
 5285            P2=T,   D_CSPD(D10), BSEL/B17,                  !GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
 5286            NEXT,   J/GOTEST102B                            !
     (5157)  DC5[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0.1.0..0..0...0.0111...0..0000.0...11.000...001.110.000]
 5287

 5288    5160:  !(FREE)
 5289    GOTEST102B:
 5290            SETUP,  RETURN/TEST102C,                        !GO TO SUBR WHICH:
 5291            NEXT,   CALL[DINTOIR=5]                         ! D => DBUF => IR, THEN BUT(INSTR5)
     (5160)  DC5[0,00,0,0,0,0]  BM[0101..00.10..11.10..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]
 5292
```

```
5293
5294
5295
5296
5297    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5298
5299    ;TEST 102C VERIFIES THAT CSPD(04) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5300    !  (125200), E88 TARGET (412).  LOOKING FOR CSP ADDRESS BIT<02> STUCK ONE/ZERO,
5301    !  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5302    5564:
5303    TEST102C:
5304            P0,     LOAD-ENUA(ZTARGET412),                  ;INSTR5 E88 OUTPUT
5305                    LOAD-ERROR(TEST102C),                   ;ERROR DIRECTORY KEY
5306                    DC5-CTR(C7,),                           ;COMPARE AT TARGET
5307                    BUMP-VERIFY,                            ;COUNT
5308            NEXT,   J/LOADD102C                             !
    (5564)  DC5[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,001,,010...0,0,0,,0,,0...0,0000...0,,0000,0...11,000...001,110,001]
5309
5310    5161:  1(FREE)
5311    LOADD102C:
5312            P2=T,   D_CSPD(D04), BSEL/B17,                  ;GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
5313            NEXT,   J/GOTEST102C                            !
    (5161)  DC5[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,1,0,,0,,0...0,1011...0,,0000,0...11,000...001,110,010]
5314
5315    5162:  1(FREE)
5316    GOTEST102C:
5317            SETUP,  RETURN/TEST102D,                        ;GO TO SUBR WHICH:
5318            NEXT,   CALL[DINTOIR=5]                         ; D -> DBUF -> IR, THEN BUT(INSTR5)
    (5162)  DC5[0,00,0,0,0,0]  BM[0101,,00,10,,11,01,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100...010,111,011]
5319
5320
5321
5322
5323
5324    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5325
5326    ;TEST 102D VERIFIES THAT CSPD(01) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5327    !  (000152), E78 TARGET (425).  LOOKING FOR CSP ADDRESS BIT<00> STUCK ONE/ZERO,
5328    !  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5329    5554:
5330    TEST102D:
5331            P0,     LOAD-ENUA(ZTARGET425),                  ;INSTR5 E88 OUTPUT
5332                    LOAD-ERROR(TEST102D),                   ;ERROR DIRECTORY KEY
5333                    DC5-CTR(C7,),                           ;COMPARE AT TARGET
5334            NEXT,   J/LOADD102D                             !
    (5554)  DC5[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,010,,101...0,0,0,,0,,0...0,0000...0,,0000,0...11,000...001,110,011]
5335
5336    5163:  1(FREE)
5337    LOADD102D:
5338            P2=T,   D_CSPD(D01), BSEL/B17,                  ;GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
5339            NEXT,   J/GOTEST102D                            !
    (5163)  DC5[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,1,0,,0,,0...0,1110...0,,0000,0...11,000...001,110,100]
5340
```



```
5341    5164:  1(FREE)
5342    GOTEST102D:
5343            SETUP,  RETURN/SCOPE102,                        ;GO TO SUBR WHICH:
5344            NEXT,   CALL[DINTOIR=5]                         ; D -> DBUF -> IR, THEN BUT(INSTR5)
    (5164)  DC5[0,00,0,0,0,0]  BM[0101,,00,00,,11,10,,101,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100...010,111,011]
5345
5346
5347
5348
5349    5165:  1(FREE)
5350    SCOPE102:
5351            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST103A" (+1, WORDS)
5352                    J/TEST103A                              ;   ERROR:  "LOAD01-102A"  (-16, WORDS)
    (5165)  DC5[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0...11,000...101,011,001]
5353
5354
5355    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5356
5357
5358    ;THE FOLLOWING SET OF FOUR TESTS VERIFIES THAT THE CSP, AND THE CSP ADDRESS FIELD "CSPADDR"
5359    ;HAS NO STUCK ONE BITS, AND THAT THE EMIT -> CSP -> D -> DBUF -> IR DATAPATH
5360    ;IS FULLY FUNCTIONAL.
5361
5362
5363    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5364
5365
5366    ;TEST 103A VERIFIES THAT CSPD(13) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5367    !  (125200), E88 TARGET (412).  LOOKING FOR CSP ADDRESS BIT<02> STUCK ONE/ZERO,
5368    !  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5369    5531:
5370    TEST103A:
5371            P0,     LOAD-ENUA(ZTARGET412),                  ;INSTR5 E88 OUTPUT
5372                    LOAD-ERROR(TEST103A),                   ;ERROR DIRECTORY KEY
5373                    DC5-CTR(C12,),                          ;COMPARE AT TARGET
5374            NEXT,   J/LOAD16-103A                           !
    (5531)  DC5[1,00,1,0,0,0]  BM[0011,,00,11,,11,00,,001,,010...0,0,0,,0,,0...0,0000...0,,0000,0...11,000...101,100,110]
5375
5376    5546:
5377    LOAD16-103A:
5378            P0,     BUMP-VERIFY,                            ;COUNT
5379            P3,     CSPD[16]_EMIT, EMIT/000152,             ;INSTR5 DATA PATTERN:
5380            NEXT,   J/LOAD15-103A                           !  (000152)=E78(425)
    (5546)  DC5[0,00,0,0,0,1]  BM[0000,,10,00,,00,01,,101,,010...0,0,0,,0,,0...0,0001...1,,0000,0...11,000...001,110,110]
5381
5382    5166:  1(FREE)

5383    LOAD15-103A:
5384            P3,     CSPD[15]_EMIT, EMIT/000125,             ;INSTR5 DATA PATTERN:
5385            NEXT,   J/LOAD13-103A                           !  (000125)=E78(432)
    (5166)  DC5[0,00,0,0,0,0]  BM[0000,,10,00,,00,01,,010,,101...0,0,0,,0,,0...0,0010...1,,0000,0...11,000...001,110,111]
5386
5387    5167:  1(FREE)
5388    LOAD13-103A:
```

```
5389            P3,     CSPD[13]_EMIT, EMIT/125200,             ;INSTRS DATA PATTERN:
5390            NEXT,   J/LOAD07-103A                           ;  (125200)=E88(412)
     (5167)  DCS[0,00,0,0,0,0]  BM[1010..10,10..10,10..000..000...0,0,0..0..0...0,0100...1..0000,0...11,000...001,111,000]
5391
5392    5170:  ;(FREE)
5393    LOAD07-103A:
5394            P3,     CSPD[07]_EMIT, EMIT/152500,             ;INSTRS DATA PATTERN:
5395            NEXT,   J/LOAD17-103A                           ;  (152500)=E88(405)
     (5170)  DCS[0,00,0,0,0,0]  BM[1101..10,01..01,01..000..000...0,0,0..0..0...0,1000...1..0000,0...11,000...001,111,001]
5396
5397    5171:  ;(FREE)
5398    LOAD17-103A:
5399            P3,     CSPD[17]_EMIT, EMIT/000000,             ;INSTRS DATA PATTERN:
5400                                                            ;  (000000)=E78(434)
5401            NEXT,   J/LOADD103A                             ;IF THIS DATA USED, CSP ADDRESSING ERROR
     (5171)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..000...0,0,0..0..0...0,0000...1..0000,0...11,000...001,111,010]
5402
5403    5172:  ;(FREE)
5404    LOADD103A:
5405            P2=T,   D_CSPD(D13), BSEL/B17,                  ;GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
5406            NEXT,   J/GOTEST103A                            ;
     (5172)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,1,0..0..0...0,0100...0..0000,0...11,000...001,111,011]
5407
5408    5173:  ;(FREE)
5409    GOTEST103A:
5410            SETUP,  RETURN/TEST103B,                        ;GO TO SUBR WHICH:
5411            NEXT,   CALL[DINTOIR=5]                         ; D -> DBUF -> IR, THEN BUT(INSTR5)
     (5173)  DCS[0,00,0,0,0,0]  BM[0101..00,10..11,11..010..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,011]
5412
5413
5414
5415
5416
5417    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5418
5419    ;TEST 103B VERIFIES THAT CSPD(15) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5420    ;  (000125), E78 TARGET (432).  LOOKING FOR CSP ADDRESS BIT<01> STUCK ONE/ZERO,
5421    ;  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5422    5572:
5423    TEST103B:
5424            P0,     LOAD-ENUA(ZTARGET432),                  ;INSTRS E78 OUTPUT
5425                    LOAD-ERROR(TEST103B),                   ;ERROR DIRECTORY KEY
5426                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
5427            NEXT,   J/LOADD103B                             ;
     (5572)  DCS[1,00,1,0,0,0]  BM[1000..00,11..11,00..011..010...0,0,0..0..0...0,0000...0..0000,0...11,000...001,111,100]
5428
5429    5174:  ;(FREE)
5430    LOADD103B:
5431            P2=T,   D_CSPD(D15), BSEL/B17,                  ;GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
5432            NEXT,   J/GOTEST103B                            ;
     (5174)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,1,0..0..0...0,0010...0..0000,0...11,000...001,111,101]
5433
5434    5175:  ;(FREE)
```



```
5435    GOTEST103B:
5436            SETUP,  RETURN/TEST103C,                        ;GO TO SUBR WHICH:
5437            NEXT,   CALL[DINTOIR=5]                         ; D -> DBUF -> IR, THEN BUT(INSTR5)
     (5175)  DCS[0,00,0,0,0,0]  BM[0101..00,10..11,11..110..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,011]
5438
5439
5440
5441
5442
5443    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5444
5445    ;TEST 103C VERIFIES THAT CSPD(16) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5446    ;  (000152), E78 TARGET (425).  LOOKING FOR CSP ADDRESS BIT<00> STUCK ONE/ZERO,
5447    ;  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5448    5576:
5449    TEST103C:
5450            P0,     LOAD-ENUA(ZTARGET425),                  ;INSTRS E78 OUTPUT
5451                    LOAD-ERROR(TEST103C),                   ;ERROR DIRECTORY KEY
5452                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
5453                    BUMP-VERIFY,                            ;COUNT
5454            NEXT,   J/LOADD103C                             ;
     (5576)  DCS[1,00,1,0,0,1]  BM[1000..00,11..11,00..010..101...0,0,0..0..0...0,0000...0..0000,0...11,000...001,111,110]
5455
5456    5176:  ;(FREE)
5457    LOADD103C:
5458            P2=T,   D_CSPD(D16), BSEL/B17,                  ;GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
5459            NEXT,   J/GOTEST103C                            ;
     (5176)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,1,0..0..0...0,0001...0..0000,0...11,000...001,111,111]
5460
5461    5177:  ;(FREE)
5462    GOTEST103C:
5463            SETUP,  RETURN/TEST103D,                        ;GO TO SUBR WHICH:
5464            NEXT,   CALL[DINTOIR=5]                         ; D -> DBUF -> IR, THEN BUT(INSTR5)
     (5177)  DCS[0,00,0,0,0,0]  BM[0101..00,11..01,11..100..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,011]
5465
5466
5467
5468
5469
5470    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5471
5472    ;TEST 103D VERIFIES THAT CSPD(07) WAS WRITTEN WITH THE UNIQUE INSTR5 PATTERN:
5473    ;  (152500), E88 TARGET (405).  LOOKING FOR CSP ADDRESS BIT<03> STUCK ONE/ZERO,
5474    ;  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
5475    5674:
5476    TEST103D:

5477            P0,     LOAD-ENUA(ZTARGET405),                  ;INSTRS E88 OUTPUT
5478                    LOAD-ERROR(TEST103D),                   ;ERROR DIRECTORY KEY
5479                    DCS-CTR(C7,),                           ;COMPARE AT TARGET

5480            NEXT,   J/LOADD103D                             ;
     (5674)  DCS[1,00,1,0,0,0]  BM[1000..00,11..11,00..000..101...0,0,0..0..0...0,0000...0..0000,0...11,000...010,000,000]
5481
```

```
	5200:	!(FREE)
	LOADD103D:
		P2-T,	D_CSPD(D07), BSEL/B17,			!GET CSP LOC VIA CSPADDR, BASCON FIELD "00"
		NEXT,	J/GOTEST103D				!
    (5200)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...0.1.0..0..0...0.1000...0..0000.0...11.000...010.000.001]

	5201:	!(FREE)
	GOTEST103D:
		SETUP,	RETURN/SCOPE103,			!GO TO SUBR WHICH:
		NEXT,	CALL[DINTOIR-5]				! D -> DBUF -> IR, THEN BUT(INSTR5)
    (5201)  DCS[0.00.0.0.0.0]  BM[0101..00.01..00.00..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]

	5202:	!(FREE)
	SCOPE103:
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST104A" (+1. WORDS)
			J/TEST104A				!   ERROR:  "LOAD16-103A"  (-16. WORDS)
    (5202)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...101.100.111]

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!THE FOLLOWING SET OF TWO TESTS VERIFIES THAT THE CSP, AND THE CSP ADDRESS FIELD "BASCON"
	!HAS NO STUCK ZERO/ONE BITS, AND THAT THE EMIT -> CSP -> D -> DBUF -> IR DATAPATH
	!IS FULLY FUNCTIONAL.

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!TEST 104A VERIFIES THAT CSPB(16) WAS WRITTEN WITH THE UNIQUE INSTRS PATTERN:
	!  (000152), E78 TARGET (425).  LOOKING FOR CSP ADDRESS BIT<00> STUCK ONE/ZERO,
	!  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
	!THIS TEST USES THE "BASCON" ADDRESS MODE FOR THE CSP.
	5547:
	TEST104A:
		P0,	LOAD-ENUA(ZTARGET425),			!INSTRS E78 OUTPUT
			LOAD-ERROR(TEST104A),			!ERROR DIRECTORY KEY
			DCS-CTR(C7.),				!COMPARE AT TARGET
		NEXT,	J/LOADD104A				!
    (5547)  DCS[1.00.1.0.0.0]  BM[1000..00.11..11.00..010..101...0.0.0..0..0...0.0000...0..0000.0...11.000...101.100.000]

	5540:
	LOADD104A:
		P2-T,	D_CSPB(B16), CSPADDR/D17,		!GET CSP LOC VIA BASCON, CSPADDR FIELD "0000"
		NEXT,	J/GOTEST104A				!
    (5540)  DCS[0.00.0.0.0.0]  BM[1010..11.01..00.00..000..000...0.1.0..0..0...0.0000...0..0000.0...11.000...010.000.011]

	5203:	!(FREE)
	GOTEST104A:
		SETUP,	RETURN/TEST104B,			!GO TO SUBR WHICH:
```



```
		NEXT,	CALL[DINTOIR-5]				! D -> DBUF -> IR, THEN BUT(INSTR5)
    (5203)  DCS[0.00.0.0.0.0]  BM[0101..00.11..01.00..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!TEST 104B VERIFIES THAT CSPB(15) WAS WRITTEN WITH THE UNIQUE INSTRS PATTERN:
	!  (000125), E78 TARGET (432).  LOOKING FOR CSP ADDRESS BIT<01> STUCK ONE/ZERO,
	!  OR ERRORS IN DATAPATH FROM EMIT -> CSP -> ALU-B -> D -> DBUF -> IR.
	!THIS TEST USES THE "BASCON" ADDRESS MODE FOR THE CSP.
	5646:
	TEST104B:
		P0,	LOAD-ENUA(ZTARGET432),			!INSTRS E78 OUTPUT
			LOAD-ERROR(TEST104B),			!ERROR DIRECTORY KEY
			DCS-CTR(C7.),				!COMPARE AT TARGET
		NEXT,	J/LOADD104B				!
    (5646)  DCS[1.00.1.0.0.0]  BM[1000..00.11..11.00..011..010...0.0.0..0..0...0.0000...0..0000.0...11.000...010.000.100]

	5204:	!(FREE)
	LOADD104B:
		P2-T,	D_CSPB(B15), CSPADDR/D17,		!GET CSP LOC VIA BASCON, CSPADDR FIELD "0000"
		NEXT,	J/GOTEST104B				!
    (5204)  DCS[0.00.0.0.0.0]  BM[1010..11.10..00.00..000..000...0.1.0..0..0...0.0000...0..0000.0...11.000...010.000.101]

	5205:	!(FREE)
	GOTEST104B:
		SETUP,	RETURN/SCOPE104,			!GO TO SUBR WHICH:
		NEXT,	CALL[DINTOIR-5]				! D -> DBUF -> IR, THEN BUT(INSTR5)
    (5205)  DCS[0.00.0.0.0.0]  BM[0101..00.01..00.00..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]

	5206:	!(FREE)
	SCOPE104:
		P0,	BUSDIN_EMIT-[I],			!RESET PROC UCON
			EN-CLK-IR[15-00],			!
		NEXT,	BUTD[SCOPE],				!NO ERROR:  "TEST105A" (+1. WORDS)
			J/TEST105A				!   ERROR:  "LOADD104A"  (-5. WORDS)
    (5206)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...101.100.001]

	!.PAGE=====================================================================================================

	.TOC	*	TEST105:  SR CAN LOAD/STORE AS A REGISTER

	!*********************************************************************************
	!*
```

```
!*      TESTS:  105                                     UWORDS:  023 + 032
!*
!*      FUNCTIONS:
!*
!*      THE FOLLOWING TESTS VERIFY THE VALIDITY OF THE SR AS A TEMPORARY REGISTER,
!*      (IE, IT CAN BE LOADED/READ) IN ALL BIT POSITIONS, AND THAT THE ALU-A SIDE CAN
!*      PASS DATA INTO D.
!*
!*****************************************************************************************


!TEST 105A VERIFIES THAT THE SR CAN BE LOADED/READ WITH THE INSTRS PATTERN:
!  (000125), E78 TARGET (432), AND TO VERIFY THE:
!  DATAPATH FROM SR -> ALU-A -> D -> DBUF -> IR.
5541:
TEST105A:
        P0,     LOAD-ENUA(ZTARGET432),                  !INSTRS E78 OUTPUT
                LOAD-ERROR(TEST105A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C8,),                           !COMPARE AT TARGET
                BUMP-VERIFY,                            !COUNT
        NEXT,   J/LOADSR105A                            !
 (5541)  DCS[1,00,1,0,0,1]  BM[0111,,00,11,,11,00,,011,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,100,010]

 5542:
LOADSR105A:
        P2,     RES_CSPD(D02),                          !BITS<13:11>=00/0, WHICH IS;  SR/LOAD, GUARD/DISABLED
        P3-T,   SR_CSPD(D02), BSEL/B17,                 !DATA IS (000125) = INSTR5 E78 (432)
        NEXT,   J/GOTEST105A                            !
 (5542)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,1,0,1,,0,,0,,,0,1101,,,0,,1000,1,,,11,000,,,010,000,111]

 5207:  !(FREE)
GOTEST105A:
        P0,     BUMP-VERIFY,                            !COUNT
        SETUP,  RETURN/TEST105A1,                       !GO TO SUBR WHICH:
        NEXT,   CALL[SRINTOIR-5]                        ! SR => D -> DBUF -> IR, THEN BUT(INSTR5)
 (5207)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,00,01,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,010]





!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!TEST 105A1 VERIFIES THAT THE BUT(SR3-0) SEES THE "0101" IN THE SR.
5610:
TEST105A1:
        P0,     LOAD-ENUA(ZTARGET405),                  !BIT<3:0> = "0101"
                LOAD-ERROR(TEST105A1),                  !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE AT TARGET
        NEXT,   J/GOBUT105A1                            !
 (5610)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,000]

 5210:  !(FREE)
```



```
GOBUT105A1:
        P0,     BUMP-VERIFY,                            !COUNT
        SETUP,  RETURN/TEST105B,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                J/BUTSR3-0                              !SR<3:0> IN BIT<3:0>
 (5210)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,01,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,110]





!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!TEST 105B VERIFIES THAT THE SR CAN BE LOADED/READ WITH THE INSTRS PATTERN:
!  (000152), E78 TARGET (425), AND TO VERIFY THE:
!  DATAPATH FROM SR -> ALU-A -> D -> DBUF -> IR.
5652:
TEST105B:
        P0,     LOAD-ENUA(ZTARGET425),                  !INSTRS E78 OUTPUT
                LOAD-ERROR(TEST105B),                   !ERROR DIRECTORY KEY
                DCS-CTR(C8,),                           !COMPARE AT TARGET
        NEXT,   J/LOADSR105B                            !
 (5652)  DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,010,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,001]

 5211:  !(FREE)
LOADSR105B:
        P2-T,   SR_CSPD(D01), BSEL/B17,                 !DATA IS (000152) = INSTR5 E78 (425)
        NEXT,   J/GOTEST105B                            !
 (5211)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,1110,,,0,,0000,0,,,11,000,,,010,001,010]

 5212:  !(FREE)
GOTEST105B:
        SETUP,  RETURN/TEST105B1,                       !GO TO SUBR WHICH:
        NEXT,   CALL[SRINTOIR-5]                        ! SR -> D -> DBUF -> IR, THEN BUT(INSTR5)
 (5212)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,010]





!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!TEST 105B1 VERIFIES THAT THE BUT(SR3-0) SEES THE "1010" IN THE SR.
5600:
TEST105B1:
        P0,     LOAD-ENUA(ZTARGET412),                  !BIT<3:0> = "1010"

                LOAD-ERROR(TEST105B1),                  !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE AT TARGET
                BUMP-VERIFY,                            !COUNT
        NEXT,   J/GOBUT105B1                            !
 (5600)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,011]
```

```
5673    5213:  !(FREE)
5674    GOBUT105B!
5675            SETUP,  RETURN/TEST105C,                        !RETURN TO START OF NEXT SUBTEST
5676            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
5677                    J/BUTSR3-0                              !SR<3:0> IN BIT<3:0>
    (5213)  DCS[0,00,0,0,0,0]  BM[0101..00,11..01,00..010..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,110]
5678
5679
5680
5681
5682
5683
5684    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5685
5686    !TEST 105C VERIFIES THAT THE SR CAN BE LOADED/READ WITH THE INSTR5 PATTERN:
5687    !  (125200), E88 TARGET (412), AND TO VERIFY THE:
5688    !  DATAPATH FROM SR -> ALU-A -> D -> DBUF -> IR.
5689    5642:
5690    TEST105C:
5691            P0,     LOAD-ENUA(ZTARGET412),                  !INSTR5 E88 OUTPUT
5692                    LOAD-ERROR(TEST105C),                   !ERROR DIRECTORY KEY
5693                    DCS-CTR(C8,),                           !COMPARE AT TARGET
5694            NEXT,   J/LOADSR105C                            !
    (5642)  DCS[1,00,1,0,0,0]  BM[0111..00,11..11,00..001..010...0,0,0..0..0...0,0000...0..0000,0...11,000...010,001,100]
5695
5696    5214:  !(FREE)
5697    LOADSR105C:
5698            P2-T,   SR_CSPD(D04), BSEL/B17,                 !DATA IS (125200) = INSTR5 E88 (412)
5699            NEXT,   J/GOTEST105C                            !
    (5214)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,0,1..0..0...0,1011...0..0000,0...11,000...010,001,101]
5700
5701    5215:  !(FREE)
5702    GOTEST105C:
5703            SETUP,  RETURN/TEST105D,                        !GO TO SUBR WHICH:
5704            NEXT,   CALL[SRINTOIR-5]                        ! SR -> D -> DBUF -> IR, THEN BUT(INSTR5)
    (5215)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,11..110..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,010]
5705
5706
5707
5708
5709
5710    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5711
5712    !TEST 105D VERIFIES THAT THE SR CAN BE LOADED/READ WITH THE INSTR5 PATTERN:
5713    !  (152500), E88 TARGET (405), AND TO VERIFY THE:
5714    !  DATAPATH FROM SR -> ALU-A -> D -> DBUF -> IR.
5715    5636:
5716    TEST105D:
5717            P0,     LOAD-ENUA(ZTARGET405),                  !INSTR5 E88 OUTPUT
5718                    LOAD-ERROR(TEST105D),                   !ERROR DIRECTORY KEY
5719                    DCS-CTR(C8,),                           !COMPARE AT TARGET
5720            NEXT,   J/LOADSR105D                            !
```



```
    (5636)  DCS[1,00,1,0,0,0]  BM[0111..00,11..11,00..000..101...0,0,0..0..0...0,0000...0..0000,0...11,000...010,001,110]
5721
5722    5216:  !(FREE)
5723    LOADSR105D:
5724            P0,     BUMP-VERIFY,                            !COUNT
5725            P2-T,   SR_CSPD(D10), BSEL/B17,                 !DATA IS (152500) = INSTR5 E88 (405)
5726            NEXT,   J/GOTEST105D                            !
    (5216)  DCS[0,00,0,0,0,1]  BM[1010..10,00..00,00..000..000...0,0,1..0..0...0,0111...0..0000,0...11,000...010,001,111]
5727
5728    5217:  !(FREE)
5729    GOTEST105D:
5730            SETUP,  RETURN/TEST105E,                        !GO TO SUBR WHICH:
5731            NEXT,   CALL[SRINTOIR-5]                        ! SR -> D -> DBUF -> IR, THEN BUT(INSTR5)
    (5217)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,10..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,010]
5732
5733
5734
5735
5736
5737    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
5738
5739    !TEST 105E VERIFIES THE DATAPATH FROM:
5740    !  EMIT -> CSP -> ALU-B -> SR -> ALU-A -> D -> DBUF -> IR,
5741    !  IS A VALID "1101" IN BITS<15:12>.  SR VALUE = (152500) FROM PREVIOUS TEST.
5742    5620:
5743    TEST105E:
5744            P0,     LOAD-ENUA(ZTARGET415),                  !BIT<15:12> = "1101"
5745                    LOAD-ERROR(TEST105E),                   !ERROR DIRECTORY KEY
5746                    DCS-CTR(C3,),                           !COMPARE AT TARGET
5747            NEXT,   J/GOTEST105E                            !
    (5620)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..001..101...0,0,0..0..0...0,0000...0..0000,0...11,000...010,010,000]
5748
5749    5220:  !(FREE)
5750    GOTEST105E:
5751            SETUP,  RETURN/SCOPE105,                        !RETURN TO SCOPE LOOP TEST WORD
5752            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
5753                    J/BUTIR15-12                            !BIT<15:12> TEST
    (5220)  DCS[0,00,0,0,0,0]  BM[0101..00,01..00,10..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,000,000]
5754
5755
5756
5757    5221:  !(FREE)
5758    SCOPE105:
5759            P0,     BUSDIN_EMIT-(I),                        !RESET PROC UCON
5760                    EN-CLK-IR(15-00),                       !
5761            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "SETUPCSP17A" (+1, WORDS)
5762                    J/SETUPCSP17A                           !   ERROR:  "LOADSR105A"  (-17, WORDS)
    (5221)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,01..000..100...0,0,0..0...0,1,1001...0..0000,0...11,000...101,100,011]
5763
5764
5765
5766
```

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5767
5768
5769
5770    !.PAGE=========================================================================================================
5771
5772    .TOC   *   TEST114-121:  ALU LOGIC TESTS / D[C] TESTS
5773
5774    !*************************************************************************************
5775    !*
5776    !*     TESTS:  114 - 121                              UWORDS:  250 + 300
5777    !*
5778    !*     FUNCTIONS:
5779    !*
5780    !*     THESE TESTS TEST THE ALU LOGIC FUNCTIONS.
5781    !*
5782    !*************************************************************************************
5783
5784
5785
5786    !
5787    !       SUMMARY OF ALU LOGIC / D[C] TESTS:
5788    !
5789    !       TEST             ALU            OPERANDS              D[C]
5790    !       NUMB            FUNCTION         A/B=D              FUNCTION
5791    !       ----            --------        --------            --------
5792    !
5793    !       114A            ZERO             1/1=0              CIN=PS[C]=0
5794    !
5795    !       115A            NOT-A            1/1=0              CIN=1
5796    !       115B            NOT-A            0/1=1              PS[C]=0
5797    !       115C            NOT-A            0/0=1
5798    !       115D            NOT-A            1/0=0
5799    !
5800    !       116A            NOT-A-AND-B      0/1=1              ALU15=1, D[C]=1
5801    !       116B            ZERO             1/0=0
5802    !       116C            NOT-A-AND-B      0/0=0              ALU15=0, D[C]=0
5803    !       116D            ZERO             0/1=0
5804    !
5805    !       117A            A-AND-NOT-B      1/0=1              CIN=D[C]=0
5806    !       117B            A-AND-NOT-B      1/1=0              (ALU15=1)
5807    !       117C            A-AND-NOT-B      0/0=0              CIN=D[C]=1
5808    !
5809    !       120A            A-AND-B          0/1=0
5810    !       120B            A-AND-B          1/1=1              CIN=0
5811    !
5812    !       121A            A-XOR-B          0/0=0              ALU00=1
5813    !       121B            A-XOR-B          1/0=1              ALU00=0
5814    !       121C            A-XOR-B          0/1=1              ALU07=1
5815    !       121D            A-XOR-B          1/1=0              ALU07=0
5816    !
5817    !       122A            A-IOR-B          0/0=0              CIN=1
5818    !       122A3           BUT(D<14-00>=ZERO*D15) W/ D=(000000)
5819    !       122A4           BUT(D<14-00>=ZERO*D15) W/ D=(125252)
5820    !
```



```
5821    !
5822
5823    !FOR THE ALU LOGIC TESTS FOLLOWING, THE REQUIRED CONSTANTS
5824    !IN THE CSP ARE:
5825    5543:
5826    SETUPCSP17A:
5827            P3,     CSPD[15]_EMIT, EMIT/000077,             !MASK FOR BITS<05:00>
5828            NEXT,   GOTO-PAGE(7),                           !XFR
5829                    J/SETUPCSP16A                           !
    (5543)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,00,00,,111,,111...0,0,0,,0,,0...0,0010...1,,0000,0,,,11,100,,,000,000,010]
5830
5831    7002:  !(FREE)
5832    SETUPCSP16A:
5833            P3,     CSPD[16]_EMIT, EMIT/170000,             !BITS<15:12> SET
5834            NEXT,   J/SETUPCSP15A                           !
    (7002)  DCS[0,00,0,0,0,0]  BM[1111,,10,00,,00,00,,000,,000...0,0,0,,0,,0...0,0001...1,,0000,0,,,11,000,,,000,001,000]
5835
5836    7010:  !(FREE)
5837    SETUPCSP15A:
5838            P3,     CSPD[17]_EMIT, EMIT/007700,             !MASK FOR BITS<11:06>
5839            NEXT,   J/SETUPCSP14A                           !
    (7010)  DCS[0,00,0,0,0,0]  BM[0000,,10,11,,11,11,,000,,000...0,0,0,,0,,0...0,0000...1,,0000,0,,,11,000,,,000,001,001]
5840
5841    7011:  !(FREE)
5842    SETUPCSP14A:
5843            P3,     CSPD[14]_EMIT, EMIT/000100,             !BIT<06> SET
5844            NEXT,   J/SETUPCSP12A                           !
    (7011)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,00,01,,000,,000...0,0,0,,0,,0,,0,0011...1,,0000,0,,,11,000,,,000,001,010]
5845
5846    7012:  !(FREE)
5847    SETUPCSP12A:
5848            P3,     CSPD[11]_EMIT, EMIT/125252,             !PATTERN: "1010 1010 1010 1010"
5849            NEXT,   J/SETUPCSP05A                           !
    (7012)  DCS[0,00,0,0,0,0]  BM[1010,,10,10,,10,10,,101,,010...0,0,0,,0,,0...0,0110...1,,0000,0,,,11,000,,,000,001,011]
5850
5851    7013:  !(FREE)
5852    SETUPCSP05A:
5853            P3,     CSPD[10]_EMIT, EMIT/052525,             !PATTERN: "0101 0101 0101 0101"
5854            NEXT,   J/SETUPCSP07A                           !
    (7013)  DCS[0,00,0,0,0,0]  BM[0101,,10,01,,01,01,,010,,101...0,0,0,,0,,0...0,0111...1,,0000,0,,,11,000,,,000,001,100]
5855
5856    7014:  !(FREE)
5857    SETUPCSP07A:
5858            P3,     CSPD[12]_EMIT, EMIT/177777,             !PATTERN: "1111 1111 1111 1111 "
5859            NEXT,   J/SETUPCSP00A                           !
    (7014)  DCS[0,00,0,0,0,0]  BM[1111,,10,11,,11,11,,111,,111...0,0,0,,0,,0...0,0101...1,,0000,0,,,11,000,,,000,001,101]

5860
5861    7015:  !(FREE)
5862    SETUPCSP00A:
5863            P3,     CSPD[13]_EMIT, EMIT/000000,             !PATTERN: "0000 0000 0000 0000"
5864            NEXT,   GOTO-PAGE(0),                           !SAME AS (4)
5865                    J/TEST114A                              !
```

```
(7015)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0100,,,1,,0000,0,,,11,100,,,110,000,111]




        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !VERIFY THAT WITH: ALU=(ZERO), A=(177777), B=(177777), THEN D=(000000), AND D[C]=CIN=PS[C]=(0)
        4607:
        TEST114A:
                P0,     LOAD-ENUA(ZTARGET434),               !INSTRS FOR IR=(000000)
                        LOAD-ERROR(TEST114A),                !ERROR DIRECTORY KEY
                        DCS-CTR(C0,),                        !COMPARE AT TARGET
                NEXT,   J/GETONES114A                        !
(4607)  DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,000,000]

        4600:
        GETONES114A:
                P2-T,   D_CSPD(C177777), D[C]_ALU15,         !ALL ONES STORED HERE
                P3,     A#BSPHI[C177777]_D,                  !WRITE INTO ASP,BSP
                NEXT,   J/ALU114A
(4600)  DCS[0,00,0,0,0,0]  BM[1010,,10,11,,00,01,,101,,100,,,0,1,0,,0,,0,,,0,0101,,,0,,1111,0,,,11,000,,,000,000,011]

        4003:  !(FREE)
        ALU114A:
                P2-T,   D_ZERO, D[C]_CINMUX,                 !ALU=(ZERO), D[C]=CIN=PS[C]=(0)
                        BUS-A_ASPHI(C177777),                !A=(177777)
                        BUS-B_CSPD(C177777),                 !B=(177777)
                NEXT,   J/GETZEROES114A                      !D=(000000)
(4003)  DCS[0,00,0,0,0,0]  BM[0011,,10,00,,11,01,,101,,000,,,0,1,0,,0,,0,,,0,0101,,,0,,0000,0,,,11,000,,,000,000,100]

        4004:  !(FREE)
        GETZEROES114A:
                P3,     A#BSPHI[C000000]_D,                  !ALL ZEROS STORED HERE IN ASP, BSP
                NEXT,   J/GOBUT114A                          !
(4004)  DCS[0,00,0,0,0,0]  BM[0000,,00,11,,00,01,,100,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,1111,0,,,11,000,,,000,000,101]

        4005:  !(FREE)
        GOBUT114A:
                SETUP,  RETURN/TEST114A2,                    !EXEC SUBR WHICH:
                                                             !(1) D -> IR
                NEXT,   CALL[DZERO]                          !(2) BUT(INSTRS) INTO ZTARGET---
(4005)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,00,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,010]

        !CHECK THAT D[C] GOT A (0) FROM "CINMUX=PS[C]", ABOVE
        4603:
        TEST114A2:
                P0,     LOAD-ENUA(ZTARGET402),               !BIT <00> = D[C] = (0)
                        LOAD-ERROR(TEST114A2),               !ERROR DIRECTORY KEY
                        DCS-CTR(C3,),                        !COMPARE AT TARGET
                NEXT,   J/GOBUT114A2                         !
(4603)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,110]
```



```
        4006:  !(FREE)
        GOBUT114A2:
                SETUP,  RETURN/SCOPE114A,                    !RETURN TO SCOPE LOOP TEST WORD
                NEXT,   GOTO-PAGE(7),                        !BUT TABLE
                        J/BUTD[C]A                           !D[C]H IN BIT<00>
(4006)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,00,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,100]


        4007:  !(FREE)
        SCOPE114A:
                P2-T,   D_CSPD(C052525), SAVE-D[C],          !STORE A CONSTANT
                P3,     A#BSPHI[C052525]_D,                  !
                NEXT,   BUTD[SCOPE],                         !NO ERROR:  "TEST115A1"   (+1, WORDS)
                        J/TEST115A1                          !   ERROR:  "GETONES114A" (-6,WORDS)
(4007)  DCS[0,00,0,1,0,0]  BM[1010,,10,11,,00,01,,111,,111,,,0,1,0,,0,,0,,,0,0111,,,0,,1111,0,,,11,000,,,110,000,001]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !THIS NEXT SET OF 12. TESTS EXERCISES THE "NOT-A" ALU FUNCTION

        !   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -   -

        !TESTS 115A 1-3 VERIFIES THAT WITH:
        !ALU=(NOT-A), A=(052525), B=(177777), THEN D=(125252), AND D[C]=CINMUX=(1)
        4601:
        TEST115A1:
                P0,     LOAD-ENUA(ZTARGET412),               !BIT<15:12> = "1010"
                        LOAD-ERROR(TEST115A1),               !ERROR DIRECTORY KEY
                        DCS-CTR(C7,),                        !COMPARE AT TARGET
                NEXT,   J/ALU115A1                           !
(4601)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,001,000]

        4610:
        ALU115A1:
                P0,     BUMP-VERIFY,                         !COUNT
                P2-T,   D_NOT-A, D[C]_CINMUX,                !ALU=(NOT-A) D[C]=CINMUX=(1)
                        BUS-A_ASPHI(C052525),                !A=(052525)
                        BUS-B_CSPD(C177777),                 !B=(177777)
                NEXT,   J/GETALTN115A1                       !D=(125252)
(4610)  DCS[0,00,0,0,0,1]  BM[0000,,10,00,,11,01,,111,,000,,,0,1,0,,0,,0,,,0,0101,,,0,,0000,0,,,11,000,,,000,001,000]

        4010:  !(FREE)

        GETALTN115A1:
                P3,     A#BSPHI[C125252]_D,                  !STORE CONSTANT (125252), HOPEFULLY
                NEXT,   J/GOBUT115A1                         !
(4010)  DCS[0,00,0,0,0,0]  BM[0000,,00,11,,00,01,,110,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,1111,0,,,11,000,,,000,001,001]

        4011:  !(FREE)
        GOBUT115A1:
```

```
5960            SETUP,  RETURN/TEST115A4,                       !EXEC SUBR WHICH:
5961                                                            !(1) D<15:12> -> IR<15:12>
5962            NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
     (4011)  DCS[0,00,0,0,0,0]  BM[0100..00.11..00.00..100..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010.011.100]
5963
5964
5965    !CHECK THAT D[C] GOT A (1) FROM "CINMUX=(1)", ABOVE
5966    4604:
5967    TEST115A4:
5968            P0,     LOAD=ENUA(ZTARGET403),                  !BIT <00> = D[C] = (1)
5969                    LOAD=ERROR(TEST115A4),                  !ERROR DIRECTORY KEY
5970                    DCS-CTR(C3,),                           !COMPARE AT TARGET
5971                    BUMP=VERIFY,                            !COUNT
5972            NEXT,   J/GOBUT115A4                            !
     (4604)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..011...0.0.0...0..0...0.0000...0..0000.0...11.000...000.001.010]
5973
5974    4012:  !(FREE)
5975    GOBUT115A4:
5976            SETUP,  RETURN/TEST115A2,                       !RETURN TO START OF NEXT SUBTEST
5977            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
5978                    J/BUTD[C]A                              !D[C]N IN BIT<00>
     (4012)  DCS[0,00,0,0,0,0]  BM[0100..00.11..00.01..110..111...0.0.0...0..0...0.0000...0..0000.0...11.100...011.100.100]
5979
5980
5981    !CHECK BIT<11:06> = "1010 10"
5982    4616:
5983    TEST115A2:
5984            P0,     LOAD=ENUA(ZTARGET412),                  !INSTRS-E78 OUTPUT FOR BIT <11:06>="101 010"
5985                    LOAD=ERROR(TEST115A2),                  !ERROR DIRECTORY KEY
5986                    DCS-CTR(C6,),                           !COMPARE AT TARGET
5987                    BUMP=VERIFY,                            !COUNT
5988            NEXT,   J/GOBUT115A2                            !
     (4616)  DCS[1,00,1,0,0,1]  BM[1001..00.11..11.00..001..010...0.0.0...0..0...0.0000...0..0000.0...11.000...000.001.011]
5989
5990    4013:  !(FREE)
5991    GOBUT115A2:
5992            SETUP,  RETURN/TEST115A3,                       !EXEC SUBR WHICH:
5993                                                            !(1) D<11:06> -> IR<11:06>
5994            NEXT,   CALL[D11-06]                            !(2) BUT(INSTR5) INTO ZTARGET---
     (4013)  DCS[0,00,0,0,0,0]  BM[0100..00.11..00.01..101..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010.011.110]
5995
5996
5997
5998    !CHECK BIT<05:00> = "10 1010"
5999    4615:
6000    TEST115A3:
6001
6002            P0,     LOAD=ENUA(ZTARGET425),                  !INSTR5-E88 OUTPUT FOR BIT <05:00> = "101 010"
6003                    LOAD=ERROR(TEST115A3),                  !ERROR DIRECTORY KEY
6004                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6005            NEXT,   J/GOBUT115A3                            !
```



```
     (4615)  DCS[1,00,1,0,0,0]  BM[1001..00.11..11.00..010..101...0.0.0...0..0...0.0000...0..0000.0...11.000...000.001.100]
6006
6007    4014:  !(FREE)
6008    GOBUT115A3:
6009            SETUP,  RETURN/TEST115B1,                       !EXEC SUBR WHICH:
6010                                                            !(1) D<05:00> -> IR<05:00>
6011            NEXT,   CALL[D05-00]                            !(2) BUT(INSTR5) INTO ZTARGET---
     (4014)  DCS[0,00,0,0,0,0]  BM[0100..00.11..00.01..100..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010.100.000]
6012
6013
6014
6015
6016    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6017
6018    !TESTS 115B 1-3 VERIFIES THAT WITH:
6019    !ALU=(NOT-A), A=(125252), B=(177777), THEN D=(052525), AND D[C]_PS[C]=(0)
6020    4614:
6021    TEST115B1:
6022            P0,     LOAD=ENUA(ZTARGET405),                  !BIT <15:12> = "0101"
6023                    LOAD=ERROR(TEST115B1),                  !ERROR DIRECTORY KEY
6024                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6025            NEXT,   J/ALU115B1                              !
     (4614)  DCS[1,00,1,0,0,0]  BM[1001..00.11..11.00..000..101...0.0.0...0..0...0.0000...0..0000.0...11.000...000.001.101]
6026
6027    4015:  !(FREE)
6028    ALU115B1:
6029            P0,     BUMP-VERIFY,                            !COUNT
6030            P2-T,   D_NOT-A, D[C]_PS[C],                    !ALU=(NOT-A), D[C]=PS[C]=(0)
6031                    BUS-A_ASPHI(C125252),                   !A=(125252)
6032                    BUS-B_CSPD(C177777),                    !B=(177777)
6033            NEXT,   J/GOBUT115B1                            !D=(052525)
     (4015)  DCS[0,00,0,0,0,1]  BM[0000..10.00..11.01..110..001...0.1.0...0..0...0.0101...0..0000.0...11.000...000.001.110]
6034
6035    4016:  !(FREE)
6036    GOBUT115B1:
6037            SETUP,  RETURN/TEST115B4,                       !EXEC SUBR WHICH:
6038                                                            !(1) D<15:12> -> IR<15:12>
6039            NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
     (4016)  DCS[0,00,0,0,0,0]  BM[0100..00.11..00.00..010..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010.011.100]
6040
6041
6042    !CHECK THAT D[C] GOT A (0) FROM "PS[C]", ABOVE
6043    4602:
6044    TEST115B4:
6045            P0,     LOAD=ENUA(ZTARGET402),                  !BIT <00> = D[C] = (0)
6046                    LOAD=ERROR(TEST115B4),                  !ERROR DIRECTORY KEY
6047                    DCS-CTR(C3,),                           !COMPARE AT TARGET
6048                    BUMP=VERIFY,                            !COUNT
6049            NEXT,   J/GOBUT115B4                            !
     (4602)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..010...0.0.0...0..0...0.0000...0..0000.0...11.000...000.001.111]
6050
6051    4017:  !(FREE)
```

```
6052    GOBUT115B4:
6053            SETUP,  RETURN/TEST115B2,                       !RETURN TO START OF NEXT SUBTEST
6054            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
6055                    J/BUTD[C]A                              !D[C]H IN BIT<00>
    (4017)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,01,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,100]
6056
6057
6058    !CHECK BIT<11:06> = "0101 01"
6059    4613:
6060    TEST115B2:
6061            P0,     LOAD-ENUA(ZTARGET405),                  !INSTR5-E78 OUTPUT FOR BIT <11:06> = "010 101"
6062                    LOAD-ERROR(TEST115B2),                  !ERROR DIRECTORY KEY
6063                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6064                    BUMP-VERIFY,                            !COUNT
6065            NEXT,   J/GOBUT115B2                            !
    (4613)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,010,000]
6066
6067    4020:  !(FREF)
6068    GOBUT115B2:
6069            SETUP,  RETURN/TEST115B3,                       !EXEC SUBR WHICH:
6070                                                            !(1) D<11:06> -> IR<11:06>
6071            NEXT,   CALL[D11-06]                            !(2) BUT(INSTR5) INTO ZTARGET---
    (4020)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]
6072
6073
6074
6075    !CHECK BIT<05:00> = "01 0101"
6076    4612:
6077    TEST115B3:
6078
6079            P0,     LOAD-ENUA(ZTARGET432),                  !INSTR5-E88 OUTPUT FOR BIT<05:00> = "010 101"
6080                    LOAD-ERROR(TEST115B3),                  !ERROR DIRECTORY KEY
6081                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6082            NEXT,   J/GOBUT115B3                            !
    (4612)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,010,001]
6083
6084    4021:  !(FREE)
6085    GOBUT115B3:
6086            SETUP,  RETURN/SCOPE115B,                       !EXEC SUBR WHICH:
6087                                                            !(1) D<05:00> -> IR<05:00>
6088            NEXT,   CALL[D05-00]                            !(2) BUT(INSTR5) INTO ZTARGET---
    (4021)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,10,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,000]
6089
6090
6091    4022:  !(FREF)
6092    SCOPE115B:
6093            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST115C1"   (+1, WORDS)
6094                    J/TEST115C1                             !   ERROR:  "ALU115A1" (-17,WORD8)
    (4022)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,001,001]
6095
6096
```



```
6097
6098
6099    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6100
6101    !TESTS 115C 1-3 VERIFIES THAT WITH:
6102    !ALU=(NOT-A), A=(052525), B=(000000), THEN D=(125252)
6103    4611:
6104    TEST115C1:
6105            P0,     LOAD-ENUA(ZTARGET412),                  !BIT <15:12> = "1010"
6106                    LOAD-ERROR(TEST115C1),                  !ERROR DIRECTORY KEY
6107                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6108            NEXT,   J/ALU115C1                              !
    (4611)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,010,010]
6109
6110    4622:
6111    ALU115C1:
6112            P0,     BUMP-VERIFY,                            !COUNT
6113            P2-T,   D_NOT-A, SAVE-D[C],                     !ALU=(NOT-A)
6114                    BUS-A_ASPHI(C052525),                   !A=(052525)
6115                    BUS-B_CSPD(C000000),                    !B=(000000)
6116            NEXT,   J/GOBUT115C1                            !D=(125252)
    (4622)  DCS[0,00,0,0,0,1]  BM[0000,,10,00,,11,01,,111,,111,,,0,1,0,,0,,0,,,0,0100,,,0,,0000,0,,,11,000,,,000,010,011]
6117
6118    4023:  !(FREE)
6119    GOBUT115C1:
6120            SETUP,  RETURN/TEST115C2,                       !EXEC SUBR WHICH:
6121                                                            !(1) D<15:12> -> IR<15:12>
6122            NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
    (4023)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,100]
6123
6124    !CHECK BIT<11:06> = "1010 10"
6125    4617:
6126    TEST115C2:
6127            P0,     LOAD-ENUA(ZTARGET412),                  !INSTR5-E78 OUTPUT FOR BIT <11:06> = "101 010"
6128                    LOAD-ERROR(TEST115C2),                  !ERROR DIRECTORY KEY
6129                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6130                    BUMP-VERIFY,                            !COUNT
6131            NEXT,   J/GOBUT115C2                            !
    (4617)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,010,100]
6132
6133    4024:  !(FREE)
6134    GOBUT115C2:
6135            SETUP,  RETURN/TEST115C3,                       !EXEC SUBR WHICH:
6136                                                            !(1) D<11:06> -> IR<11:06>
6137            NEXT,   CALL[D11-06]                            !(2) BUT(INSTR5) INTO ZTARGET---
    (4024)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,10,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]

6138
6139
6140

6141    !CHECK BIT<05:00> = "10 1010"
6142    4627:
6143    TEST115C3:
```

```

        P0,     LOAD-ENUA(ZTARGET425),                  !INSTR5-E88 OUTPUT FOR BIT<05:00> = "101 010"
                LOAD-ERROR(TEST115C3),                  !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           !COMPARE AT TARGET
        NEXT,   J/GOBUT115C3                            !
 (4627) DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..010..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.101]

    4025:  !(FREE)
    GOBUT115C3:
        SETUP,  RETURN/TEST115D1,                       !EXEC SUBR WHICH:
                                                        !(1) D<05:00> -> IR<05:00>
        NEXT,   CALL[D05-00]                            !(2) BUT(INSTR5) INTO ZTARGET---
 (4025) DCS[0.00.0.0.0.0]  BM[0100..00.11..00.10..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.000]




    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TESTS 115D 1-3 VERIFIES THAT WITH:
    !ALU=(NOT-A, A=(125252), B=(000000), THEN D=(052525)
    4626:
    TEST115D1:
        P0,     LOAD-ENUA(ZTARGET405),                  !BIT<15:12> = "0101"
                LOAD-ERROR(TEST115D1),                  !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           !COMPARE AT TARGET
        NEXT,   J/ALU115D1                              !
 (4626) DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.110]

    4026:  !(FREE)
    ALU115D1:
        P0,     BUMP-VERIFY,                            !COUNT
        P2-T,   D_NOT-A, SAVE-D[C],                     !ALU=(NOT-A), D[C]_0
                BUS-A_ASPHI(C125252),                   !A=(125252)
                BUS-B_CSPD(C000000),                    !B=(000000)
        NEXT,   J/GOBUT115D1                            !D=(052525)
 (4026) DCS[0.00.0.0.0.1]  BM[0000..10.00..11.01..110..111...0.1.0..0..0...0.0100...0..0000.0...11.000...000.010.111]

    4027:  !(FREE)
    GOBUT115D1:
        SETUP,  RETURN/TEST115D2,                       !EXEC SUBR WHICH:
                                                        !(1) D<15:12> -> IR<15:12>
        NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
 (4027) DCS[0.00.0.0.0.0]  BM[0100..00.11..00.10..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.100]

    !CHECK BIT<11:06> = "0101 01"
    4625:
    TEST115D2:
        P0,     LOAD-ENUA(ZTARGET405),                  !INSTR5-E78 OUTPUT FOR BIT<11:06> = "010 101"
                LOAD-ERROR(TEST115D2),                  !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           !COMPARE AT TARGET
                BUMP-VERIFY,                            !COUNT
```



```
        NEXT,   J/GOBUT115D2                            !
 (4625) DCS[1.00.1.0.0.1]  BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.000]

    4030:  !(FREE)
    GOBUT115D2:
        SETUP,  RETURN/TEST115D3,                       !EXEC SUBR WHICH:
                                                        !(1) D<11:06> -> IR<11:06>
        NEXT,   CALL[D11-06]                            !(2) BUT(INSTR5) INTO ZTARGET---
 (4030) DCS[0.00.0.0.0.0]  BM[0100..00.11..00.10..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.110]



    !CHECK BIT<05:00> = "01 0101"
    4624:
    TEST115D3:

        P0,     LOAD-ENUA(ZTARGET432),                  !INSTR5-E88 OUTPUT FOR BIT<05:00> = "010 101"
                LOAD-ERROR(TEST115D3),                  !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           !COMAPRE AT TARGET
        NEXT,   J/GOBUT115D3                            !
 (4624) DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..011..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.001]

    4031:  !(FREE)
    GOBUT115D3:
        SETUP,  RETURN/SCOPE115D,                       !EXEC SUBR WHICH:
                                                        !(1) D<05:00> -> IR<05:00>
        NEXT,   CALL[D05-00]                            !(2) BUT(INSTR5) INTO ZTARGET---
 (4031) DCS[0.00.0.0.0.0]  BM[0100..00.00..00.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.000]

    4032:  !(FREE)
    SCOPE115D:
        P0,     BUMP-VERIFY,                            !COUNT
        NEXT,   BUTD[SCOPE],                            !NO ERROR: "TEST116A1" (+1, WORDS)
                J/TEST116A1                             !   ERROR: "ALU115C1"  (-13, WORDS)
 (4032) DCS[0.00.0.1.0.1]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.010.011]




    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !THIS NEXT SET OF 12, TESTS EXERCISES THE ALU FUNCTIONS
    !"ZERO" AND "NOT-A-AND-B", AND THE D[C] INPUTS "ALU15" AND "D[C]"

    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


    !TESTS 116A 1-5 VERIFIES THAT WITH:
    !ALU=(NOT-A-AND-B), A=(000000), B=(125252), THEN D=(125252)
    4623:
    TEST116A1:
        P0,     LOAD-ENUA(ZTARGET412),                  !BIT<15:12> = "1010"
                LOAD-ERROR(TEST116A1),                  !ERROR DIRECTORY KEY
```

```
                DCS-CTR(C6.),                          !COMPARE AT TARGET
        NEXT,   J/ALU116A1                             !
  (4623)  DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..001..010...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.100]

    4634:
    ALU116A1:
        P0,     BUMP-VERIFY,                           !COUNT
        P2-T,   D_NOT-A-AND-B, D[C]_ALU15,             !ALU=(NOT-A-AND-B), D[C]=(1)
                BUS-A_ASPHI(C000000),                  !A=(000000)
                BUS-B_CSPD(C125252),                   !B=(125252)
        NEXT,   J/GOBUT116A1                           !D=(125252)
  (4634)  DCS[0.00.0.0.0.1]  BM[0010..10.00..11.01..100..100...0.1.0..0..0...0.0110...0..0000.0...11.000...000.011.011]

    4033:  !(FREE)
    GOBUT116A1:
        SETUP,  RETURN/TEST116A2,                      !EXEC SUBR WHICH:
                                                       !(1) D<15:12> => IR<15:12>
        NEXT,   CALL[D15-12]                           !(2) BUT (IR15-12) INTO ZTARGET---
  (4033)  DCS[0.00.0.0.0.0]  BM[0100..00.11..00.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.100]

    !CHECK THAT D[C] GOT A (1) FROM "ALU15," ABOVE
    4621:
    TEST116A2:
        P0,     LOAD-ENUA(ZTARGET403),                 !BIT <00> = D[C] = (1)
                LOAD-ERROR(TEST116A2),                 !ERROR DIRECTORY KEY
                DCS-CTR(C3.),                          !COMPARE AT TARGET
                BUMP-VERIFY,                           !COUNT
        NEXT,   J/GOBUT116A2                           !
  (4621)  DCS[1.00.1.0.0.1]  BM[1100..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.100]
    4034:  !(FREE)
    GOBUT116A2:
        SETUP,  RETURN/TEST116A3,                      !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                          !BUT TABLE
                J/BUTD[C]A                             !D[C]H IN BIT <00>
  (4034)  DCS[0.00.0.0.0.0]  BM[0100..00.11..00.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.100]

    !CHECK BIT<11:06> = "1010 10"
    4620:
    TEST116A3:
        P0,     LOAD-ENUA(ZTARGET412),                 !INSTRS-E78 OUTPUT FOR BIT <11:06> = "101 010"
                LOAD-ERROR(TEST116A3),                 !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                          !COMPARE AT TARGET
                BUMP-VERIFY,                           !COUNT
        NEXT,   J/GOBUT116A3                           !
  (4620)  DCS[1.00.1.0.0.1]  BM[1001..00.11..11.00..001..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.101]

    4035:  !(FREE)
    GOBUT116A3:
        SETUP,  RETURN/TEST116A4,                      !EXEC SUBR WHICH:
                                                       !(1) D<11:06> => IR<11:06>
        NEXT,   CALL[D11-06]                           !(2) BUT(INSTRS) INTO ZTARGET---
```



```
  (4035)  DCS[0.00.0.0.0.0]  BM[0100..00.11..00.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.110]

    !CHECK BIT<05:00> = "10 1010"
    4637:
    TEST116A4:

        P0,     LOAD-ENUA(ZTARGET425),                 !INSTRS-E88 OUTPUT FOR BIT <05:00> ="101 010"
                LOAD-ERROR(TEST116A4),                 !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                          !COMPARE AT TARGET
        NEXT,   J/GOBUT116A4                           !
  (4637)  DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..010..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.110]

    4036:  !(FREE)
    GOBUT116A4:
        SETUP,  RETURN/TEST116A5,                      !EXEC SUBR WHICH:
                                                       !(1) D<05:00> => IR<05:00>
        NEXT,   CALL[D05-00]                           !(2) BUT(INSTRS) INTO ZTARGET---
  (4036)  DCS[0.00.0.0.0.0]  BM[0100..00.11..00.11..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.000]

    !CHECK THAT D[C] WAS PROPOGATED UNCHANGED AS A (1), VIA D[C]_D[C]
    4636:
    TEST116A5:
        P0,     LOAD-ENUA(ZTARGET403),                 !BIT<01> = D[C] = (1)
                LOAD-ERROR(TEST116A5),                 !ERROR DIRECTORY KEY
                DCS-CTR(C3.),                          !COMPARE AT TARGET
        NEXT,   J/GOBUT116A5                           !
  (4636)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...000.011.111]

    4037:  !(FREE)
    GOBUT116A5:
        SETUP,  RETURN/TEST116B,                       !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                          !BUT TABLE
                J/BUTD[C]B                             !D[C]H IN BIT <01>
  (4037)  DCS[0.00.0.0.0.0]  BM[0100..00.11..00.00..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.101.000]

    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST 116B VERIFIES THAT WITH:

    !ALU=(ZERO), A=(125252), B=(052525), THEN D=(000000)
    4606:
    TEST116B:
        P0,     LOAD-ENUA(ZTARGET434),                 !INSTRS FOR IR=(000000)
                LOAD-ERROR(TEST116B),                  !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                          !COMPARE AT TARGET
```

```
                NEXT,   J/ALU116B                               !
   (4606) DCS[1.00.1.0.0.0] BM[1001..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...000.100.000]
        4040:  !(FREE)
        ALU116B:
                P2-T,   D_ZERO, SAVE-D[C],                      !ALU=(ZERO), D[C]=D[C]=(1)
                        BUS-A_ASPHI(C125252),                   !A=(125252)
                        BUS-B_CSPD(C052525),                    !B=(052525)
                NEXT,   J/GOBUT116B                             !D=(000000)
   (4040) DCS[0.00.0.0.0.0] BM[0011..10.00..11.01..110..111...0.1.0..0..0...0.0111...0..0000.0...11.000...000.100.001]
        4041:  !(FREE)
        GOBUT116B:
                SETUP,  RETURN/SCOPE116C,                       !EXEC SUBR WHICH:
                                                                !(1) D-> IR
                NEXT,   CALL[DZERO]                             !(2) BUT(INSTR5) INTO ZTARGET---
   (4041) DCS[0.00.0.0.0.0] BM[0100..00.00..01.00..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.010]
        4042:  !(FREE)
        SCOPE116C:
                NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST116C1"   (+1, WORDS)
                        J/TEST116C1                             !   ERROR:  "ALU116A1"  (-13, WORDS)
   (4042) DCS[0.00.0.1.0.0] BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...110.011.101]
        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        !TEST 116C 1-5 VERIFIES THAT WITH:
        !ALU=(NOT-A-AND-B), A=(000000), B=(052525), THEN D=(052525)
        4635:
        TEST116C1:
                P0,     LOAD-ENUA(ZTARGET405),                  !BIT<15:12> = "0101"
                        LOAD-ERROR(TEST116C1),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C6.),                           !COMPARE AT TARGET
                NEXT,   J/ALU116C1                              !
   (4635) DCS[1.00.1.0.0.0] BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...110.100.110]
        4646:
        ALU116C1:
                P0,     BUMP-VERIFY,                            !COUNT
                P2-T,   D_NOT-A-AND-B, D[C]_ALU15,              !ALU=(NOT-A-AND-B), D[C]=(0)
                        BUS-A_ASPHI(C000000),                   !A=(000000)
                        BUS-B_CSPD(C052525),                    !B=(052525)
                NEXT,   J/GOBUT116C1                            !D=(052525)
   (4646) DCS[0.00.0.0.0.1] BM[0010..10.00..11.01..100..100...0.1.0..0..0...0.0111...0..0000.0...11.000...000.100.011]
        4043:  !(FREE)
        GOBUT116C1:
                SETUP,  RETURN/TEST116C2,                       !EXEC SUBR WHICH:
                                                                !(1) D<15:12> -> IR<15:12>
```



```
                NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
   (4043) DCS[0.00.0.0.0.0] BM[0100..00.11..00.11..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.100]
        !CHECK THAT D[C] GOT A (0) FROM "ALU15", ABOVE
        4633:
        TEST116C2:
                P0,     LOAD-ENUA(ZTARGET402),                  !BIT <00> = D[C] = (0)
                        LOAD-ERROR(TEST116C2),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/GOBUT116C2                            !
   (4633) DCS[1.00.1.0.0.1] BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.100.100]
        4044:  !(FREE)
        GOBUT116C2:
                SETUP,  RETURN/TEST116C3,                       !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                        J/BUTD[C]A                              !D[C]N IN BIT<00>
   (4044) DCS[0.00.0.0.0.0] BM[0100..00.11..00.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.100]
        !CHECK BIT<11:06> = "0101 01"
        4632:
        TEST116C3:
                P0,     LOAD-ENUA(ZTARGET405),                  !INSTR5-E78 OUTPUT FOR BIT<11:06>="010 101"
                        LOAD-ERROR(TEST116C3),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C6.),                           !COMPARE AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/GOBUT116C3                            !
   (4632) DCS[1.00.1.0.0.1] BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.100.101]
        4045:  !(FREE)
        GOBUT116C3:
                SETUP,  RETURN/TEST116C4,                       !EXEC SUBR WHICH:
                                                                !(1) D<11:06>-> IR<11:06>
                NEXT,   CALL[D11-06]                            !(2) BUT(INSTR5) INTO ZTARGET---
   (4045) DCS[0.00.0.0.0.0] BM[0100..00.11..00.11..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.110]
        !CHECK BIT <05:00> = "01 0101"
        4631:
        TEST116C4:
                P0,     LOAD-ENUA(ZTARGET432),                  !INSTR5-E88 OUTPUT FOR BIT <05:00> = "010 101"
                        LOAD-ERROR(TEST116C4),                  !ERROR DIRECTORY KEY
                NEXT,   J/GOBUT116C4                            !
   (4631) DCS[1.00.0.0.0.0] BM[0000..00.11..11.00..011..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.100.110]
        4046:  !(FREE)
        GOBUT116C4:
                SETUP,  RETURN/TEST116C5,                       !EXEC SUBR WHICH:
```

```
6422                                                    ;(1) D<05:00> -> IR<05:00>
6423            NEXT,   CALL[D05=00]                    ;(2) BUT(INSTRS) INTO ZTARGET---
    (4046)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,11,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,100,000]
6424
6425
6426
6427    ;CHECK THAT D[C] WAS PROPOGATED UNCHANGED AS A (0), VIA D[C]_D[C]
6428    4630:
6429    TEST116C5:
6430            P0,     LOAD=ENUA(ZTARGET401),          ;BIT<01> = D[C] = (0)
6431                    LOAD=ERROR(TEST116C5),          ;ERROR DIRECTORY KEY
6432                    DCS=CTR(C3,),                   ;COMPARE AT TARGET
6433            NEXT,   J/GOBUT116C5                    ;
    (4630)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,100,111]
6434
6435    4047:  ;(FREE)
6436    GOBUT116C5:
6437
6438            SETUP,  RETURN/TEST116D,                ;RETURN TO START OF NEXT SUBTEST
6439            NEXT,   GOTO=PAGE(7),                   ;BUT TABLE
6440                    J/BUTD[C]B                      ;D[C]N IN BIT <01>
    (4047)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,101,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,101,000]
6441
6442
6443
6444
6445
6446
6447    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6448
6449    ;TEST 116D VERIFIES THAT WITH:
6450    ;ALU=(ZERO), A=(052525), B=(125252), THEN D=(000000)
6451    4645:
6452    TEST116D:
6453            P0,     LOAD=ENUA(ZTARGET434),          ;INSTRS FOR IR=(000000)
6454                    LOAD=ERROR(TEST116D),           ;ERROR DIRECTORY KEY
6455                    DCS=CTR(C6,),                   ;COMPARE AT TARGET
6456            NEXT,   J/ALU116D                       ;
    (4645)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,101,000]
6457
6458    4050:  ;(FREE)
6459    ALU116D:
6460            P2=T,   D_ZERO, SAVE=D[C],              ;ALU=(ZERO), D[C]=D[C]=(0)
6461                    BUS=A_ASPHI(C052525),           ;A=(052525)
6462                    BUS=B_CSPD(C125252),            ;B=(125252)
6463            NEXT,   J/GOBUT116D                     ;D=(000000)
    (4050)  DCS[0,00,0,0,0,0]  BM[0011,,10,00,,11,01,,111,,111...0,1,0,,0,,0...0,0110...0,,0000,0,,,11,000,,,000,101,001]
6464
6465    4051:  ;(FREE)
6466    GOBUT116D:
6467            SETUP,  RETURN/SCOPE116D,               ;EXEC SUBR WHICH:
6468                                                    ;(1) D  -> IR
```



```
6469            NEXT,   CALL[DZERO]                     ;(2) BUT(INSTRS) INTO ZTARGET---
    (4051)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,01,01,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,100,010]
6470
6471
6472
6473    4052:  ;(FREE)
6474    SCOPE116D:
6475            NEXT,   BUTD[SCOPE],                    ;NO ERROR: "TEST117A1" (+1, WORDS)
6476                    J/TEST117A1                     ;   ERROR: "ALU116C1"  (-13, WORDS)
    (4052)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,100,111]
6477
6478
6479
6480
6481
6482    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6483
6484    ;THIS NEXT SET OF 9, TESTS EXERCIZES THE ALU FUNCTION
6485    ;"A-AND-NOT-B", AND THE CARRYOUT OF "CINMUX=D[C]" INTO D[C]
6486
6487
6488
6489
6490    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6491
6492    ;TESTS 117A 1-4 VERIFIES THAT WITH:
6493    ;ALU=(A-AND-NOT-B), A=(177777), B=(125252), THEN D=(052525)
6494    4647:
6495    TEST117A1:
6496            P0,     LOAD=ENUA(ZTARGET405),          ;BIT<15:12> = "0101"
6497                    LOAD=ERROR(TEST117A1),          ;ERROR DIRECTORY KEY
6498                    DCS=CTR(C6,),                   ;COMPARE AT TARGET
6499            NEXT,   J/ALU117A1                      ;
    (4647)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,110]
6500
6501    4666:
6502    ALU117A1:
6503            P0,     BUMP=VERIFY,                    ;COUNT
6504            P2=T,   D_A-AND-NOT-B, D[C]_CINMUX,      ;ALU=(A-AND-NOT-B), D[C]=CIN=D[C]=(0)
6505                    BUS=A_ASPHI(C177777),           ;A=(177777)
6506                    BUS=B_CSPD(C125252),            ;B=(125252)
6507            NEXT,   J/GOBUT117A1                    ;D=(052525)
    (4666)  DCS[0,00,0,0,0,1]  BM[0111,,10,00,,11,01,,101,,000...0,1,0,,0,,0...0,0110...0,,0000,0,,,11,000,,,000,101,011]
6508
6509    4053:  ;(FREE)
6510    GOBUT117A1:
6511
6512            SETUP,  RETURN/TEST117A2,               ;EXEC SUBR WHICH:
6513                                                    ;(1) D<15:12> -> IR<15:12>
6514            NEXT,   CALL[D15-12]                    ;(2) BUT(IR15-12) INTO ZTARGET---
    (4053)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,011,100]
6515
6516    ;CHECK BIT<11:06> = "0101 01"
```

```
6516    4644:
6517    TEST117A2:
6518            P0,     LOAD-ENUA(ZTARGET405),          !INSTRS-E78 OUTPUT FOR BIT<11:06>="010 101"
6519                    LOAD-ERROR(TEST117A2),          !ERROR DIRECTORY KEY
6520                    DCS-CTR(C6,),                   !COMPARE AT TARGET
6521                    BUMP-VERIFY,                    !COUNT
6522            NEXT,   J/GOBUT117A2                    !
     (4644)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,000,,101...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000,,,000,101,100]
6523
6524    4054:  !(FREE)
6525    GOBUT117A2:
6526            SETUP,  RETURN/TEST117A3,               !EXEC SUBR WHICH:
6527                                                    !(1) D<11:06> => IR<11:06>
6528            NEXT,   CALL[D11-06]                    !(2) BUT(INSTR5) INTO ZTARGET---
     (4054)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,011,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100,,,010,011,110]
6529
6530
6531
6532    !CHECK BIT<05:00> = "01 0101"
6533    4643:
6534    TEST117A3:
6535
6536            P0,     LOAD-ENUA(ZTARGET432),          !INSTRS-E88 OUTPUT FOR BIT <05:00>="010 101"
6537                    LOAD-ERROR(TEST117A3),          !ERROR DIRECTORY KEY
6538                    DCS-CTR(C6,),                   !COMPARE AT TARGET
6539            NEXT,   J/GOBUT117A3                    !
     (4643)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000,,,000,101,101]
6540
6541    4055:  !(FREE)
6542    GOBUT117A3:
6543            SETUP,  RETURN/TEST117A4,               !EXEC SUBR WHICH:
6544                                                    !(1) D<05:00> => IR<05:00>
6545            NEXT,   CALL[D05-00]                    !(2) BUT(INSTR5) INTO ZTARGET---
     (4055)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,010,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100,,,010,100,000]
6546
6547    !CHECK THAT D[C] GOT A (0) FROM CINMUX, ABOVE
6548    4642:
6549    TEST117A4:
6550            P0,     LOAD-ENUA(ZTARGET413),          !BIT<02> = D[C] = (0)
6551                    LOAD-ERROR(TEST117A4),          !ERROR DIRECTORY KEY
6552                    DCS-CTR(C3,),                   !COMPARE AT TARGET
6553                    BUMP-VERIFY,                    !COUNT
6554            NEXT,   J/GOBUT117A4                    !
     (4642)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,001,,011...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000,,,000,101,110]
6555
6556    4056:  !(FREE)
6557    GOBUT117A4:
6558            SETUP,  RETURN/TEST117B1,               !RETURN TO START OF NEXT SUBTEST
6559            NEXT,   GOTO-PAGE(7),                   !BUT TABLE
6560                    J/BUTD[C]C                      !D[C]H IN BIT<02>
     (4056)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,001,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100,,,011,001,000]
```



```
6561
6562
6563
6564
6565    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6566
6567    !TESTS 1178 1-3 VERIFIES THAT WITH:
6568    !ALU=(A-AND-NOT-B), A=(177777), B=(052525), THEN D=(125252)
6569    4641:
6570    TEST117B1:
6571            P0,     LOAD-ENUA(ZTARGET412),          !BIT<15:12> = "1010"
6572                    LOAD-ERROR(TEST117B1),          !ERROR DIRECTORY KEY
6573                    DCS-CTR(C6,),                   !COMPARE AT TARGET
6574            NEXT,   J/ALU117B1                      !
     (4641)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000,,,000,101,111]
6575
6576    4057:  !(FREE)
6577    ALU117B1:
6578            P0,     BUMP-VERIFY,                    !COUNT
6579            P2-T,   D_A-AND-NOT-B, D[C]_ALU15,       !ALU=(A-AND-NOT-B), D[C]=ALU15=(1)
6580                    BUS-A_ASPHI(C177777),           !A=(177777)
6581                    BUS-B_CSPD(C052525),            !B=(052525)
6582            NEXT,   J/GOBUT117B1                    !D=(125252)
     (4057)  DCS[0,00,0,0,0,1]  BM[0111,,10,00,,11,01,,101,,100...0,1,0,,0,,0,,0...0,0111...0,,0000,0...11,000,,,000,110,000]
6583
6584    4060:  !(FREE)
6585    GOBUT117B1:
6586            SETUP,  RETURN/TEST117B2,               !EXEC SUBR WHICH:
6587                                                    !(1) D<15:12> => IR<15:12>
6588            NEXT,   CALL[D15-12]                    !(2) BUT(IR15-12) INTO ZTARGET---
     (4060)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,00,,000,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100,,,010,011,100]
6589
6590    !CHECK BIT <11:06> = "1010 10"
6591    4640:
6592    TEST117B2:
6593            P0,     LOAD-ENUA(ZTARGET412),          !INSTRS-E78 OUTPUT FOR BIT <11:06>="101 010"
6594                    LOAD-ERROR(TEST117B2),          !ERROR DIRECTORY KEY
6595                    DCS-CTR(C6,),                   !COMPARE AT TARGET
6596                    BUMP-VERIFY,                    !COUNT
6597            NEXT,   J/GOBUT117B2                    !
     (4640)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,001,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000,,,000,110,001]
6598
6599    4061:  !(FREE)
6600    GOBUT117B2:
6601            SETUP,  RETURN/TEST117B3,               !EXEC SUBR WHICH:
6602                                                    !(1) D<11:06> => IR<11:06>

6603            NEXT,   CALL[D11-06]                    !(2) BUT(INSTR5) INTO ZTARGET---
     (4061)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,111,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100,,,010,011,110]
6604
6605
6606
6607    !CHECK BIT<05:00> = "10 1010"
```

```
6608    4657:
6609    TEST117B3:
6610
6611            P0,     LOAD=ENUA(ZTARGET425),                  ;INSTRS=E88 OUTPUT FOR BIT <05:00> = "101 010"
6612                    LOAD=ERROR(TEST117B3),                  ;ERROR DIRECTORY KEY
6613                    DCS=CTR(C6,),                           ;COMPARE AT TARGET
6614            NEXT,   J/GOBUT117B3                            ;
    (4657)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,010,,101...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,110,010]
6615
6616    4062:  ;(FREE)
6617    GOBUT117B3:
6618            SETUP,  RETURN/TEST117C1,                       ;EXEC SUBR WHICH:
6619                                                            ;(1) D<05:00> -> IR<05:00>
6620            NEXT,   CALL[D05=00]                            ;(2) BUT (INSTRS) INTO ZTARGET---
    (4062)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,110,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,100,000]
6621
6622
6623
6624
6625
6626
6627
6628    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6629
6630    ;TESTS 117C 1-2 VERIFIES THAT WITH:
6631    ;ALU=(A-AND-NOT-B), A=(000000), B=(000000), THEN D=(000000)
6632    4656:
6633    TEST117C1:
6634            P0,     LOAD=ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
6635                    LOAD=ERROR(TEST117C1),                  ;ERROR DIRECTORY KEY
6636                    DCS=CTR(C6,),                           ;COMPARE AT TARGET
6637            NEXT,   J/ALU117C1                              ;
    (4656)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,110,011]
6638
6639    4063:  ;(FREE)
6640    ALU117C1:
6641            P2=T,   D_A-AND-NOT-B, D[C]_CINMUX,              ;ALU=(A-AND-NOT-B), D[C]=CINMUX=D[C]=(1)
6642                    BUS=A_ASPHI(C000000),                   ;A=(000000)
6643                    BUS=B_CSPD(C000000),                    ;B=(000000)
6644            NEXT,   J/GOBUT117C1                            ;
    (4063)  DCS[0,00,0,0,0,0]  BM[0111,,10,00,,11,01,,100,,000...0,1,0,,0,,0,,0...0,0100...0,,0000,0,,,11,000,,,000,110,100]
6645
6646    4064:  ;(FREE)
6647    GOBUT117C1:
6648            SETUP,  RETURN/TEST117C2,                       ;EXEC SUBR WHICH:
6649                                                            ;(19 D  -> IR
6650            NEXT,   CALL[DZERO]                             ;(2) BUT(INSTRS) INTO ZTARGET---
    (4064)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,11,,111,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,010,100,010]
6651
6652
6653    ;CHECK THAT D[C] GOT A (1) FROM CINMUX, ABOVE
6654    4677:
```



```
6655    TEST117C2:
6656            P0,     LOAD=ENUA(ZTARGET417),                  ;BIT<03> = D[C] = (1)
6657                    LOAD=ERROR(TEST117C2),                  ;ERROR DIRECTORY KEY
6658                    DCS=CTR(C3,),                           ;COMPARE AT TARGET
6659            NEXT,   J/GOBUT117C2                            ;
    (4677)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,000,110,101]
6660
6661    4065:  ;(FREE)
6662    GOBUT117C2:
6663            SETUP,  RETURN/SCOPE117C,                       ;RETURN TO SCOPE LOOP TEST WORD
6664            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE
6665                    J/BUTD[C]C                              ;BIT<02> = D[C]H
    (4065)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,01,10,,110,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,001,000]
6666
6667
6668
6669    4066:  ;(FREE)
6670    SCOPE117C:
6671            NEXT,   BUTD[SCOPE],                            ;NO ERROR: "TEST120A1" (+1, WORDS)
6672                    J/TEST120A1                             ; ERROR: "ALU117A1" (-20, WORDS)
    (4066)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,111]
6673
6674
6675    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6676
6677    ;THIS NEXT SET OF 7, TESTS EXERCIZES THE ALU FUNCTION
6678    ;"A-AND-B", AND THE CARRYOUT OF "CINMUX =(0) INTO D[C]
6679
6680    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6681
6682    ;TESTS 120A 1-3 VERIFIES THAT WITH:
6683    ;ALU=(A-AND-B), A=(125252), B=(177777), THEN D=(125252)
6684    4667:
6685    TEST120A1:
6686            P0,     LOAD=ENUA(ZTARGET412),                  ;BIT<15:12> = "1010"
6687                    LOAD=ERROR(TEST120A1),                  ;ERROR DIRECTORY KEY
6688                    DCS=CTR(C6,),                           ;COMPARE AT TARGET
6689            NEXT,   J/ALU120A1                              ;
    (4667)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,100]
6690
6691    4664:
6692    ALU120A1:
6693            P0,     PUMP=VERIFY,                            ;COUNT
6694            P2=T,   D_A-AND-B, D[C]_ALU15,                  ;ALU=(A-AND-B), D[C]=(1)
6695                    BUS=A_ASPHI(C125252),                   ;A=(125252)
6696                    BUS=B_CSPD(C177777),                    ;B=(177777)
6697            NEXT,   J/GOBUT120A1                            ;D=(125252)
    (4664)  DCS[0,00,0,0,0,1]  BM[1011,,10,00,,11,01,,110,,100...0,1,0,,0,,0,,0...0,0101...0,,0000,0,,,11,000,,,000,110,111]
6698
6699    4067:  ;(FREE)
6700    GOBUT120A1:
6701            SETUP,  RETURN/TEST120A2,                       ;EXEC SUBR WHICH:
6702                                                            ;(1) D<15:12>  -> IR<15:12>
```

```
           NEXT,    CALL[D15-12]                           !(2) BUT(IR15-12) INTO ZTARGET---
   (4067)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,100]

    !CHECK BIT <11:06> = "1010 10"
    4655:
    TEST120A2:
           P0,      LOAD-ENUA(ZTARGET412),                 !INSTR5-E78 OUTPUT FOR BIT <11:06> = "101 010"
                    LOAD-ERROR(TEST120A2),                 !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                          !COMPARE AT TARGET
                    BUMP-VERIFY,                           !COUNT
           NEXT,    J/GOBUT120A2                           !
   (4655)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,000]

    4070:  !(FREE)
    GOBUT120A2:
           SETUP,   RETURN/TEST120A3,                      !EXEC SUBR WHICH:
                                                           !(1) D<11:06> -> IR<11:06>
           NEXT,    CALL[D11-06]                           !(2) BUT(INSTR5) INTO ZTARGET---
   (4070)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]



    !CHECK BIT<05:00> = "10 1010"
    4654:
    TEST120A3:

           P0,      LOAD-ENUA(ZTARGET425),                 !INSTR5-E88 OUTPUT FOR BIT<05:00>="101 010"
                    LOAD-ERROR(TEST120A3),                 !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                          !COMPARE AT TARGET
           NEXT,    J/GOBUT120A3                           !
   (4654)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,010,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,001]

    4071:  !(FREE)
    GOBUT120A3:
           SETUP,   RETURN/TEST120B1,                      !EXEC SUBR WHICH:
                                                           !(1) D<05:00> -> IR<05:00>
           NEXT,    CALL[D05-00]                           !(2) BUT(INSTR5) INTO ZTARGET---
   (4071)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,000]




    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

    !TESTS 120B 1-4 VERIFIES THAT WITH:
    !ALU=(A-AND-B), A=(052525), B=(177777), THEN D=(052525)
    4653:
    TEST120B1:
           P0,      LOAD-ENUA(ZTARGET405),                 !BIT<15:12> = "0101"
                    LOAD-ERROR(TEST120B1),                 !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                          !COMPARE AT TARGET
```



```
           NEXT,    J/ALU120B1                             !
   (4653)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,010]

    4072:  !(FREE)
    ALU120B1:

           P2-T,    D_A-AND-B, D[C]_CINMUX,                !ALU=(A-AND-B), D[C]=CIN=(0)
                    BUS-A_ASPHI(C052525),                  !A=(052525)
                    BUS-B_CSPD(C177777),                   !B=(177777)
           NEXT,    J/GOBUT120B1                           !D=(052525)
   (4072)  DCS[0,00,0,0,0,0]  BM[1011,,10,00,,11,01,,111,,000,,,0,1,0,,0,,0,,,0,0101,,,0,,0000,0,,,11,000,,,000,111,011]

    4073:  !(FREE)
    GOBUT120B1:
           SETUP,   RETURN/TEST120B2,                      !EXEC SUBR WHICH:
                                                           !(1) D<15:12> -> IR<15:12>
           NEXT,    CALL[D15-12]                           !(2) BUT(IR15-12) INTO ZTARGET---
   (4073)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,100]

    !CHECK BIT<11:06> = "0101 01"
    4652:
    TEST120B2:
           P0,      LOAD-ENUA(ZTARGET405),                 !INSTR5-E78 OUTPUT FOR BIT<11:06>="010 101"
                    LOAD-ERROR(TEST120B2),                 !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                          !COMPARE AT TARGET
                    BUMP-VERIFY,                           !COUNT
           NEXT,    J/GOBUT120B2                           !
   (4652)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,100]

    4074:  !(FREE)
    GOBUT120B2:
           SETUP,   RETURN/TEST120B3,                      !EXEC SUBR WHICH:
                                                           !(1) D<11:06> -> IR<11:06>
           NEXT,    CALL[D11-06]                           !(2) BUT(INSTR5) INTO ZTARGET---
   (4074)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,01,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]



    !CHECK BIT<05:00> = "01 0101"
    4651:
    TEST120B3:

           P0,      LOAD-ENUA(ZTARGET432),                 !INSTR5-E88 OUTPUT FOR BIT <05:00>="010 101"
                    LOAD-ERROR(TEST120B3),                 !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                          !COMPARE AT TARGET
           NEXT,    J/GOBUT120B3                           !

   (4651)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,101]

    4075:  !(FREE)
    GOBUT120B3:
           SETUP,   RETURN/TEST120B4,                      !EXEC SUBR WHICH:
                                                           !(1) D<05:00> -> IR<05:00>
```

```
6795            NEXT,   CALL[D05=00]                    ;(2) BUT(INSTR5) INTO ZTARGET---
     (4075)  DCS[0,00,0,0,0,0]  BM[0100..00.11..01.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,100,000]
6796
6797    ;CHECK THAT D[C] GOT A (0) FROM "CINNUX" = (0)
6798    4650;
6799    TEST120B4;
6800            P0,     LOAD-ENUA(ZTARGET402),          ;BIT<00> = D[C] = (0)
6801                    LOAD-ERROR(TEST120B4),          ;ERROR DIRECTORY KEY
6802                    DCS-CTR(C3,),                   ;COMPARE AT TARGET
6803                    BUMP-VERIFY,                    ;COUNT
6804            NEXT,   J/GOBUT120B4                    ;
     (4650)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11,000...000,111,110]
6805
6806    4076;  ;(FREE)
6807    GOBUT120B4;
6808            SETUP,  RETURN/SCOPE120B,               ;RETURN TO SCOPE LOOP TEST WORD
6809            NEXT,   GOTO-PAGE(7),                   ;BUT TABLE
6810                    J/BUTD[C]A                      ;D[C]N IN BIT <00>
     (4076)  DCS[0,00,0,0,0,0]  BM[0100..00.00..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11,100...011,100,100]
6811
6812    4077;  ;(FREE)
6813    SCOPE120B;
6814            NEXT,   BUTD[SCOPE],                    ;NO ERROR;  "TEST121A1" (+1, WORD8)
6815                    J/TEST121A1                     ;   ERROR;  "ALU120A1"  (-15, WORD8)
     (4077)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,000...110,110,101]
6816
6817
6818
6819
6820
6821    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6822
6823    ;THIS NEXT SET OF 16, TESTS EXERCIZES THE ALU FUNCTION
6824    ;"A-XOR-B", AND THE CARRYOUT FUNCTIONS OF "ALU00" AND "ALU07" INTO D[C]
6825
6826    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6827
6828
6829    ;TESTS 121A 1-4 VERIFIES THAT WITH:
6830    ;ALU=(A-XOR-B), A=(000000), B=(052525), THEN D=(052525)
6831    4665;
6832    TEST121A1;
6833            P0,     LOAD-ENUA(ZTARGET405),          ;BIT<15:12> = "0101"
6834                    LOAD-ERROR(TEST121A1),          ;ERROR DIRECTORY KEY
6835                    DCS-CTR(C6,),                   ;COMPARE AT TARGET
6836            NEXT,   J/ALU121A1                      ;
     (4665)  DCS[1,00,1,0,0,0]  BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11,000...111,000,110]
6837
6838    4706;
6839    ALU121A1;
6840            P0,     BUMP-VERIFY,                    ;COUNT
6841            P2-T,   D_A-XOR-B, D[C]_ALU00,          ;ALU=(A-XOR-B), D[C]=ALU00=(1)
```



```
6842                    BUS-A_ASPHI(C000000),           ;A=(000000)
6843                    BUS-B_CSPD(C052525),            ;B=(052525)
6844            NEXT,   J/GOBUT121A1                    ;D=(052525)
     (4706)  DCS[0,00,0,0,0,1]  BM[0110..10.00..11.01..100..010...0.1.0..0..0...0.0111...0..0000.0...11,000...001,000,011]
6845
6846    4103;  ;(FREE)
6847    GOBUT121A1;
6848            SETUP,  RETURN/TEST121A2,                ;EXEC SUBR WHICH:
6849                                                    ;(1) D<15:12> -> IR<15:12>
6850            NEXT,   CALL[D15=12]                    ;(2) BUT(IR15-12) INTO ZTARGET---
     (4103)  DCS[0,00,0,0,0,0]  BM[0100..00.11..01.11..110..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,011,100]
6851
6852    ;CHECK BIT<11:06> = "0101 01"
6853    4676;
6854    TEST121A2;
6855            P0,     LOAD-ENUA(ZTARGET405),          ;INSTR5-E78 OUTPUT FOR BIT<11:06>="010 101"
6856                    LOAD-ERROR(TEST121A2),          ;ERROR DIRECTORY KEY
6857                    DCS-CTR(C6,),                   ;COMPARE AT TARGET
6858                    BUMP-VERIFY,                    ;COUNT
6859            NEXT,   J/GOBUT121A2                    ;
     (4676)  DCS[1,00,1,0,0,1]  BM[1001..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11,000...001,000,100]
6860
6861    4104;  ;(FREE)
6862    GOBUT121A2;
6863            SETUP,  RETURN/TEST121A3,                ;EXEC SUBR WHICH:
6864                                                    ;(1) D<11:06> -> IR<11:06>
6865            NEXT,   CALL[D11=06]                    ;(2) BUT(INSTR5) INTO ZTARGET---
     (4104)  DCS[0,00,0,0,0,0]  BM[0100..00.11..01.11..101..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,011,110]
6866
6867
6868
6869    ;CHECK BIT<05:00> = "01 0101"
6870    4675;
6871    TEST121A3;
6872            P0,     LOAD-ENUA(ZTARGET432),          ;INSTR5-E88 OUTPUT FOR BIT<05:00>="010 101"
6873                    LOAD-ERROR(TEST121A3),          ;ERROR DIRECTORY KEY
6874                    DCS-CTR(C6,),                   ;COMPARE AT TARGET
6875            NEXT,   J/GOBUT121A3                    ;
     (4675)  DCS[1,00,1,0,0,0]  BM[1001..00.11..11.00..011..010...0.0.0..0..0...0.0000...0..0000.0...11,000...001,000,101]
6876
6877    4105;  ;(FREE)
6878    GOBUT121A3;
6879            SETUP,  RETURN/TEST121A4,                ;EXEC SUBR WHICH:
6880                                                    ;(1) D<05:00> -> IR<05:00>
6881            NEXT,   CALL[D05=00]                    ;(2) BUT(INSTR5) INTO ZTARGET---
     (4105)  DCS[0,00,0,0,0,0]  BM[0100..00.11..01.11..100..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,100,000]

6882
6883    ;CHECK THAT D[C] GOT A (1) FROM "ALU00"
6884    4674;

6885    TEST121A4;
6886            P0,     LOAD-ENUA(ZTARGET403),          ;BIT<01> = D[C] = (1)
```

```
6887                    LOAD-ERROR(TEST121A4),                  !ERROR DIRECTORY KEY
6888                    DCS-CTR(C3,),                           !COMPARE AT TARGET
6889                    BUMP-VERIFY,                            !COUNT
6890            NEXT,   J/GOBUT121A4                            !
    (4674)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,011...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,000,110]
6891
6892    4106:   !(FREE)
6893    GOBUT121A4:
6894            SETUP,  RETURN/TEST121B1,                       !RETURN TO START OF NEXT SUBTEST
6895            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
6896                    J/BUTD[C]B                              !D[C]H IN BIT<01>
    (4106)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,10,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,101,000]
6897
6898
6899
6900
6901    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6902
6903    !TESTS 121B 1-4 VERIFIES THAT WITH:
6904    !ALU=(A-XOR-B), A=(177777), B=(052525), THEN D=(125252)
6905    4663:
6906    TEST121B1:
6907            P0,     LOAD-ENUA(ZTARGET412),                  !BIT<15:12> = "1010"
6908                    LOAD-ERROR(TEST121B1),                  !ERROR DIRECTORY KEY
6909                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6910            NEXT,   J/ALU121B1                              !
    (4663)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,000,111]
6911
6912    4107:   !(FREE)
6913    ALU121B1:
6914            P0,     BUMP-VERIFY,                            !COUNT
6915            P2=T,   D_A-XOR-B, D[C]_ALU00,                  !ALU=(A-XOR-B), D[C]=ALU00=(0)
6916                    BUS-A_ASPHI(C177777),                   !A=(177777)
6917                    BUS-B_CSPD(C052525),                    !B=(052525)
6918            NEXT,   J/GOBUT121B1                            !D=(125252)
    (4107)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,11,01,,101,,010...0,1,0,,0,,0...0,0111...0,,0000,0,,,11,000,,,001,001,000]
6919
6920    4110:   !(FREE)
6921    GOBUT121B1:
6922            SETUP,  RETURN/TEST121B2,                       !EXEC SUBR WHICH:
6923                                                            !(1) D<15:12> -> IR<15:12>
6924            NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
    (4110)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,10,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,011,100]
6925
6926    !CHECK BIT<11:06> = "1010 10"
6927    4662:
6928    TEST121B2:
6929            P0,     LOAD-ENUA(ZTARGET412),                  !INSTRS=E78 OUTPUT FOR BIT<11:06>="101 010"
6930                    LOAD-ERROR(TEST121B2),                  !ERROR DIRECTORY KEY
6931                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6932                    BUMP-VERIFY,                            !COUNT
6933            NEXT,   J/GOBUT121B2                            !
```



```
    (4662)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,001,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,001,001]
6934
6935    4111:   !(FREE)
6936    GOBUT121B2:
6937            SETUP,  RETURN/TEST121B3,                       !EXEC SUBR WHICH:
6938                                                            !(1) D<11:06> -> IR<11:06>
6939            NEXT,   CALL[D11-06]                            !(2) BUT(INSTRS) INTO ZTARGET---
    (4111)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,10,,001,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,011,110]
6940
6941
6942
6943    !CHECK BIT<05:00> = "10 1010"
6944    4661:
6945    TEST121B3:
6946
6947            P0,     LOAD-ENUA(ZTARGET425),                  !INSTRS=E88 OUTPUT FOR BIT<05:00>="101 010"
6948                    LOAD-ERROR(TEST121B3),                  !ERROR DIRECTORY KEY
6949                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6950            NEXT,   J/GOBUT121B3                            !
    (4661)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,010,,101...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,001,010]
6951
6952    4112:   !(FREE)
6953    GOBUT121B3:
6954            SETUP,  RETURN/TEST121B4,                       !EXEC SUBR WHICH:
6955                                                            !(1) D<05:00) -> IR<05:00>
6956            NEXT,   CALL[D05-00]                            !(2) BUT(INSTRS) INTO ZTARGET---
    (4112)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,01,10,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,100,000]
6957
6958    !CHECK THAT D[C] GOT A (0) FROM "ALU00"
6959    4660:
6960    TEST121B4:
6961            P0,     LOAD-ENUA(ZTARGET401),                  !BIT<01> = D[C] = (0)
6962                    LOAD-ERROR(TEST121B4),                  !ERROR DIRECTORY KEY
6963                    DCS-CTR(C3,),                           !COMPARE AT TARGET
6964                    BUMP-VERIFY,                            !COUNT
6965            NEXT,   J/GOBUT121B4                            !
    (4660)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,001...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,001,011]
6966
6967    4113:   !(FREE)
6968    GOBUT121B4:
6969            SETUP,  RETURN/SCOPE121C,                       !RETURN TO SCOPE LOOP TEST WORD
6970            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
6971                    J/BUTD[C]B                              !D[C]H IN BIT<01>
    (4113)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,10,01,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,101,000]
6972
6973
6974
6975    4114:   !(FREE)
6976    SCOPE121C:
6977            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST121C1"   (+1, WORDS)
6978                    J/TEST121C1                             !   ERROR:  "ALU121A1"  (-17, WORDS)
```

```
      (4114)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,111]
6979
6980
6981
6982    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
6983
6984    !TESTS 121C 1-4 VERIFIES THAT WITH:
6985    !ALU=(A-XOR-B), A=(000000), B=(125252), THEN D=(125252)
6986    4707!
6987    TEST121C1:
6988            P0,     LOAD-ENUA(ZTARGET412),                  !BIT<15:12> = "1010"
6989                    LOAD-ERROR(TEST121C1),                  !ERROR DIRECTORY KEY
6990                    DCS-CTR(C6,),                           !COMPARE AT TARGET
6991            NEXT,   J/ALU121C1                              !
      (4707)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,111,000]
6992
6993    4670!
6994    ALU121C1:
6995            P0,     BUMP-VERIFY,                            !COUNT
6996            P2-T,   D_A-XOR-B, D[C]_ALU07,                  !ALU=(A-XOR-B), D[C]=ALU07=(1)
6997                    BUS-A_ASPHI(C000000),                   !A=(000000)
6998                    BUS-B_CSPD(C125252),                    !B=(125252)
6999            NEXT,   J/GOBUT121C1                            !D=(125252)
      (4670)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,11,01,,100,,011,,,0,1,0,,0,,0,,,0,0110,,,0,,0000,0,,,11,000,,,001,001,101]
7000
7001    4115!  !(FREE)
7002    GOBUT121C1:
7003            SETUP,  RETURN/TEST121C2,                       !EXEC SUBR WHICH:
7004                                                            !(1) D<15:12> -> IR<15:12>
7005            NEXT,   CALL[D15-12]                            !(2) BUT(IR15-12) INTO ZTARGET---
      (4115)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,00,00,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,100]
7006
7007    !CHECK BIT<11:06> = "1010 10"
7008    4605!
7009    TEST121C2:
7010            P0,     LOAD-ENUA(ZTARGET412),                  !INSTR$=E78 OUTPUT FOR BIT<11:06>="101 010"
7011                    LOAD-ERROR(TEST121C2),                  !ERROR DIRECTORY KEY
7012                    DCS-CTR(C6,),                           !COMPARE AT TARGET
7013                    BUMP-VERIFY,                            !COUNT
7014            NEXT,   J/GOBUT121C2                            !
      (4605)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,001,110]
7015
7016    4116!  !(FREE)
7017    GOBUT121C2:
7018            SETUP,  RETURN/TEST121C3,                       !EXEC SUBR WHICH:
7019                                                            !(1) D<11:06> -> IR<11:06>
7020            NEXT,   CALL[D11-06]                            !(2) BUT(INSTR$) INTO ZTARGET---
      (4116)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]
7021
7022
7023    !CHECK BIT<05:00> = "10 1010"
7024    4717!
```



```
7025    TEST121C3:
7026
7027            P0,     LOAD-ENUA(ZTARGET425),                  !INSTR$=E88 OUTPUT FOR BIT<05:00>="101 010"
7028                    LOAD-ERROR(TEST121C3),                  !ERROR DIRECTORY KEY
7029                    DCS-CTR(C6,),                           !COMPARE AT TARGET
7030            NEXT,   J/GOBUT121C3                            !
      (4717)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,010,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,001,111]
7031
7032    4117!  !(FREE)
7033    GOBUT121C3:
7034            SETUP,  RETURN/TEST121C4,                       !EXEC SUBR WHICH:
7035                                                            !(1) D<05:00> -> IR<05:00>
7036            NEXT,   CALL[D05-00]                            !(2) BUT(INSTR$) INTO ZTARGET---
      (4117)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,01,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,000]
7037
7038    !CHECK THAT D[C] GOT A (1) FROM "ALU07"
7039    4716!
7040    TEST121C4:
7041            P0,     LOAD-ENUA(ZTARGET417),                  !BIT<02> = D[C] = (1)
7042                    LOAD-ERROR(TEST121C4),                  !ERROR DIRECTORY KEY
7043                    DCS-CTR(C3,),                           !COMPARE AT TARGET
7044                    BUMP-VERIFY,                            !COUNT
7045            NEXT,   J/GOBUT121C4                            !
      (4716)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,000]
7046
7047    4120!  !(FREE)
7048    GOBUT121C4:
7049            SETUP,  RETURN/TEST121D1,                       !RETURN TO START OF NEXT SUBTEST
7050            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
7051                    J/BUTD[C]C                              !D[C]H IN BIT<02>
      (4120)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,10,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,000]
7052
7053
7054
7055
7056    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7057
7058    !TESTS 121D 1-4 VERIFIES THAT WITH:
7059    !ALU=(A-XOR-B), A=(177777), B=(125252), THEN D=(052525)
7060    4727!
7061    TEST121D1:
7062            P0,     LOAD-ENUA(ZTARGET405),                  !BIT<15:12> = "0101"
7063                    LOAD-ERROR(TEST121D1),                  !ERROR DIRECTORY KEY
7064                    DCS-CTR(C6,),                           !COMPARE AT TARGET
7065            NEXT,   J/ALU121D1                              !
      (4727)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,001]
7066
7067    4121!  !(FREE)
7068    ALU121D1:
7069            P0,     BUMP-VERIFY,                            !COUNT
7070            P2-T,   D_A-XOR-B, D[C]_ALU07,                  !ALU=(A-XOR-B), D[C]=ALU07=(0)
7071                    BUS-A_ASPHI(C177777),                   !A=(177777)
```

```
                BUS-B_CSPD(C125252),                    ;B=(125252)
        NEXT,   J/GOBUT121D1                            ;D=(052525)
 (4121) DCS[0,00,0,0,0,1]  BM[0110,,10,00,,11,01,,101,,011,,,0,1,0,,0,,0,,,0,0110,,,0,,0000,0,,,11,000,,,001,010,010]

 4122:  ;(FREE)
 GOBUT121D1:
        SETUP,  RETURN/TEST121D2,                       ;EXEC SUBR WHICH:
                                                        ;(1) D<15:12> => IR<15:12>
        NEXT,   CALL[D15-12]                            ;(2) BUT(IR15-12) INTO ZTARGET---
 (4122) DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,10,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,100]

 ;CHECK BIT<11:06> = "0101 01"
 4726:
 TEST121D2:
        P0,     LOAD-ENUA(ZTARGET405),                  ;INSTRS-E78 OUTPUT FOR BIT<11:06>="010 101"
                LOAD-ERROR(TEST121D2),                  ;ERROR DIRECTORY KEY
                DCS-CTR(C6,),                           ;COMPARE AT TARGET
                BUMP-VERIFY,                            ;COUNT
        NEXT,   J/GOBUT121D2                            ;
 (4726) DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,011]

 4123:  ;(FREE)
 GOBUT121D2:
        SETUP,  RETURN/TEST121D3,                       ;EXEC SUBR WHICH:
                                                        ;(1) D<11:06> => IR<11:06>
        NEXT,   CALL[D11-06]                            ;(2) BUT(INSTRS) INTO ZTARGET---
 (4123) DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,110]



 ;CHECK BIT<05:00> = "01 0101"
 4737:
 TEST121D3:

        P0,     LOAD-ENUA(ZTARGET432),                  ;INSTRS-E88 OUTPUT FOR BIT<05:00>="010 101"
                LOAD-ERROR(TEST121D3),                  ;ERROR DIRECTORY KEY
                DCS-CTR(C6,),                           ;COMPARE AT TARGET
        NEXT,   J/GOBUT121D3                            ;
 (4737) DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,100]

 4124:  ;(FREE)
 GOBUT121D3:
        SETUP,  RETURN/TEST121D4,                       ;EXEC SUBR WHICH:
                                                        ;(1) D<05:00> => IR<05:00>
        NEXT,   CALL[D05-00]                            ;(2) BUT(INSTRS) INTO ZTARGET---
 (4124) DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,11,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,000]

 ;CHECK THAT D[C] GOT A (0) FROM "ALU07"
 4736:
 TEST121D4:
        P0,     LOAD-ENUA(ZTARGET413),                  ;BIT<02> = D[C] = (0)
```



```
                LOAD-ERROR(TEST121D4),                  ;ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           ;COMPARE AT TARGET
                BUMP-VERIFY,                            ;COUNT
        NEXT,   J/GOBUT121D4                            ;
 (4736) DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,001,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,101]

 4125:  ;(FREE)
 GOBUT121D4:
        SETUP,  RETURN/SCOPE121D,                       ;RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                J/BUTD[C]C                              ;D[C]H IN BIT<02>
 (4125) DCS[0,00,0,0,0,0]  BM[0100,,00,00,,10,10,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,000]

 4126:  ;(FREE)
 SCOPE121D:
        P0,     BUMP-VERIFY,                            ;COUNT
        NEXT,   BUTD[SCOPE],                            ;NO ERROR: "TEST122A1" (+1, WORDS)
                J/TEST122A1                             ;   ERROR:  "ALU121C1" (-17, WORDS)
 (4126) DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,111,001]








 ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 ;THIS NEXT SET OF 8, TESTS CHECK THE ALU FUNCTIONS "A"
 ;AND "A-IOR-B", THE FUNCTION D[C]=CINMUX=(1), AND ALSO
 ;THE BUT(D<14:00>=ZERO#D<15>) BUT FOR D=(0)(00000) AND
 ;D=(1)(25252)
 4671:
 TEST122A1:
        P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
                LOAD-ERROR(TEST122A1),                  ;ERROR DIRECTORY KEY
                DCS-CTR(C6,),                           ;COMPARE AT TARGET
        NEXT,   J/ALU122A1                              ;
 (4671) DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,111,010]

 4672:
 ALU122A1:
        P0,     BUMP-VERIFY,                            ;COUNT
        P2-T,   D_A-IOR-B, D[C]_CINMUX,                 ;ALU=(A-IOR-B), D[C]=CINMUX=(1)
                BUS-A_ASPHI(C000000),                   ;A=(000000)

                BUS-B_BSPHI(C000000),                   ;B=(000000)
        NEXT,   J/GOBUT122A1                            ;D=(000000)
 (4672) DCS[0,00,0,0,0,1]  BM[1110,,01,11,,11,01,,100,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,111]

 4127:  ;(FREE)
 GOBUT122A1:
        SETUP,  RETURN/TEST122A2,                       ;EXEC SUBR WHICH:
```

```
7165                                                    !(1) D -> IR
7166            NEXT,   CALL[DZERO]                     !(2) BUT(INSTRS) INTO STARGET---
    (4127)  DCS[0,00,0,0,0,0]  BM[0100..00.10..11.11..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,100,010]
7167
7168
7169
7170    !CHECK THAT D[C] GOT A (1) FROM CINMUX=(1)
7171    4570:
7172    TEST122A2:
7173            P0,     LOAD=ENUA(ZTARGET403),          !BIT<00> = D[C] = (1)
7174                    LOAD=ERROR(TEST122A2),          !ERROR DIRECTORY KEY
7175                    DCS=CTR(C3,),                   !COMPARE AT TARGET
7176            NEXT,   J/GOBUT122A2                    !
    (4570)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..011...0,0,0..0..0...0,0000...0..0000,0...11,000...001,011,000]
7177
7178    4130:  !(FREE)
7179    GOBUT122A2:
7180            SETUP,  RETURN/TEST122A3,               !RETURN TO START OF NEXT SUBTEST
7181            NEXT,   GOTO=PAGE(7),                   !BUT TABLE
7182                    J/BUTD[C]A                      !D[C]H IN BIT <00>
    (4130)  DCS[0,00,0,0,0,0]  BM[0100..00.11..10.11..100..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,100]
7183
7184
7185
7186    !CHECK THAT D<15>=0, (D<14:00>=ZERO]=1 WHEN D=(000000)
7187    4734:
7188    TEST122A3:
7189            P0,     LOAD=ENUA(ZTARGET402),          !SETUP FOR D<15:00>=ZERO
7190                    LOAD=ERROR(TEST122A3),          !ERROR DIRECTORY KEY
7191                    DCS=CTR(C3,),                   !COMPARE AT TARGET
7192            NEXT,   J/GOBUT122A3                    !
    (4734)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...001,011,001]
7193
7194    4131:  !(FREE)
7195    GOBUT122A3:
7196            SETUP,  RETURN/TEST122A4,               !RETURN TO START OF NEXT SUBTEST
7197            NEXT,   GOTO=PAGE(7),                   !BUT TABLE
7198                    J/BUTD=IS=ZERO                  !BIT<1:0> = D<15>@ D<14:00>=ZERO
    (4131)  DCS[0,00,0,0,0,0]  BM[0100..00.11..10.11..101..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,001]
7199
7200    !CHECK THAT D<15>=(1), (D<14:00>=ZERO]=(0) WHEN D=(125252)
7201    4735:
7202    TEST122A4:
7203            P0,     LOAD=ENUA(ZTARGET401),          !SETUP FOR D<15:00>=(125252)
7204                    LOAD=ERROR(TEST122A4),          !ERROR DIRECTORY KEY
7205                    DCS=CTR(C4,),                   !COMPARE AT TARGET
7206                    BUMP=VERIFY,                    !COUNT
7207            NEXT,   J/SETD122A4                     !
    (4735)  DCS[1,00,1,0,0,1]  BM[1011..00.11..11.00..000..001...0,0,0..0..0...0,0000...0..0000,0...11,000...001,011,010]
7208
7209    4132:  !(FREE)
```



```
7210    SETD122A4:
7211            P2-T,   D_CSPD(C125252), D[C]_0,        !SETUP D FOR TEST
7212            NEXT,   J/GOBUT122A4                    !
    (4132)  DCS[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0,1,0..0..0...0,0110...0..0000,0...11,000...001,011,011]
7213
7214    4133:  !(FREE)
7215    GOBUT122A4:
7216            SETUP,  RETURN/SCOPE122A,               !RETURN TO SCOPE LOOP TEST WORD
7217            NEXT,   GOTO=PAGE(7),                   !BUT TABLE
7218                    J/BUTD=IS=ZERO                  !BIT<1:0> = D15@[D<14:00>=ZERO]
    (4133)  DCS[0,00,0,0,0,0]  BM[0100..00.00..10.11..100..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,001]
7219
7220
7221
7222    4134:  !(FREE)
7223    SCOPE122A:
7224            P0,     BUSDIN_EMIT=[I],                !RESET PROC UCON
7225                    EN=CLK=IR[15=00],               !
7226            NEXT,   BUTD[SCOPE],                    !NO ERROR:  "TEST130A1"   (+1, WORDS)
7227                    J/TEST130A1                     !   ERROR:  "ALU122A1"  (-0, WORDS)
    (4134)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.01..000..100...0,0,0..0..0...1,1001...0..0000,0...11,000...110,111,011]
7228
7229
7230
7231
7232
7233    !.PAGE*************************************************************************************************************
7234
7235
7236    .TOC    *   TEST130-136:  ALU ARITHMETIC FUNCTION/CARRY LOOKAHEAD TESTS
7237
7238    !*****************************************************************************************
7239    !*
7240    !*      TESTS:  130 - 136                               UWORDS:  127 + 160
7241    !*
7242    !*      FUNCTIONS:
7243    !*
7244    !*      ALU ARITHMETIC FUNCTION DECODE, INTERNAL CARRIES, CARRYOUTS, CARRY LOOKAHEAD,
7245    !*
7246    !*****************************************************************************************
7247
7248    !
7249    !       SUMMARY OF ALU ARITHMETIC / CARRY LOOKAHEAD TESTS:
7250    !
7251    !       TEST            OPERANDS EMPLOYED:
7252    !       NUMB            (A/B)+(B/A)+(CIN)=(COUT)(D)     ALU FUNCTION

7253    !       ----            --------------------------      --------------------
7254    !
7255    !       130A            (0101)+(0101)+(0)=(0)(1010)     A-PLUS-B-PLUS-0
7256    !       130B            (1010)+(1010)+(1)=(1)(0101)     A-PLUS-B-PLUS-1
7257    !
7258    !       131A            (1010)+(0101)+(0)=(0)(1111)     A-PLUS-B-PLUS-PS[C]
7259    !       131B            (0101)+(1010)+(0)=(0)(1111)     DIVIDE/D[C]=0/A-PLUS-B-PLUS-0
```

```
7260    !
7261    !       132A            (1010)+(1010)+(0)+(1)(0000)     A=MINUS+B+MINUS=0
7262    !       132B            (0101)+(0101)+(0)+(1)(0000)     DIVIDE/D[C]=1/A=MINUS+B+MINUS=0
7263    !
7264    !       133A            (1000)+(1000)+(0)+(1)(0000)     A=PLUS+B+PLUS+D[C]
7265    !       133B            (0111)+(0111)+(1)+(0)(1111)     A=PLUS+NOT+B+PLUS+D[C]
7266    !
7267    !       134A            (0100)+(1100)+(0)+(1)(0000)     A=PLUS+B+PLUS+D[C]
7268    !       134B            (1011)+(0011)+(1)+(0)(1111)     A=PLUS+NOT+B+PLUS+D[C]
7269    !
7270    !       135A            (1010)+(0110)+(0)+(1)(0000)     A=PLUS+B+PLUS+D[C]
7271    !       135B            (0101)+(1001)+(1)+(0)(1111)     A=PLUS+NOT+B+PLUS+D[C]
7272    !
7273    !       136A            (0101)+(1011)+(0)+(1)(0000)     A=PLUS+B+PLUS+D[C]
7274    !       136B            (1010)+(0100)+(1)+(0)(1111)     A=PLUS+NOT+B+PLUS+D[C]
7275    !
7276    !
7277    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
7278
7279    !CHECK INTERNAL ALU CARRIES WITH:      (052525)+(052525)+(0)=(125252)
7280    !ALSO CHECK ALU FUNCTION "A=PLUS+B+PLUS+0", D[C]_COUT15=(0)
7281    !
7282    4673:
7283    TEST130A1:
7284            P0,     LOAD=ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 TEST
7285                    LOAD=ERROR(TEST130A1),                  !ERROR DIRECTORY KEY
7286                    DCS=CTR(C0,),                           !COMPARE AT TARGET
7287            NEXT,   J/ARITH130A1                            !
    (4673)  DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,100,000]
7288
7289    4540:
7290    ARITH130A1:
7291            P2=T,   D_A=PLUS=B=PLUS=0,                      !ALU=(A=PLUS=B), CIN=(0)
7292                    D[C]_COUT15,                            !GET CARRYOUT
7293                    BUS=A_ASPHI(C052525),                   !A=(052525)
7294                    BUS=B_BSPHI(C052525),                   !B=(052525)
7295                    SR_A=PLUS=B=PLUS=0,                     !D=(125252), COUT15=(0)
7296            NEXT,   J/COMP130A1                             !
    (4540)  DCS[0,00,0,0,0,0]  BM[1001,,01,11,,11,01,,111,,110...0,1,1,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,011,101]
7297
7298    4135:  !(FREE)
7299    COMP130A1:
7300            P0,     BUMP=VERIFY,                            !COUNT
7301            P2=T,   D_SR=XOR=CSPD(C125252),                 !COMPARE RECEIVED: EXPECTED
7302                    SAVE=D[C],                              !SAVE CARRY
7303            NEXT,   J/GOBUT130A1                            !
    (4135)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,00,00,,000,,111...0,1,0,,0,,0...0,0110...0,,0000,0,,,11,000,,,001,011,110]
7304
7305    4136:  !(FREE)
7306    GOBUT130A1:
7307            SETUP,  RETURN/TEST130A2,                       !RETURN TO START OF NEXT SUBTEST
7308            NEXT,   CALL[DINTOIR=5]                         !GO PUT D => IR, BUT(INSTR5)
    (4136)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,01,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,111,011]
```



```
7309
7310
7311
7312    !CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
7313    4550:
7314    TEST130A2:
7315            P0,     LOAD=ENUA(ZTARGET402),                  !BIT<00> CLEAR
7316                    LOAD=ERROR(TEST130A2),                  !ERROR DIRECTORY KEY
7317                    DCS=CTR(C3,),                           !COMPARE AT TARGET
7318            NEXT,   J/GOBUT130A2                            !
    (4550)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,011,111]
7319
7320    4137:  !(FREE)
7321    GOBUT130A2:
7322            SETUP,  RETURN/TEST130B1,                       !RETURN TO START OF NEXT SUBTEST
7323            NEXT,   GOTO=PAGE(7),                           !BUT TABLE
7324                    J/BUTD[C]A                              !D[C]H= COUT15 H IN BIT<00>
    (4137)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,10,11,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,100]
7325
7326
7327
7328    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
7329
7330    !CHECK INTERNAL ALU CARRIES WITH: (125252)+(125252)+(1)=(052525)
7331    !ALSO CHECK ALU FUNCTION "A=PLUS=B=PLUS=1", D[C]_COUT15=(1)
7332    !
7333    4530:
7334    TEST130B1:
7335            P0,     LOAD=ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 TEST
7336                    LOAD=ERROR(TEST130B1),                  !ERROR DIRECTORY KEY
7337                    DCS=CTR(C8,),                           !COMPARE AT TARGET
7338            NEXT,   J/ARITH130B1                            !
    (4530)  DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,100,000]
7339
7340    4140:  !(FREE)
7341    ARITH130B1:
7342            P2=T,   D_A=PLUS=B=PLUS=1,                      !ALU=(A=PLUS=B), CIN=(1)
7343                    D[C]_COUT15,                            !GET CARRYOUT
7344                    BUS=A_ASPHI(C125252),                   !A=(125252)
7345                    BUS=B_BSPHI(C125252),                   !B=(125252)
7346                    SR_A=PLUS=B=PLUS=1,                     !D=(052525), COUT15=(1)
7347            NEXT,   J/COMP130B1                             !
    (4140)  DCS[0,00,0,0,0,0]  BM[1100,,01,11,,11,01,,110,,110...0,1,1,,0,,0...0,0000...0,,0000,0,,,11,000,,,001,100,001]
7348
7349    4141:  !(FREE)
7350    COMP130B1:

7351            P0,     BUMP=VERIFY,                            !COUNT
7352            P2=T,   D_SR=XOR=CSPD(C052525),                 !COMPARE RECEIVED: EXPECTED
7353                    SAVE=D[C],                              !SAVE CARRY
7354            NEXT,   J/GOBUT130B1                            !
    (4141)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,00,00,,000,,111...0,1,0,,0,,0...0,0111...0,,0000,0,,,11,000,,,001,100,010]
7355
7356    4142:  !(FREE)
```

```
    GOBUT130B1:
            SETUP,  RETURN/TEST130B2,                       ;RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[DINTOIR-5]                         ;GO PUT D -> IR, BUT(INSTR5)
  (4142) DCS[0,00,0,0,0,0]  BM[0100,,00,10,,10,11,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]



    ;CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
    4532:
    TEST130B2:
            P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<00> SET
                    LOAD-ERROR(TEST130B2),                  ;ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
            NEXT,   J/GOBUT130B2                            ;
  (4532) DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,011]

    4143:  ;(FREE)
    GOBUT130B2:
            SETUP,  RETURN/SCOPE130B,                       ;RETURN TO SCOPE LOOP TEST WORD
            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                    J/BUTD[C]A                              ;D[C]H= COUT15 H IN BIT<00>
  (4143) DCS[0,00,0,0,0,0]  BM[0100,,00,00,,11,00,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,100]



    4144:  ;(FREE)
    SCOPE130B:
            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST131A1"  (+1,WORDS)
                    J/TEST131A1                             ;   ERROR:  "ARITH130A1" (-11,WORDS)
  (4144) DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,100,001]



    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    ;CHECK INTERNAL ALU CARRIES WITH: (125252)+(052525)+(0)=(177777)
    ;ALSO CHECK ALU FUNCTION "A-PLUS-B-PLUS-PS[C]", D[C]_COUT15=(0)
    ;CIN=PS[C]=(0) FROM INITIALIZATION ROUTINE
    4541:
    TEST131A1:
            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/BUTINSTR5 TEST
                    LOAD-ERROR(TEST131A1),                  ;ERROR DIRECTORY KEY
                    DCS-CTR(C8,),                           ;COMPARE AT TARGET
            NEXT,   J/ARITH131A1                            ;
  (4541) DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,010,000]

    4520:
    ARITH131A1:
            P2-T,   D_A-PLUS-B-PLUS-PS[C],                  ;ALU=(A-PLUS-B), CIN=PS[C]=(0)
                    D[C]_COUT15,                            ;GET CARRYOUT
                    BUS-A_ASPHI(C125252),                   ;A=(125252)
                    BUS-B_CSPD(C052525),                    ;B=(052525)
```



```
                    SR_A-PLUS-B-PLUS-PS[C],                 ;D=(177777), COUT15=(0)
            NEXT,   J/COMP131A1                             ;
  (4520) DCS[0,00,0,0,0,0]  BM[0001,,10,00,,11,01,,110,,110,,,0,1,1,,0,,0,,,0,0111,,,0,,0000,0,,,11,000,,,001,100,101]

    4145:  ;(FREE)
    COMP131A1:
            P0,     BUMP-VERIFY,                            ;COUNT
            P2-T,   D_SR-XOR-CSPD(C177777),                 ;COMPARE RECEIVED: EXPECTED
                    SAVE-D[C],                              ;SAVE CARRY
            NEXT,   J/GOBUT131A1                            ;
  (4145) DCS[0,00,0,0,0,1]  BM[0110,,10,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0101,,,0,,0000,0,,,11,000,,,001,100,110]

    4146:  ;(FREE)
    GOBUT131A1:
            SETUP,  RETURN/TEST131A2,                       ;RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[DINTOIR-5]                         ;GO PUT D -> IR, BUT(INSTR5)
  (4146) DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,00,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]



    ;CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
    4544:
    TEST131A2:
            P0,     LOAD-ENUA(ZTARGET401),                  ;BIT<01> CLEAR
                    LOAD-ERROR(TEST131A2),                  ;ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
            NEXT,   J/GOBUT131A2                            ;
  (4544) DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,111]

    4147:  ;(FREE)
    GOBUT131A2:
            SETUP,  RETURN/TEST131B1,                       ;RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                    J/BUTD[C]B                              ;D[C]H= COUT15 H IN BIT<01>
  (4147) DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,00,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,101,000]



    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    ;CHECK INTERNAL ALU CARRIES WITH:             (052525)+(125252)+(0)=(177777)
    ;ALSO CHECK ALU FUNCTION "DIVIDE-STEP" = "A-PLUS-B" SINCE D[C]H=(0)
    ;FROM ABOVE, D[C]_COUT15=(0)
    4546:
    TEST131B1:
            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/BUTINSTR5 TEST

                    LOAD-ERROR(TEST131B1),                  ;ERROR DIRECTORY KEY
                    DCS-CTR(C8,),                           ;COMPARE AT TARGET
            NEXT,   J/ARITH131B1                            ;
  (4546) DCS[1,00,1,0,0,0]  BM[0111,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,101,000]

    4150:  ;(FREE)
```

```
    ARITH131B1:
            P2-T,   D_DIVIDE-STEP,                          !ALU=(A-PLUS-B), CIN=(0)
                    D[C]_COUT15,                            !GET CARRYOUT
                    BUS-A_ASPHI(C052525),                   !A=(052525)
                    BUS-B_CSPD(C125252),                    !B=(125252)
                    SR_DIVIDE-STEP,                         !D=(177777), COUT15=(0)
            NEXT,   J/COMP131B1                             !
 (4150)  DCS[0,00,0,0,0,0]  BM[1000,,10,00,,11,01,,111,,110,,,0,1,1,,0,,0,,,0,0110,,,0,,0000,0,,,11,000,,,001,101,001]

    4151:  !(FREE)
    COMP131B1:
            P0,     BUMP-VERIFY,                            !COUNT
            P2-T,   D_SR-XOR-CSPD(C177777),                 !COMPARE RECEIVED: EXPECTED
                    SAVE-D[C],                              !SAVE CARRY
            NEXT,   J/GOBUT131B1                            !
 (4151)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0101,,,0,,0000,0,,,11,000,,,001,101,010]

    4152:  !(FREE)
    GOBUT131B1:
            SETUP,  RETURN/TEST131B2,                       !RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[DINTOIR-5]                         !GO PUT D -> IR, BUT(INSTRS)
 (4152)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,11,01,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]



    !CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
    4750:
    TEST131B2:
            P0,     LOAD-ENUA(ZTARGET413),                  !BIT<02> CLEAR
                    LOAD-ERROR(TEST131B2),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE AT TARGET
            NEXT,   J/GOBUT131B2                            !
 (4750)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,101,011]

    4153:  !(FREE)
    GOBUT131B2:
            SETUP,  RETURN/SCOPE131B,                       !RETURN TO SCOPE LOOP TEST WORD
            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                    J/BUTD[C]C                              !D[C]H= COUT15 H IN BIT<02>
 (4153)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,11,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,000]



    4154:  !(FREE)
    SCOPE131B:
            P3,     CSPD[05]_EMIT, EMIT/170360,             !CONSTANT FOR USE BELOW
            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST132A1" (+1, WORDS)
                    J/TEST132A1                             !   ERROR:  "ARITH131A1"(-11, WORDS)
 (4154)  DCS[0,00,0,1,0,0]  BM[1111,,10,00,,00,11,,110,,000,,,0,0,0,,0,,0,,,0,1010,,,1,,0000,0,,,11,000,,,101,010,001]
```



```
    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !CHECK INTERNAL ALU CARRIES  WITH:              (125252)-(125252)-(0)=(000000)
    !ALSO CHECK ALU FUNCTION "A-MINUS-B", D[C]_COUT15=(1)
    !
    4521:
    TEST132A1:
            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTRS TEST
                    LOAD-ERROR(TEST132A1),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C7,),                           !COMPARE AT TARGET
            NEXT,   J/ARITH132A1                            !
 (4521)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,010,010]

    4522:
    ARITH132A1:
            P3-T,   D_A-MINUS-B,                            !ALU=(A-MINUS-B-MINUS-1), CIN=(1)
                    D[C]_COUT15,                            !GET CARRYOUT
                    BUS-A_ASPHI(C125252),                   !A=(125252)
                    BUS-B_BSPHI(C125252),                   !B=(125252)
                                                            !D=(000000), COUT15=(1)
            NEXT,   J/GOBUT132A1                            !
 (4522)  DCS[0,00,0,0,0,0]  BM[1101,,01,11,,11,01,,110,,110,,,1,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,101,101]

    4155:  !(FREE)
    GOBUT132A1:
            P0,     BUMP-VERIFY,                            !COUNT
            SETUP,  RETURN/TEST132A2,                       !RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[DINTOIR-5]                         !GO PUT D -> IR, BUT(INSTRS)
 (4155)  DCS[0,00,0,0,0,1]  BM[0100,,00,10,,10,01,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]



    !CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
    4516:
    TEST132A2:
            P0,     LOAD-ENUA(ZTARGET403),                  !BIT<01> SET
                    LOAD-ERROR(TEST132A2),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE AT TARGET
            NEXT,   J/GOBUT132A2                            !
 (4516)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,101,110]

    4156:  !(FREE)
    GOBUT132A2:
            SETUP,  RETURN/TEST132B1,                       !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                    J/BUTD[C]B                              !D[C]H= COUT15 H IN BIT<01>

 (4156)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,10,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,101,000]



    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
        !CHECK INTERNAL ALU CARRIES WITH:            (052525)-(052525)-(0)=(000000)
        !ALSO CHECK ALU FUNCTION "DIVIDE-STEP" = "A-MINUS-B" SINCE D[C]=(1)
        !FROM ABOVE, D[C]_COUT15=(1)
        4517:
        TEST132B1:
                P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 TEST
                        LOAD-ERROR(TEST132B1),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C7.),                           !COMPARE AT TARGET
                NEXT,   J/ARITH132B1                            !
   (4517)  DCS[1.00.1.0.0.0]  BM[1000..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...001.101.111]

        4157:  !(FREE)
        ARITH132B1:
                P3-T,   D_DIVIDE-STEP,                          !ALU=(A-MINUS-B-MINUS-1), CIN=(1)
                        D[C]_COUT15,                            !GET CARRYOUT
                        BUS-A_ASPHI(C052525),                   !A=(052525)
                        BUS-B_BSPHI(C052525),                   !B=(052525)
                                                                !D=(000000), COUT15=(1)
                NEXT,   J/GOBUT132B1                            !
   (4157)  DCS[0.00.0.0.0.0]  BM[1000..01.11..11.01..111..110...1.1.0..0..0...0.0000...0..0000.0...11.000...001.110.000]

        4160:  !(FREE)
        GOBUT132B1:
                P0,     BUMP-VERIFY,                            !COUNT
                SETUP,  RETURN/TEST132B2,                       !RETURN TO START OF NEXT SUBTEST
                NEXT,   CALL[DINTOIR-5]                         !GO PUT D => IR, BUT(INSTR5)
   (4160)  DCS[0.00.0.0.0.1]  BM[0100..00.10..01.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]



        !CHECK THAT CARRYOUT OF BIT15 (COUT15) WAS CORRECT
        4472:
        TEST132B2:
                P0,     LOAD-ENUA(ZTARGET417),                  !BIT<02> SET
                        LOAD-ERROR(TEST132B2),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE AT TARGET
                NEXT,   J/GOBUT132B2                            !
   (4472)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..001..111...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.001]

        4161:  !(FREE)
        GOBUT132B2:
                SETUP,  RETURN/SCOPE132B,                       !RETURN TO SCOPE LOOP TEST WORD
                NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                        J/BUTD[C]C                              !D[C]H=COUT15 H IN BIT <02>
   (4161)  DCS[0.00.0.0.0.0]  BM[0100..00.00..11.10..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.000]



        4162:  !(FREE)
        SCOPE132B:
                P3,     CSPD[06]_EMIT, EMIT/007417,             !CONSTANT FOR USE BELOW
                NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST133A1"   (+1, WORDS)
```



```
                        J/TEST133A1                             !  ERROR:  "ARITH132A1" (-9, WORDS)
   (4162)  DCS[0.00.0.1.0.0]  BM[0000..10.11..11.00..001..111...0.0.0..0..0...0.1001...1..0000.0...11.000...101.010.011]




        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !CHECK CARRY PROPOGATE/GENERATE LOGIC WITH:
        !(103607)-PLUS-(103607)-PLUS-(1)=(007417), COUT15=(1)
        4523:
        TEST133A1:
                P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
                        LOAD-ERROR(TEST133A1),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C10.),                          !COMPARE AT TARGET
                NEXT,   J/OPB133A1                              !
   (4523)  DCS[1.00.1.0.0.0]  BM[0101..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...101.001.000]

        4510:
        OPB133A1:
                P3,     CSPD[16]_EMIT,                          !A,B-SIDE OPERANDS:
                        EMIT/103607,                            !"1000 0111 1000 0111"
                NEXT,   J/DOPA133A1                             !
   (4510)  DCS[0.00.0.0.0.0]  BM[1000..10.01..11.10..000..111...0.0.0..0..0...0.0001...1..0000.0...11.000...001.110.011]

        4163:  !(FREE)
        DOPA133A1:
                P2-T,   D_CSPD(D16), D[C]_ALU15,                !OP-A INTO D, D[C]_1
                        SR_CSPD(D16),                           !OP-A INTO SR TOO
                NEXT,   J/GOTEST133A1                           !(OPA=OPB)
   (4163)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..100...0.1.1..0..0...0.0001...0..0000.0...11.000...001.110.100]

        4164:  !(FREE)
        GOTEST133A1:
                P0,     BUMP-VERIFY,                            !COUNT
                SETUP,  RETURN/TEST133A2,                       !EXEC SUBR WHICH:
                                                                !(1) D_OPA-PLUS-OPB-PLUS-1
                                                                !(2) D_007417-XOR-D (EQUAL?)
                NEXT,   CALL[ALUCARRY1]                         !(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
   (4164)  DCS[0.00.0.0.0.1]  BM[0100..00.10..10.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...000.000.111]



        !CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (1)
        4500:
        TEST133A2:

                P0,     LOAD-ENUA(ZTARGET403),                  !BIT<00>SET
                        LOAD-ERROR(TEST133A2),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/GOBUT133A2                            !
   (4500)  DCS[1.00.1.0.0.1]  BM[1100..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.101]
```

```
7637    4165:  !(FREE)
7638    GOBUT133A2:
7639            SETUP,  RETURN/TEST133B1,                       !RETURN TO START OF NEXT SUBTEST
7640            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
7641                    J/BUTD[C]A                              !D[C]H = COUT15 IN BIT<00>
     (4165)  DCS[0,00,0,0,0,0]  BM[0100..00.10..10.00..001..111...0.0.0...0..0...0.0000...0..0000.0...11.100...011.100.100]
7642
7643
7644
7645
7646
7647    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7648
7649    !CHECK CARRY PROPOGATE/GENERATE LOGIC WITH COMPLEMENT OF ABOVE:
7650    !(074170)-PLUS-(074170)-PLUS-(0)=(170360), COUT15=(0)
7651    4501:
7652    TEST133B1:
7653            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
7654                    LOAD-ERROR(TEST133B1),                  !ERROR DIRECTORY KEY
7655                    DCS-CTR(C9.),                           !COMPARE AT TARGET
7656            NEXT,   J/OPA133B1                              !
     (4501)  DCS[1,00,1,0,0,0]  BM[0110..00.11..11.00..011..100...0.0.0...0..0...0.0000...0..0000.0...11.000...001.110.110]
7657
7658    4166:  !(FREE)
7659    OPA133B1:
7660            P2=T,   D_NOT-CSPD(D16),                        !
7661                    D[C]_ALU15,                             !OP-A INTO D, D[C]_0
7662                    SR_NOT-CSPD(D16),                       !OP-A INTO SR TOO
7663                                                            !A-SIDE OPERAND:
7664                                                            !"0111 1000 0111 1000"
7665                                                            !B-SIDE OPERAND WILL BE:
7666            NEXT,   J/GOTEST133B1                           !(SAME AS OP-A)
     (4166)  DCS[0,00,0,0,0,0]  BM[0111..10.00..11.01..101..100...0.1.1...0..0...0.0001...0..0000.0...11.000...001.110.111]
7667
7668    4167:  !(FREE)
7669    GOTEST133B1:
7670            SETUP,  RETURN/TEST133B2,                       !EXEC SUBR WHICH:
7671                                                            !(1) D_(NOT-OPA)-PLUS-(NOT-OPB)
7672                                                            !(2) D_170360-XOR-D (EQUAL?)
7673            NEXT,   CALL[ALUCARRY2]                         !(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
     (4167)  DCS[0,00,0,0,0,0]  BM[0100..00.10..10.00..010..111...0.0.0...0..0...0.0000...0..0000.0...11.100...000.010.000]
7674
7675
7676
7677    !CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (0)
7678    4502:
7679    TEST133B2:
7680            P0,     LOAD-ENUA(ZTARGET402),                  !BIT<00> CLEAR
7681                    LOAD-ERROR(TEST133B2),                  !ERROR DIRECTORY KEY
7682            NEXT,   J/GOBUT133B2                            !
     (4502)  DCS[1,00,0,0,0,0]  BM[0000..00.11..11.00..000..010...0.0.0...0..0...0.0000...0..0000.0...11.000...001.111.000]
7683
```



```
7684    4170:  !(FREE)
7685    GOBUT133B2:
7686            SETUP,  RETURN/SCOPE1338,                       !RETURN TO SCOPE LOOP TEST WORD
7687            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
7688                    J/BUTD[C]A                              !D[C]H = COUT15 H IN BIT<00>
     (4170)  DCS[0,00,0,0,0,0]  BM[0100..00.00..11.11..001..111...0.0.0...0..0...0.0000...0..0000.0...11.100...011.100.100]
7689
7690
7691
7692    4171:  !(FREE)
7693    SCOPE133B:
7694            P0,     BUMP-VERIFY,                            !COUNT
7695            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST134A1" (+1, WORDS)
7696                    J/TEST134A1                             !   ERROR:  "OPA133A1"  (-11, WORDS)
     (4171)  DCS[0,00,0,1,0,1]  BM[0000..00.00..00.00..000..000...0.0.0...0..0...0.0000...0..0000.0...11.000...101.001.001]
7697
7698
7699
7700    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7701
7702    !CHECK CARRY PROPOGATE/GENERATE LOGIC WITH:
7703    !(045513)-PLUS-(141703)-PLUS-(1)=(007417), COUT15=(1)
7704    4511:
7705    TEST134A1:
7706            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
7707                    LOAD-ERROR(TEST134A1),                  !ERROR DIRECTORY KEY
7708                    DCS-CTR(C11.),                          !COMPARE AT TARGET
7709            NEXT,   J/OPA134A1                              !
     (4511)  DCS[1,00,1,0,0,0]  BM[0100..00.11..11.00..011..100...0.0.0...0..0...0.0000...0..0000.0...11.000...101.001.010]
7710
7711    4512:
7712    OPA134A1:
7713            P0,     BUMP-VERIFY,                            !COUNT
7714            P3,     CSPD[17]_EMIT,                          !A-SIDE OPERAND:
7715                    EMIT/045513,                            !"0100 1011 0100 1011"
7716            NEXT,   J/OPB134A1                              !
     (4512)  DCS[0,00,0,0,0,1]  BM[0100..10.10..11.01..001..011...0.0.0...0..0...0.0000...1..0000.0...11.000...001.111.010]
7717
7718    4172:  !(FREE)
7719    OPB134A1:
7720            P3,     CSPD[16]_EMIT,                          !B-SIDE OPERAND:
7721                    EMIT/141703,                            !"1100 0011 1100 0011"
7722            NEXT,   J/DOPA134A1                             !
     (4172)  DCS[0,00,0,0,0,0]  BM[1100..10.00..11.11..000..011...0.0.0...0..0...0.0001...1..0000.0...11.000...001.111.011]
7723
7724    4173:  !(FREE)

7725    DOPA134A1:
7726            P2=T,   D_CSPD(D17), D[C]_ALU00,                !OP-A INTO D, D[C]_1
7727                    SR_CSPD(D17),                           !OP-A INTO SR TOO
7728            NEXT,   J/GOTEST134A1                           !
     (4173)  DCS[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..010...0.1.1...0..0...0.0000...0..0000.0...11.000...001.111.100]
7729
7730    4174:  !(FREE)
```

```
7731    GOTEST134A1:
7732            P0,     BUMP-VERIFY,                            ;COUNT
7733            SETUP,  RETURN/TEST134A2,                       ;EXEC SUBR WHICH:
7734                                                            ;(1) D_OPA-PLUS-OPB-PLUS-1
7735                                                            ;(2) D_007417-XOR-D (EQUAL?)
7736            NEXT,   CALL[ALUCARRY1]                         ;(3) J/BUTINSTRS/(000000) (CHECK ANSWER)
     (4174)  DCS[0,00,0,0,0,1]  BM[0100..00,10..10,00..011..111...0,0,0..0...0,0000...0..0000,0...11,100...000,000,111]
7737
7738
7739
7740    ;CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (1)
7741    4503:
7742    TEST134A2:
7743            P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<01> SET
7744                    LOAD-ERROR(TEST134A2),                  ;ERROR DIRECTORY KEY
7745                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
7746                    BUMP-VERIFY,                            ;COUNT
7747            NEXT,   J/GOBUT134A2                            ;
     (4503)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,00..000..011...0,0,0..0...0,0000...0..0000,0...11,000...001,111,101]
7748
7749    4175:  ;(FREE)
7750    GOBUT134A2:
7751            SETUP,  RETURN/TEST134B1,                       ;RETURN TO START OF NEXT SUBTEST
7752            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
7753                    J/BUTD[C]B                              ;D[C] = COUT15 IN BIT<01>
     (4175)  DCS[0,00,0,0,0,0]  BM[0100..00,10..10,00..100..111...0,0,0..0...0,0000...0..0000,0...11,100...011,101,000]
7754
7755
7756
7757
7758
7759    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7760
7761    ;CHECK CARRY PROPOGATE/GENERATE LOGIC WITH COMPLEMENT OF ABOVE:
7762    ;(132264)-PLUS-(036074)-PLUS-(0)=(170360), COUT15=(0)
7763    4504:
7764    TEST134B1:
7765            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/BUTINSTRS COMPARE
7766                    LOAD-ERROR(TEST134B1),                  ;ERROR DIRECTORY KEY
7767                    DCS-CTR(C9,),                           ;COMPARE AT TARGET
7768            NEXT,   J/OPA134B1                              ;
     (4504)  DCS[1,00,1,0,0,0]  BM[0110..00,11..11,00..011..100...0,0,0..0...0,0000...0..0000,0...11,000...001,111,110]
7769
7770    4176:  ;(FREE)
7771    OPA134B1:
7772            P2=T,   D_NOT-CSPD(D17),                        ;
7773                    D[C]_ALU00,                             ;OP-A INTO D, D[C]_(0)
7774                    SR_NOT-CSPD(D17),                       ;OP-A INTO SR TOO
7775                                                            ;A-SIDE OPERAND:
7776                                                            ;"1011 0100 1011 0100"
7777                                                            ;B-SIDE OPERAND WILL BE:
7778            NEXT,   J/GOTEST134B1                           ;"0011 1100 0011 1100"
```



```
     (4176)  DCS[0,00,0,0,0,0]  BM[0111..10,00..11,01..101..010...0,1,1..0..0...0,0000...0..0000,0...11,000...001,111,111]
7779
7780    4177:  ;(FREE)
7781    GOTEST134B1:
7782            SETUP,  RETURN/TEST134B2,                       ;EXEC SUBR WHICH:
7783                                                            ;(1) D_(NOT-OPA)-PLUS-(NOT-OPB)
7784                                                            ;(2) D_170360-XOR-D (EQUAL?)
7785            NEXT,   CALL[ALUCARRY2]                         ;(3) J/BUTINSTRS/(000000) (CHECK ANSWER)
     (4177)  DCS[0,00,0,0,0,0]  BM[0100..00,10..10,00..101..111...0,0,0..0...0,0000...0..0000,0...11,100...000,010,000]
7786
7787
7788
7789    ;CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (0)
7790    4505:
7791    TEST134B2:
7792            P0,     LOAD-ENUA(ZTARGET401),                  ;BIT<01> CLEAR
7793                    LOAD-ERROR(TEST134B2),                  ;ERROR DIRECTORY KEY
7794                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
7795            NEXT,   J/GOBUT134B2                            ;
     (4505)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..001...0,0,0..0...0,0000...0..0000,0...11,000...010,000,000]
7796
7797    4200:  ;(FREE)
7798    GOBUT134B2:
7799            SETUP,  RETURN/SCOPE134B,                       ;RETURN TO SCOPE LOOP TEST WORD
7800            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
7801                    J/BUTD[C]B                              ;D[C]H = COUT15 H IN BIT<01>
     (4200)  DCS[0,00,0,0,0,0]  BM[0100..00,01..00,00..001..111...0,0,0..0...0,0000...0..0000,0...11,100...011,101,000]
7802
7803
7804
7805    4201:  ;(FREE)
7806    SCOPE134B:
7807            P0,     BUMP-VERIFY,                            ;COUNT
7808            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST135A1" (+1, WORDS)
7809                    J/TEST135A1                             ;   ERROR:  "OPA134A1" (-11, WORDS)
     (4201)  DCS[0,00,0,1,0,1]  BM[0000..00,00,00..00,00..000..000...0,0,0..0...0,0000...0..0000,0...11,000...101,001,011]
7810
7811
7812
7813    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7814
7815    ;CHECK CARRY PPOPOGATE/GENERATE LOGIC WITH:
7816    ;(122645)-PLUS-(064551)-PLUS-(1)=(007417), COUT15=(1)
7817    4513:
7818    TEST135A1:
7819            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/BUTINSTRS COMPARE
7820                    LOAD-ERROR(TEST135A1),                  ;ERROR DIRECTORY KEY
7821                    DCS-CTR(C11,),                          ;COMPARE AT TARGET
7822            NEXT,   J/OPA135A1                              ;
     (4513)  DCS[1,00,1,0,0,0]  BM[0100..00,11..11,00..011..100...0,0,0..0...0,0000...0..0000,0...11,000...101,001,100]
7823
7824    4514:
```

```
7825    OPA135A1:
7826            P0,     BUMP-VERIFY,                            ;COUNT
7827            P3,     CSPD[17]_EMIT,                          ;A-SIDE OPERAND:
7828                    EMIT/122645,                            ;"1010 0101 1010 0101"
7829            NEXT,   J/OPB135A1                              ;
    (4514)  DCS[0,00,0,0,0,1]  BM[1010,,10,01,,01,10,,100,,101...0,0,0,,0,,0,,0...0,0000...1,,0000,0,,,11,000,,,010,000,010]
7830
7831    4202:  ;(FREE)
7832    OPB135A1:
7833            P3,     CSPD[16]_EMIT,                          ;B-SIDE OPERAND:
7834                    EMIT/064551,                            ;"0110 1001 0110 1001"
7835            NEXT,   J/DOPA135A1                             ;
    (4202)  DCS[0,00,0,0,0,0]  BM[0110,,10,10,,01,01,,101,,001...0,0,0,,0,,0,,0...0,0001,,,1,,0000,0,,,11,000,,,010,000,011]
7836
7837    4203:  ;(FREE)
7838    DOPA135A1:
7839            P2=T,   D_CSPD(D17), D[C]_ALU15,                ;OP-A INTO D, D[C]_1
7840                    SR_CSPD(D17),                           ;OP-A INTO SR TOO
7841            NEXT,   J/GOTEST135A1                           ;
    (4203)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,100...0,1,1,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,000,100]
7842
7843    4204:  ;(FREE)
7844    GOTEST135A1:
7845            P0,     BUMP-VERIFY,                            ;COUNT
7846            SETUP,  RETURN/TEST135A2,                       ;EXEC SUBR WHICH:
7847                                                            ;(1) D_OPA-PLUS-OPB-PLUS-1
7848                                                            ;(2) D_007417-XOR-D (EQUAL?)
7849            NEXT,   CALL[ALUCARRY1]                         ;(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
    (4204)  DCS[0,00,0,0,0,1]  BM[0100,,00,10,,10,00,,110,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,000,000,111]
7850
7851
7852
7853    ;CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (1)
7854    4506:
7855    TEST135A2:
7856            P0,     LOAD-ENUA(ZTARGET417),                  ;BIT<02> SET
7857                    LOAD-ERROR(TEST135A2),                  ;ERROR DIRECTORY KEY
7858                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
7859                    BUMP-VERIFY,                            ;COUNT
7860            NEXT,   J/GOBUT135A2                            ;
    (4506)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,001,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,000,101]
7861
7862    4205:  ;(FREE)
7863    GOBUT135A2:
7864            SETUP,  RETURN/TEST135B1,                       ;RETURN TO START OF NEXT SUBTEST
7865            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
7866                    J/BUTD[C]C                              ;D[C]H = COUT15 IN BIT<02>
    (4205)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,10,00,,111,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,011,001,000]
7867
7868
7869
7870
```



```
7871
7872    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7873
7874    ;CHECK CARRY PROPOGATE/GENERATE LOGIC WITH COMPLEMENT OF ABOVE:
7875    ;(055132)-PLUS-(113226)-PLUS-(0)=(170360), COUT15=(0)
7876    4507:
7877    TEST135B1:
7878            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
7879                    LOAD-ERROR(TEST135B1),                  ;ERROR DIRECTORY KEY
7880                    DCS-CTR(C9,),                           ;COMPARE AT TARGET
7881            NEXT,   J/OPA135B1                              ;
    (4507)  DCS[1,00,1,0,0,0]  BM[0110,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,000,110]
7882
7883    4206:  ;(FREE)
7884    OPA135B1:
7885            P2=T,   D_NOT-CSPD(D17),                        ;
7886                    D[C]_ALU15,                             ;OP-A INTO D, D[C]_(0)
7887                    SR_NOT-CSPD(D17),                       ;OP-A INTO SR TOO
7888                                                            ;A-SIDE OPERAND:
7889                                                            ;"0101 1010 0101 1010"
7890                                                            ;B-SIDE OPERAND WILL BE:
7891            NEXT,   J/GOTEST135B1                           ;"1001 0110 1001 0110"
    (4206)  DCS[0,00,0,0,0,0]  BM[0111,,10,00,,11,01,,101,,100...0,1,1,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,000,111]
7892
7893    4207:  ;(FREE)
7894    GOTEST135B1:
7895            SETUP,  RETURN/TEST135B2,                       ;EXEC SUBR WHICH:
7896                                                            ;(1) D_(NOT-OPA)-PLUS-(NOT-OPB)
7897                                                            ;(2) D_170360-XOR-D (EQUAL?)
7898            NEXT,   CALL[ALUCARRY2]                         ;(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
    (4207)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,11,,111,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,000,010,000]
7899
7900
7901
7902    ;CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (0)
7903    4477:
7904    TEST135B2:
7905            P0,     LOAD-ENUA(ZTARGET413),                  ;BIT<02> CLEAR
7906                    LOAD-ERROR(TEST135B2),                  ;ERROR DIRECTORY KEY
7907                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
7908            NEXT,   J/GOBUT135B2                            ;
    (4477)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,001,,011...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,001,000]
7909
7910    4210:  ;(FREE)
7911    GOBUT135B2:
7912            SETUP,  RETURN/SCOPE135B,                       ;RETURN TO SCOPE LOOP TEST WORD

7913            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
7914                    J/BUTD[C]C                              ;D[C]H = COUT15 H IN BIT<02>
    (4210)  DCS[0,00,0,0,0,0]  BM[0100,,00,01,,00,01,,001,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,011,001,000]
7915
7916
7917
```

```
7918    4211:  1(FREE)
7919    SCOPE135%:
7920            P0,     BUMP-VERIFY,                            !COUNT
7921            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST136A1" (+1, WORD8)
7922                    J/TEST136A1                             !   ERROR:  "OPA135A1"  (-1), WORD8)
    (4211)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000...101,001,101]
7923
7924
7925
7926    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7927
7928    !CHECK CARRY PROPOGATE/GENERATE LOGIC WITH:
7929    !(055132)-PLUS-(132264)-PLUS-(1)=(007417), COUT15=(1)
7930    4515:
7931    TEST136A1:
7932            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
7933                    LOAD-ERROR(TEST136A1),                  !ERROR DIRECTORY KEY
7934                    DCS-CTR(C10,),                          !COMPARE AT TARGET
7935            NEXT,   J/OPB136A1                              !
    (4515)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000...101,100,010]
7936
7937    4542:
7938    OPA136A1:
7939            P3,     CSPD[16]_EMIT,                          !B-SIDE OPERAND:
7940                    EMIT/132264,                            !"1011 0100 1011 0100"
7941            NEXT,   J/DOPA136A1                             !
    (4542)  DCS[0,00,0,0,0,0]  BM[1011,,10,01,,00,10,,110,,100...0,0,0,,0,,0,,0...0,0001...1,,0000,0...11,000...010,001,010]
7942
7943    4212:  1(FREE)
7944    DOPA136A1:
7945            P2=T,   D_NOT-CSPD(D17), D[C]_COUT07,           !OP-A INTO D, D[C]_1
7946                    SR_NOT-CSPD(D17),                       !OP-A INTO SR TOO
7947            NEXT,   J/GOTEST136A1                           !"0101 1010 0101 1010"
    (4212)  DCS[0,00,0,0,0,0]  BM[0111,,10,00,,11,01,,101,,101...0,1,1,,0,,0,,0...0,0000...0,,0000,0...11,000...010,001,011]
7948
7949    4213:  1(FREE)
7950    GOTEST136A1:
7951            P0,     BUMP-VERIFY,                            !COUNT
7952            SETUP,  RETURN/TEST136A2,                       !EXEC SUBR WHICH:
7953                                                            !(1) D_OPA-PLUS-OPB-PLUS-1
7954                                                            !(2) D_007417-XOR-D EQUAL?)
7955            NEXT,   CALL[ALUCARRY1]                         !(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
    (4213)  DCS[0,00,0,0,0,1]  BM[0100,,00,10,,01,11,,110,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100...000,000,111]
7956
7957
7958
7959    !CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (1)
7960    4476:
7961    TEST136A2:
7962            P0,     LOAD-ENUA(ZTARGET403),                  !BIT<00> SET
7963                    LOAD-ERROR(TEST136A2),                  !ERROR DIRECTORY KEY
7964                    DCS-CTR(C3,),                           !COMPARE AT TARGET
7965                    BUMP-VERIFY,                            !COUNT
```



```
7966            NEXT,   J/GOBUT136A2                            !
    (4476)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,011...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000...010,001,100]
7967
7968    4214:  1(FREE)
7969    GOBUT136A2:
7970            SETUP,  RETURN/TEST136B1,                       !RETURN TO START OF NEXT SUBTEST
7971            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
7972                    J/BUTD[C]A                              !D[C]H = COUT15 IN BIT<00>
    (4214)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,11,,101,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100...011,100,100]
7973
7974
7975
7976
7977
7978    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
7979
7980    !CHECK CARRY PROPOGATE/GENERATE LOGIC WITH COMPLEMENT OF ABOVE:
7981    !(122645)-PLUS-(132264)-PLUS-(0)=(170360), COUT15=(0)
7982    4475:
7983    TEST136B1:
7984            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/BUTINSTR5 COMPARE
7985                    LOAD-ERROR(TEST136B1),                  !ERROR DIRECTORY KEY
7986                    DCS-CTR(C9,),                           !COMPARE AT TARGET
7987            NEXT,   J/OPA136B1                              !
    (4475)  DCS[1,00,1,0,0,0]  BM[0110,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,000...010,001,101]
7988
7989    4215:  1(FREE)
7990    OPA136B1:
7991            P2=T,   D_CSPD(D17),                            !
7992                    D[C]_0,                                 !OP-A INTO D, D[C]_0
7993                    SR_CSPD(D17),                           !OP-A INTO SR TOO
7994                                                            !A-SIDE OPERAND:
7995                                                            !"1010 0101 1010 0101"
7996                                                            !B-SIDE OPERAND WILL BE:
7997            NEXT,   J/GOTEST136B1                           !"0100 1011 0100 1011"
    (4215)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,1,1,,0,,0,,0...0,0000...0,,0000,0...11,000...010,001,110]
7998
7999    4216:  1(FREE)
8000    GOTEST136B1:
8001            SETUP,  RETURN/TEST136B2,                       !EXEC SUBR WHICH:
8002                                                            !(1) D_(NOT-OPA)-PLUS-(NOT-OPB)
8003                                                            !(2) D_170360-XOR-D (EQUAL?)
8004            NEXT,   CALL[ALUCARRY2]                         !(3) J/BUTINSTR5/(000000) (CHECK ANSWER)
    (4216)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,11,,011,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0...11,100...000,010,000]
8005
8006
8007
8008    !CHECK THAT CARRYOUT COUT15 ABOVE GENERATED CORRECTLY AS A (0)
8009    4473:
8010    TEST136B2:
8011            P0,     LOAD-ENUA(ZTARGET402),                  !BIT<00> CLEAR
8012                    LOAD-ERROR(TEST136B2),                  !ERROR DIRECTORY KEY
```

```
                DCS-CTR(C3.),                           ;COMPARE AT TARGET
        NEXT,   J/GOBUT136B2                            ;
(4473)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...010.001.111]

    4217:  ;(FREE)
    GOBUT136B2:
        SETUP,  RETURN/SCOPE136B,                       ;RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                J/BUTD[C]A                              ;D[C]H = COUT15 H IN BIT<00>
(4217)  DCS[0.00.0.0.0.0]  BM[0100..00.01..00.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.100]



    4220:  ;(FREE)
    SCOPE136B:
        P0,     BUMP-VERIFY,                            ;COUNT
        NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST320A"  (+1, WORDS)
                J/TEST320A                              ;   ERROR:  "OPA136A1" (-11, WORDS)
(4220)  DCS[0.00.0.1.0.1]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...101.100.011]






    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    ;       THE FOLLOWING TWO SUBROUTINES ARE USED IN THE ABOVE CARRY LOOKAHEAD/INTERNAL CARRIES TESTS:


    7007:  ;(FREE)
    ALUCARRY1:
        P3-T,   D_A-PLUS-B-PLUS-D[C],                   ;D <- SUM OF A, B;  D[C] WAS SET PREVIOUSLY
                D[C]_COUT15,                            ;GET CARRYOUT FOR EXAMINATION LATER
                SR_A-PLUS-B-PLUS-D[C],                  ;ALSO GET IT INTO THE SR
                BUS-A_SR,                               ;A-SIDE OPERAND WAS IN THE SR
                BUS-B_CSPD(D16),                        ;B-SIDE OPERAND WAS IN CSP(16)
        NEXT,   J/ALUCARRY1A                            ;
(7007)  DCS[0.00.0.0.0.0]  BM[0100..10.00..00.00..000..110...1.1.1..0..0...0.0001...0..0000.0...11.000...000.001.111]

    7017:  ;(FREE)
    ALUCARRY1A:
        P2-T,   D_SR-XOR-CSPD(D06), SAVE-D[C],          ;COMPARE RECEIVED : (007417)
        NEXT,   J/DINTOIR5                              ;GO PUT D => IR, BUT(INSTR5) FOR (000000)
(7017)  DCS[0.00.0.0.0.0]  BM[0110..10.00..00.00..000..111...0.1.0..0..0...0.1001...0..0000.0...11.000...010.111.011]




    7020:  ;(FREE)
    ALUCARRY2:
        P3-T,   D_A-PLUS-NOT-B-PLUS-D[C],               ;D <- DIFF OF A, B;  D[C] WAS SET PREVIOUSLY
                D[C]_COUT15,                            ;GET CARRYOUT FOR EXAMINATION LATER
```



```
                SR_A-PLUS-NOT-B-PLUS-D[C],              ;ALSO GET IT INTO THE SR
                BUS-A_SR,                               ;A-SIDE OPERAND WAS IN THE SR
                BUS-B_CSPD(D16),                        ;B-SIDE OPERAND WAS IN CSP(16)
        NEXT,   J/ALUCARRY2A                            ;
(7020)  DCS[0.00.0.0.0.0]  BM[0101..10.00..00.00..000..110...1.1.1..0..0...0.0001...0..0000.0...11.000...000.010.001]

    7021:  ;(FREE)
    ALUCARRY2A:
        P2-T,   D_SR-XOR-CSPD(D05), SAVE-D[C],          ;COMPARE RECEIVED : (170360)
        NEXT,   J/DINTOIR5                              ;GO PUT D => IR, BUT(INSTR5) FOR (000000)
(7021)  DCS[0.00.0.0.0.0]  BM[0110..10.00..00.00..000..111...0.1.0..0..0...0.1010...0..0000.0...11.000...010.111.011]





    ;.PAGE==========================================================================================================


    .TOC    *   TEST320:  D[C] SELECTION / COUT07-DOUT07 / D<14:00>=ZERO@BIT<00>


    ;*****************************************************************************************
    ;*
    ;*      TESTS:  320 A - F                               UWORDS:  026 + 014
    ;*
    ;*      FUNCTIONS:
    ;*
    ;*      THESE SIX TESTS CHECK THE D[C] ADDRESS SELECTION LOGIC, COUT07 CARRY
    ;*      AND DOUT07 BUTS, AND THE D<14:00>=ZERO BUT, WHEN ONLY BIT<00>=1 (NOT
    ;*      CHECKED IN TEST410).
    ;*
    ;*****************************************************************************************



    ;TEST-320-A SETS ONLY THE D[C] INPUT "ALU00" (CODE=010), AND THEN CHECKS THAT D[C]_ALU00
    ;  RESULTS IN A "1".
    4543:
    TEST320A:
        P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<00> SET
                LOAD-ERROR(TEST320A),                   ;ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           ;COMPARE AT TARGET
        NEXT,   J/SETONE320A                            ;
(4543)  DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...111.000.000]

    4700:
    SETONE320A:
        P0,     BUMP-VERIFY,                            ;COUNT
        P3,     CSPD[17]_EMIT, EMIT/000001,             ;A ONE
        NEXT,   J/SETD320A                              ;
(4700)  DCS[0.00.0.0.0.1]  BM[0000..10.00..00.00..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...010.010.001]

    4221:  ;(FREE)
```

```
SETD320A:
        P2-T,   D_CSPD(D17), D[C]_0,                    ;D GETS (000001)
                SR_CSPD(D17),                           ;SO DOES SR
        P3,     A#BSPHI[11]_D,                          ;STORE THE CONSTANT
        NEXT,   J/GETDC320A                             ;
 (4221)  DCS[0,00,0,0,0,0]  BM[1010,,10,11,,00,01,,000,,000,,,0,1,1,,0,,0,,,0,0000,,,0,,1011,0,,,11,000,,,010,010,010]

 4222:  ;(FREE)
GETDC320A:
        P2-T,   D_A-PLUS-B-PLUS-0, D[C]_ALU00,          ;D[C] CODE (010)
                BUS-A_SR,                               ;A=(000001)
                BUS-B_CSPD(C000000),                    ;B=(000000)
        NEXT,   J/GOBUT320A                             ;D=(000001), ONLY D[C]=ALU00 SET
 (4222)  DCS[0,00,0,0,0,0]  BM[1001,,10,00,,00,00,,000,,010,,,0,1,0,,0,,0,,,0,0100,,,0,,0000,0,,,11,000,,,010,010,011]

 4223:  ;(FREE)
GOBUT320A:
        P0,     BUMP-VERIFY,                            ;COUNT
        SETUP,  RETURN/TEST320B,                        ;RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                J/BUTD[C]A                              ;D[C]H IN BIT<00>
 (4223)  DCS[0,00,0,0,0,1]  BM[0100,,00,10,,11,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,100]




        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;TEST-320-B CHECKS THAT D<14:00>=ZERO IS NOT SET WHEN D=(000001)
        4552:
        TEST320B:
        P0,     LOAD-ENUA(ZTARGET400),                  ;BIT<01> CLEAR
                LOAD-ERROR(TEST320B),                   ;ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           ;COMPARE AT TARGET
                BUMP-VERIFY,                            ;COUNT
        NEXT,   J/GOBUT320B                             ;
 (4552)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,010,100]

 4224:  ;(FREE)
GOBUT320B:
        SETUP,  RETURN/TEST320C,                        ;RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                J/BUTD-IS-ZERO                          ;CHEK ON IT
 (4224)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,10,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]



        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;TEST-320-C CHECKS THAT THE COUT15/COUT07 SIGNALS DON'T TRACK EACH OTHER
        4562:
        TEST320C:
```



```
        P0,     LOAD-ENUA(ZTARGET413),                  ;BIT<02> CLEAR
                LOAD-ERROR(TEST320C),                   ;ERROR DIRECTORY KEY
                DCS-CTR(C6,),                           ;COMPARE AT TARGET
        NEXT,   J/SETONE320C                            ;
 (4562)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,001,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,010,101]

 4225:  ;(FREE)
SETONE320C:
        P3,     CSPD[16]_EMIT, EMIT/100000,             ;A ONE IN B15
        NEXT,   J/SETD320C                              ;
 (4225)  DCS[0,00,0,0,0,0]  BM[1000,,10,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,010,010,110]

 4226:  ;(FREE)
SETD320C:
        P2-T,   D_CSPD(D16), D[C]_ALU15,                ;D GETS (100000)
                SR_CSPD(D16),                           ;SO DOES SR
        P3,     A#BSPHI[13]_D,                          ;STORE THE CONSTANT
        NEXT,   J/GETDC320C                             ;
 (4226)  DCS[0,00,0,0,0,0]  BM[1010,,10,11,,00,01,,001,,100,,,0,1,1,,0,,0,,,0,0001,,,0,,1011,0,,,11,000,,,010,010,111]

 4227:  ;(FREE)
GETDC320C:
        P0,     BUMP-VERIFY,                            ;COUNT
        P2-T,   D_A-PLUS-B-PLUS-0, D[C]_COUT07,         ;D[C] GETS COUT07=0, COUT15=1
                BUS-A_SR,                               ;A=(100000)
                BUS-B_CSPD(C125252),                    ;B=(125252)
        NEXT,   J/GOBUT320C                             ;D=(025252)
 (4227)  DCS[0,00,0,0,0,1]  BM[1001,,10,00,,00,00,,000,,101,,,0,1,0,,0,,0,,,0,0110,,,0,,0000,0,,,11,000,,,010,011,000]

 4230:  ;(FREE)
GOBUT320C:
        SETUP,  RETURN/TEST320D,                        ;RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                J/BUTD[C]C                              ;D[C]H IN BIT<02>
 (4230)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,10,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,000]





        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;TEST-320-D CHECKS THAT THE BUTR(COUT07#DOUT07) SEES THE (01*) THAT WAS GENERATED
        4537:
        TEST320D:
        P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<2:1> = "01"

                LOAD-ERROR(TEST320D),                   ;ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           ;COMPARE AT TARGET
        NEXT,   J/GOBUT320D                             ;
 (4537)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,011,001]

 4231:  ;(FREE)
GOBUT320D:
```

```
        SETUP,  RETURN/TEST320E,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                J/BUTCOUT7DOUT7                         !COUT07#D07 IN BIT<2:1>
 (4231) DCS[0.00.0.0.0.0]  BM[0100..00.10..11.01..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.001]




 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !TEST-320-E SETS ONLY THE D[C] INPUT "COUT07" (CODE=101), AND THEN CHECKS THAT D[C]_COUT07
 !  RESULTS IN A "1".
 4554:
 TEST320E:
        P0,     LOAD-ENUA(ZTARGET403),                  !BIT<01> SET
                LOAD-ERROR(TEST320E),                   !ERROR DIRECTORY KEY
                DCS-CTR(C6.),                           !COMPARE AT TARGET
        NEXT,   J/SETONE320E                            !
 (4554) DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...010.011.010]

 4232:  !(FREE)
 SETONE320E:
        P0,     BUMP-VERIFY,                            !COUNT
        P3,     CSPD[15]_EMIT, EMIT/000200,             !A ONE IN BIT07
        NEXT,   J/SETD320E                              !
 (4232) DCS[0.00.0.0.0.1]  BM[0000..10.00..00.10..000..000...0.0.0..0..0...0.0010...1..0000.0...11.000...010.011.011]

 4233:  !(FREE)
 SETD320E:
        P2-T,   D_CSPD(D15), D[C]_0,                    !D GETS (000200)
                SR_CSPD(D15),                           !SO DOES SR
        P3,     A#BSPHI[15]_D,                          !STORE THE CONSTANT
        NEXT,   J/GETDC320E                             !
 (4233) DCS[0.00.0.0.0.0]  BM[1010..10.11..00.01..010..000...0.1.1..0..0...0.0010...0..1011.0...11.000...010.011.100]

 4234:  !(FREE)
 GETDC320E:
        P2-T,   D_A-PLUS-B-PLUS-0, D[C]_COUT07,         !D[C] CODE (101)
                BUS-A_SR,                               !A=(000200)
                BUS-B_CSPD(D15),                        !B=(000200)
        NEXT,   J/GOBUT320E                             !D=(000400), ONLY D[C]=COUT07 SET
 (4234) DCS[0.00.0.0.0.0]  BM[1001..10.00..00.00..000..101...0.1.0..0..0...0.0010...0..0000.0...11.000...010.011.101]

 4235:  !(FREE)
 GOBUT320E:
        SETUP,  RETURN/TEST320F,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                J/BUTD[C]B                              !D[C]H IN BIT<01>
 (4235) DCS[0.00.0.0.0.0]  BM[0100..00.10..11.01..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.101.000]
```



```

 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !TEST-320-F CHECKS THAT THE BUTR(COUT07#DOUT07) SEES THE (10*) THAT WAS GENERATED
 4556:
 TEST320F:
        P0,     LOAD-ENUA(ZTARGET405),                  !BIT<2:1> = "10"
                LOAD-ERROR(TEST320F),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3.),                           !COMPARE AT TARGET
        NEXT,   J/GOBUT320F                             !
 (4556) DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...010.011.110]

 4236:  !(FREE)
 GOBUT320F:
        SETUP,  RETURN/SCOPE320,                        !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                J/BUTCOUT7DOUT7                         !COUT07#D07 IN BIT<2:1>
 (4236) DCS[0.00.0.0.0.0]  BM[0100..00.01..00.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.001]


 4237:  !(FREE)
 SCOPE320:
        P0,     BUMP-VERIFY,                            !COUNT
                BUSDIN_EMIT-[I],                        !RESET PROC UCONS
                EN-CLK-IR[15-00],                       !
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST350" (+1. WORDS)
                J/TEST350                               !   ERROR:  "SETONE320A"  (-20. WORDS)
 (4237) DCS[0.00.0.1.0.1]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...111.000.001]







 !.PAGE===========================================================================================================

 .TOC   *   TEST350-352:  ASP/BSP HI/LO ADDRESSING MODES, DATA VALIDITY

 !****************************************************************************************
 !*
 !*     TESTS:  350 - 352                       UWORDS:  075 + 125
 !*
 !*     FUNCTIONS:
 !*

 !*     VERIFIES THE ASP/BSP ADDRESSING MODES.
 !*
 !****************************************************************************************




 !TEST 350 A-D USES THE A/B SP "SF" AND "DF" ADDRESS MODES TO WRITE A UNIQUE PATTERN TO
```

```
8301    ;LOCATIONS (00:07) OF ASPHI, ASPLO, BSPHI, BSPLO, THRU USE OF A COUNT LOOP,
8302    ;THE GENERATED PATTERN IS THEN READ BACK, AND COMPARED TO A REGENERATED ORIGINAL,
8303    ;TO CHECK FOR ADDRESSING CORRECTNESS, ABILITY TO READ/WRITE, AND DATAPATH VALIDITY.
8304    ;
8305    ;FIRST FILL UP THE SCRATCHPADS:
8306    ;
8307    ;       AT THE END OF THE FILLUP LOOP, A/B SP HI/LO LOOK LIKE THIS:
8308    ;
8309    ;       LOCTN   ASPHI           BSPHI           ASPLO           BSPLO
8310    ;       -----   ------          ------          ------          ------
8311    ;
8312    ;        00     050700          050700          057077          057077
8313    ;        01     051611          051611          056166          056166
8314    ;        02     052522          052522          055255          055255
8315    ;        03     053433          053433          054344          054344
8316    ;        04     054344          054344          053433          053433
8317    ;        05     055255          055255          052522          052522
8318    ;        06     056166          056166          051611          051611
8319    ;        07     057077          057077          050700          050700
8320    ;        10     ------          ------          ------          ------
8321    ;        11     000001          000001          ------          ------
8322    ;        12     000152          000152          ------          ------
8323    ;        13     100000          100000          000125          000125
8324    ;        14     ------          ------          ------          ------
8325    ;        15     000200          000200          ------          ------
8326    ;        16     ------          ------          ------          ------
8327    ;        17     ------          ------          ------          ------
8328    ;
8329    ;       NOTE:  CONSTANTS FOR DCS IN ASPHI/BSPHI 01/03/05/07 WERE DESTROYED,
8330    ;              AND *MUST* BE RESTORED AFTER LEAVING THIS TEST SEQUENCE.
8331    ;
8332    ;
8333    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8334
8335
8336    4701:
8337    TEST350:
8338            P0,     LOAD=ERROR(TEST350),                    ;ERROR DIRECTORY KEY
8339            P3,     CSPD[15]_EMIT, EMIT/177067,             ;ADDED TO PATTERN "N" TO GET "N+1"
8340            NEXT,   J/START350                              ;
    (4701)  DCS[1,00,0,0,0,0]  BM[1111,,10,11,,10,00,,110,,111]...0,0,0,,0,,0...0,0010...1,,0000,0,,,11,000,,,010,100,000]
8341
8342    4240:  ;(FREE)
8343    START350:
8344            P0,     BUMP=VERIFY,                            ;COUNT
8345            P3,     CSPD[14]_EMIT, EMIT/057077,             ;THE INITIAL PATTERN
8346                                                            ;SP=0, DM=7, DF=7
8347            NEXT,   J/LOADSRD350                            ;
    (4240)  DCS[0,00,0,0,0,1]  BM[0101,,10,11,,10,00,,111,,111]...0,0,0,,0,,0...0,0011...1,,0000,0,,,11,000,,,010,100,001]
8348
8349    4241:  ;(FREE)
8350    LOADSRD350:
8351            P2=T,   D_CSPD(D14),                            ;INITIAL PATTERN
8352                    SR_CSPD(D14),                           ;D=>IR, SR=TEMP
```



```
8353            NEXT,   GOTO=PAGE(7),                           ;
8354                    J/DINTOIR350                            ;
    (4241)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,111]...0,1,1,,0,,0...0,0011...0,,0000,0,,,11,100,,,011,101,011]
8355
8356    ;*** LOOP BACK POINT FOR SP FILLUP ***
8357
8358    7353:
8359    DINTOIR350:
8360            SETUP,  RETURN/WRITEDF350,                      ;CALL SUBR FOR D => IR
8361            NEXT,   CALL[DINTOIR]                           ;
    (7353)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,00,,010,,111]...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,010,110,111]
8362
8363    4002:  ;(FREE)
8364    WRITEDF350:
8365            P0,     DCS=CTR(C15,),                          ;HOLD UP
8366            P3,     A=BSPHI[DF]_D,                          ;USE DF TO WRITE A/B HI, W/ WR(AB,H,A)
8367            NEXT,   GOTO=PAGE(7),                           ;
8368                    J/WRITESF350                            ;
    (4002)  DCS[0,00,1,0,0,0]  BM[0000,,00,00,,00,10,,000,,111]...0,0,0,,0,,0...0,0000...0,,1011,0,,,11,100,,,000,001,110]
8369
8370    7016:  ;(FREE)
8371    WRITESF350:
8372            P3,     A=BSPLO[SF]_D,                          ;USE SF TO WRITE A/B LO, W/ WR(AB,L,B)
8373            NEXT,   J/NEXTPAT350                            ;
    (7016)  DCS[0,00,0,0,0,0]  BM[0000,,00,01,,00,11,,000,,000]...0,0,0,,0,,0...0,0000...0,,0011,0,,,11,000,,,000,010,011]
8374
8375    7023:  ;(FREE)
8376    NEXTPAT350:
8377            P2=T,   SR=D_SR=PLUS=CSPD(D15), SAVE=D[C],      ;INCREMENT PATTERN
8378            NEXT,   BUTR(DMO),                              ;IF TRUE:  "LOADHI350" (+1, WORDS) EXIT LOOP
8379                    J/DINTOIR350                            ;IF FALSE: "DINTOIR350" (-3, WORDS) KEEP GOING
    (7023)  DCS[0,00,0,0,0,0]  BM[1001,,10,00,,00,00,,000,,111]...0,1,1,,0,,0...0,0010...0,,0000,0,,,01,001,,,011,101,011]
8380
8381
8382    ;COME HERE IF DONE LOOPING
8383    7357:
8384    LOADHI350:
8385                                                            ;*** IF ANY ASP/BSP HI/LO BIT<03> IN ADDR STUCK ZERO,
8386                                                            ;       ONE OF THE FOLLOWING TWO WORDS WILL OVERWRITE
8387                                                            ;       A PREVIOUSLY WRITTEN LOCATION (IE, 02 OR 03) ***
8388            P2=T,   D_CSPD(D01), SAVE=D[C],                 ;PATTERN OF (000152)
8389            P3,     A=BSPHI[12]_D,                          ;WRITE SPHI WITH ADDRS BIT<03> SET, DF=0, W/ WR(AB,H,A)
8390            NEXT,   J/LOADHIA350                            ;  FOR USE IN TEST373
    (7357)  DCS[0,00,0,0,0,0]  BM[1010,,10,10,,00,00,,001,,111]...0,1,0,,0,,0...0,1110...0,,1011,0,,,11,000,,,000,010,100]
8391
8392    7024:  ;(FREE)

8393    LOADHIA350:
8394            P2=T,   D_CSPD(D02), SAVE=D[C],                 ;PATTERN OF (000125)
8395            P3,     A=BSPLO[13]_D,                          ;WRITE SPHI WITH ADDRS BIT<03> SET, DF=0, W/ WR(AB,L,B)
8396            NEXT,   J/AGAINSRD350                           ;
    (7024)  DCS[0,00,0,0,0,0]  BM[1010,,10,11,,00,01,,001,,111]...0,1,0,,0,,0...0,1101...0,,0011,0,,,11,000,,,000,010,101]
8397
```

```
8398    7025:  !(FREE)
8399    AGAINSRD350:
8400            P2-T,   D_CSPD(D14),                    !AGAIN RESET D, SR TO INITIAL PATTERN
8401                    SR_CSPD(D14),                   !OF (037077)
8402            NEXT,   GOTO-PAGE(4),                   !
8403                    J/DINTOIRA350                   !
     (7025)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,100...0,1,1,,0,,0,,,0,0011...0,,0000,0,,,11,100,,,101,110,011]
8404
8405    !*** LOOP BACK ENTRY POINT FOR TESTS ***
8406
8407    4563:
8408    DINTOIRA350:
8409            SETUP,  RETURN/TEST350A,                !GO TO SUBR WHICH PUTS SR -> IR FOR SF/DF/DM
8410            NEXT,   CALL[SRINTOIR]                  !
     (4563)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,11,01,,010,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,110,110]
8411
8412
8413    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8414
8415    !TEST 350A CHECKS BSP-ADDRS/SF, BSPLO ADDRS FOR ERRORS
8416    4752:
8417    TEST350A:
8418            P0,     LOAD-ENUA(ZTARGET434),           !INSTRS FOR IR=(000000)
8419                    LOAD-ERROR(TEST350A),            !ERROR DIRECTORY KEY
8420                    DCS-CTR(C7,),                    !COMPARE AT TARGET
8421            NEXT,   J/COMP350A                       !
     (4752)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,111,000,010]
8422
8423    4702:
8424    COMP350A:
8425            P2-T,   D_SR-XOR-BSPLO[SF], SAVE-D[C],   !COMPARE EXPECTED:RECEIVED, BITWISE
8426            NEXT,   J/GOBUT350A                      !
     (4702)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,00,00,,000,,111...0,1,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,010,100,011]
8427
8428    4243:  !(FREE)
8429    GOBUT350A:
8430            P0,     BUMP-VERIFY,                     !COUNT
8431            SETUP,  RETURN/RESETIR350A,              !GO TO SUBR WHICH:
8432            NEXT,   CALL[DINTOIR-5]                  !  D -> IR, BUT[INSTR5)
     (4243)  DCS[0,00,0,0,0,1]  BM[0111,,00,00,,00,10,,010,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,111,011]
8433
8434    7022:  !(FREE)
8435    RESETIR350A:
8436            SETUP,  RETURN/TEST350B,                 !GO TO SUBR WHICH PUTS SR -> IR FOR SF/DF/DM
8437            NEXT,   CALL[SRINTOIR]                   !
     (7022)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,11,01,,011,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,110,110]
8438
8439
8440    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8441
8442    !TEST 350B CHECKS BSP-ADDRS/DF, BSPHI ADDRS FOR ERRORS
```



```
8443    4753:
8444    TEST350B:
8445            P0,     LOAD-ENUA(ZTARGET434),           !INSTRS FOR IR=(000000)
8446                    LOAD-ERROR(TEST350B),            !ERROR DIRECTORY KEY
8447                    DCS-CTR(C7,),                    !COMPARE AT TARGET
8448            NEXT,   J/COMP350B                       !
     (4753)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,010,100,100]
8449
8450    4244:  !(FREE)
8451    COMP350B:
8452            P2-T,   D_SP-XOR-BSPHI[DF], SAVE-D[C],   !COMPARE EXPECTED:RECEIVED, BITWISE
8453            NEXT,   J/GOBUT350B                      !
     (4244)  DCS[0,00,0,0,0,0]  BM[0110,,01,00,,00,00,,000,,111...0,1,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,010,100,101]
8454
8455    4245:  !(FREE)
8456    GOBUT350B:
8457            SETUP,  RETURN/RESETIR350B,              !GO TO SUBR WHICH:
8458            NEXT,   CALL[DINTOIR-5]                  !  D -> IR, BUT[INSTR5)
     (4245)  DCS[0,00,0,0,0,0]  BM[0111,,00,00,,00,10,,110,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,111,011]
8459
8460    7026:  !(FREE)
8461    RESETIR350B:
8462            SETUP,  RETURN/TEST350C,                 !GO TO SUBR WHICH PUTS SR -> IR FOR SF/DF/DM
8463            NEXT,   CALL[SRINTOIR]                   !
     (7026)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,11,00,,010,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,110,110]
8464
8465
8466
8467    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8468
8469    !TEST 350C CHECKS ASP-ADDRS/DF, ASPLO ADDRS FOR ERRORS
8470    4742:
8471    TEST350C:
8472            P0,     LOAD-ENUA(ZTARGET434),           !INSTRS FOR IR=(000000)
8473                    LOAD-ERROR(TEST350C),            !ERROR DIRECTORY KEY
8474                    DCS-CTR(C7,),                    !COMPARE AT TARGET
8475                    BUMP-VERIFY,                     !COUNT
8476            NEXT,   J/COMP350C                       !
     (4742)  DCS[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,010,100,110]
8477
8478    4246:  !(FREE)
8479    COMP350C:
8480            P2-T,   D_ASPLO[DF]-XOR-BSPHI[SF], SAVE-D[C],   !COMPARE RECEIVED:EXPECTED, BITWISE
8481            NEXT,   J/GOBUT350C                      !
     (4246)  DCS[0,00,0,0,0,0]  BM[0110,,01,01,,10,10,,000,,111...0,1,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,,010,100,111]
8482
8483    4247:  !(FREE)
8484    GOBUT350C:
8485            SETUP,  RETURN/RESETIR350C,              !GO TO SUBR WHICH:
8486            NEXT,   CALL[DINTOIR-5]                  !  D -> IR, BUT[INSTR5)
     (4247)  DCS[0,00,0,0,0,0]  BM[0111,,00,00,,00,10,,111,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,,010,111,011]
8487
```

```
8488    7027:  ;(FREE)
8489    RESETIR350C:
8490            SETUP,  RETURN/TEST350D,                        ;GO TO SUBR WHICH PUTS SR -> IR FOR SF/DF/DM
8491            NEXT,   CALL[SRINTOIR]                          ;
     (7027)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,11,00,,011,,111...0,0,0...0,,0...0,0000...0,,0000,0...11,100,,010,110,110]
8492
8493
8494
8495    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8496
8497    ;TEST 350D CHECKS ASP-ADDRS/SF, ASPHI ADDRS FOR ERRORS
8498    4743:
8499    TEST350D:
8500            P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8501                    LOAD-ERROR(TEST350D),                   ;ERROR DIRECTORY KEY
8502                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
8503            NEXT,   J/COMP350D                              ;
     (4743)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,010,101,000]
8504
8505    4250:  ;(FREE)
8506    COMP350D:
8507            P0,     BUMP-VERIFY,                            ;COUNT
8508            P2-T,   D_ASPHI[SF]-XOR-ASPLO[DF], SAVE-D[C],   ;COMPARE RECEIVED:EXPECTED, BITWISE
8509            NEXT,   J/GOBUT350D                             ;
     (4250)  DCS[0,00,0,0,0,1]  BM[0110,,00,00,,11,11,,000,,111...0,1,0,,0,,0...0,0000...0,,0000,0...11,000,,010,101,001]
8510
8511    4251:  ;(FREE)
8512    GOBUT350D:
8513            P0,     BUMP-VERIFY,                            ;COUNT
8514            SETUP,  RETURN/SCOPE350,                        ;GO TO SUBR WHICH:
8515            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4251)  DCS[0,00,0,0,0,1]  BM[0100,,00,01,,01,01,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,010,111,011]
8516
8517
8518
8519    4252:  ;(FREE)
8520    SCOPE350:
8521            P2-T,   D_SR, SAVE-D[C],                        ;FOR DISPLAY OF SF/DM/DF
8522            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "RESETIR350" (+1, WORDS)  KEEP ON TESTING
8523                    J/RESETIR350                            ;   ERROR:  "COMP350A"  (-11, WORDS)  HOLD UP PATTERN
     (4252)  DCS[0,00,0,1,0,0]  BM[1111,,00,00,,00,00,,000,,111...0,1,0,,0,,0...0,0000...0,,0000,0...11,000,,111,000,011]
8524
8525
8526
8527    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8528
8529    4703:
8530    RESETIR350:
8531            P0,     BUMP-VERIFY,                            ;COUNT
8532            SETUP,  RETURN/NEXTPATA350,                     ;PUT OLD PAT FROM SR INTO IR FOR DM0 TEST
8533            NEXT,   CALL[SRINTOIR]                          ;
     (4703)  DCS[0,00,0,0,0,1]  BM[0100,,00,01,,01,01,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0...11,100,,010,110,110]
```



```
8534
8535    4253:  ;(FREE)
8536    NEXTPATA350:
8537            P2-T,   SR#D_SR-PLUS-CSPD(D15), SAVE-D[C],      ;GENER NEXT PATTERN INTO D, SR
8538            NEXT,   BUTP(DM0),                              ;IF TRUE:  "LOAD05-351" (+1, WORDS) ALL DONE HERE
8539                    J/DINTOIRA350                           ;IF FALSE: "DINTOIRA" (-14, WORDS)  KEEP ON TESTING
     (4253)  DCS[0,00,0,0,0,0]  BM[1001,,10,00,,00,00,,000,,111...0,1,1,,0,,0...0,0010...0,,0000,0...01,001,,101,110,011]
8540
8541
8542
8543    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8544
8545    ;COME HERE IF DONE LOOPING
8546    ;THESE CONSTANTS ARE USED IN THE NEXT TESTS:
8547    4567:
8548    LOAD05-351:
8549            P0,     BUMP-VERIFY,                            ;COUNT
8550            P3,     CSPD[05]_EMIT, EMIT/055255,             ;SF=2, DF=5 CONSTANT
8551            NEXT,   J/LOAD06-351                            ;
     (4567)  DCS[0,00,0,0,0,1]  BM[0101,,10,10,,10,10,,101,,101...0,0,0,,0,,0...0,1010...1,,0000,0...11,000,,010,101,100]
8552
8553    4254:  ;(FREE)
8554    LOAD06-351:
8555            P3,     CSPD[06]_EMIT, EMIT/054344,             ;SF=3, DF=4 CONSTANT
8556            NEXT,   J/TEST351A                              ;
     (4254)  DCS[0,00,0,0,0,0]  BM[0101,,10,10,,00,11,,100,,100...0,0,0,,0,,0...0,1001...1,,0000,0...11,000,,111,011,010]
8557
8558
8559
8560
8561    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8562
8563    ;TESTS 351 A-D VERIFY THAT THE RIF ADDRESS, WITH ASP HI/LO IMMED0/1 MODES, OPERATES CORRECTLY
8564
8565    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8566
8567    ;TEST 351A CHECKS ASPLO RIF ADDR "001 0"=(02)
8568    4732:
8569    TEST351A:
8570            P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8571                    LOAD-ERROR(TEST351A),                   ;ERROR DIRECTORY KEY
8572                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
8573            NEXT,   J/COMP351A                              ;
     (4732)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0...11,000,,111,000,100]
8574
8575    4704:

8576    COMP351A:
8577            P2-T,   D_CSPD[05]-XOR-ASPLO(R02), SAVE-D[C],   ;COMPARE EXPECTED:RECEIVED, BITWISE
8578            NEXT,   J/GOBUT351A                             ;CSP[05]=(055255)
     (4704)  DCS[0,00,0,0,0,0]  BM[0110,,10,00,,10,00,,101,,111...0,1,0,,0,,0...0,1010...0,,0000,0...11,000,,010,101,110]
8579
8580    4256:  ;(FREE)
8581    GOBUT351A:
8582            P0,     BUMP-VERIFY,                            ;COUNT
```

```
8583            SETUP,  RETURN/TEST351B,                        ;GO TO SUBR WHICH:
8584            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4256)  DCS[0,00,0,0,0,1]  BM[0100,,00,11,,10,10,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
8585
8586
8587    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8588
8589    ;TEST 351B CHECKS ASPLO RIF ADDR "001 1"=(03)
8590    4722:
8591    TEST351B:
8592            P0,     LOAD=ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8593                    LOAD=ERROR(TEST351B),                   ;ERROR DIRECTORY KEY
8594                    DCS=CTR(C7,),                           ;COMPARE AT TARGET
8595            NEXT,   J/COMP351B                              ;
     (4722)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,101,111]
8596
8597    4257:  ;(FREE)
8598    COMP351B:
8599            P2=T,   D_CSPD[06]=XOR=ASPLO(R03), SAVE=D[C],   ;COMPARE EXPECTED:RECEIVED, BITWISE
8600            NEXT,   J/GOBUT351B                             ;CSP[06]=(054344)
     (4257)  DCS[0,00,0,0,0,0]  BM[0110,,10,00,,10,01,,101,,111,,,0,1,0,,0,,0,,,0,1001,,,0,,0000,0,,,11,000,,,010,110,000]
8601
8602    4260:  ;(FREF)
8603    GOBUT351B:
8604            SETUP,  RETURN/TEST351C,                        ;GO TO SUBR WHICH:
8605            NFXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4260)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
8606
8607
8608    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8609
8610    ;TEST 351C CHECKS ASPHI RIF ADDR "010 0"=(04)
8611    4723:
8612    TEST351C:
8613            P0,     LOAD=ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8614                    LOAD=ERROR(TEST351C),                   ;ERROR DIRECTORY KEY
8615                    DCS=CTR(C7,),                           ;COMPARE AT TARGET
8616                    BUMP=VERIFY,                            ;COUNT
8617            NEXT,   J/COMP351C                              ;
     (4723)  DCS[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,110,001]
8618
8619    4261:  ;(FREE)
8620    COMP351C:
8621            P2=T,   D_CSPD[06]=XOR=ASPHI(R04), SAVE=D[C],   ;COMPARE EXPECTED:RECEIVED, BITWISE
8622            NEXT,   J/GOBUT351C                             ;CSP[06]=(054344)
     (4261)  DCS[0,00,0,0,0,0]  BM[0110,,10,00,,11,00,,110,,111,,,0,1,0,,0,,0,,,0,1001,,,0,,0000,0,,,11,000,,,010,110,010]
8623
8624    4262:  ;(FREE)
8625    GOBUT351C:
8626            SETUP,  RETURN/TEST351D,                        ;GO TO SUBR WHICH:
8627            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
```



```
     (4262)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
8628
8629
8630    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8631
8632    ;TEST 351D CHECKS ASPHI RIF ADDR "010 1"=(05)
8633    4712:
8634    TEST351D:
8635            P0,     LOAD=ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8636                    LOAD=ERROR(TEST351D),                   ;ERROR DIRECTORY KEY
8637                    DCS=CTR(C7,),                           ;COMPARE AT TARGET
8638            NEXT,   J/COMP351D                              ;
     (4712)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,110,011]
8639
8640    4263:  ;(FREE)
8641    COMP351D:
8642            P0,     BUMP=VERIFY,                            ;COUNT
8643            P2=T,   D_CSPD[05]=XOR=ASPHI(R05), SAVE=D[C],   ;COMPARE EXPECTED:RECEIVED, BITWISE
8644            NEXT,   J/GOBUT351D                             ;CSP[05]=(052255)
     (4263)  DCS[0,00,0,0,0,1]  BM[0110,,10,00,,11,01,,110,,111,,,0,1,0,,0,,0,,,0,1010,,,0,,0000,0,,,11,000,,,010,110,100]
8645
8646    4264:  ;(FREE)
8647    GOBUT351D:
8648            P0,     BUMP=VERIFY,                            ;COUNT
8649            SETUP,  RETURN/SCOPE351,                        ;GO TO SUBR WHICH:
8650            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4264)  DCS[0,00,0,0,0,1]  BM[0100,,00,01,,01,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
8651
8652
8653
8654    4265:  ;(FREE)
8655    SCOPE351:
8656            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST352A" (+1, WORDS)
8657                    J/TEST352A                              ;   ERROR:  "COMP351A"  (-11, WORDS)
     (4265)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,000,101]
8658
8659
8660
8661
8662    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8663
8664    ;TESTS 352 A-D VERIFY THAT THE RIF ADDRESS, WITH BSP HI/LO IMMED0/1 MODES, OPERATES CORRECTLY
8665
8666    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8667
8668    ;TEST 352A CHECKS BSPLO RIF ADDR "001 0"=(02)

8669    4705:
8670    TEST352A:
8671            P0,     LOAD=ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8672                    LOAD=ERROR(TEST352A),                   ;ERROR DIRECTORY KEY
8673                    DCS=CTR(C7,),                           ;COMPARE AT TARGET
8674            NEXT,   J/COMP352A                              ;
     (4705)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,111,001,100]
```

```
8675
8676    4714:
8677    COMP352A:
8678            P2-T,   D_ASPLO[02]-XOR-BSPLO(R02), SAVE-D[C],  ;COMPARE EXPECTED:RECEIVED, BITWISE
8679            NEXT,   J/GOBUT352A                             ;DATA=(052525)
     (4714)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,00,,101,,111...0,1,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,110,110]
8680
8681    4266:  ;(FREE)
8682    GOBUT352A:
8683            P0,     BUMP-VERIFY,                            ;COUNT
8684            SETUP,  RETURN/TEST352B,                        ;GO TO SUBR WHICH:
8685            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4266)  DCS[0,00,0,0,0,1]  BM[0100,,00,11,,10,01,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0...,11,100,,,010,111,011]
8686
8687
8688    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8689
8690    ;TEST 352B CHECKS BSPLO RIF ADDR "001 1"=(03)
8691    4713:
8692    TEST352B:
8693            P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8694                    LOAD-ERROR(TEST352B),                   ;ERROR DIRECTORY KEY
8695                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
8696            NEXT,   J/COMP352B                              ;
     (4713)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,110,111]
8697
8698    4267:  ;(FREE)
8699    COMP352B:
8700            P2-T,   D_ASPLO[03]-XOR-BSPLO(R03), SAVE-D[C],  ;COMPARE EXPECTED:RECEIVED, BITWISE
8701            NEXT,   J/GOBUT352B                             ;DATA=(054344)
     (4267)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,01,,101,,111...0,1,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,111,000]
8702
8703    4270:  ;(FREE)
8704    GOBUT352B:
8705            SETUP,  RETURN/TEST352C,                        ;GO TO SUBR WHICH:
8706            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4270)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,10,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0...,11,100,,,010,111,011]
8707
8708
8709    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8710
8711    ;TEST 352C CHECKS BSPLO RIF ADDR "010 0"=(04)
8712    4724:
8713    TEST352C:
8714            P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8715                    LOAD-ERROR(TEST352C),                   ;ERROR DIRECTORY KEY
8716                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
8717                    BUMP-VERIFY,                            ;COUNT
8718            NEXT,   J/COMP352C                              ;
     (4724)  DCS[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,111,001]
8719
8720    4271:  ;(FREE)
```



```
8721    COMP352C:
8722            P2-T,   D_ASPLO[04]-XOR-BSPLO(R04), SAVE-D[C],  ;COMPARE EXPECTED:RECEIVED, BITWISE
8723            NEXT,   J/GOBUT352C                             ;DATA=(053433)
     (4271)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,00,,110,,111...0,1,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,111,010]
8724
8725    4272:  ;(FREE)
8726    GOBUT352C:
8727            SETUP,  RETURN/TEST352D,                        ;GO TO SUBR WHICH:
8728            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4272)  DCS[0,00,0,0,0,0]  BM[0100,,00,11,,10,10,,101,,111...0,0,0,,0,,0...0,0000...0,,0000,0...,11,100,,,010,111,011]
8729
8730
8731    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8732
8733    ;TEST 352D CHECKS BSPLO RIF ADDR "010 1"=(05)
8734    4725:
8735    TEST352D:
8736            P0,     LOAD-ENUA(ZTARGET434),                  ;INSTRS FOR IR=(000000)
8737                    LOAD-ERROR(TEST352D),                   ;ERROR DIRECTORY KEY
8738                    DCS-CTR(C7,),                           ;COMPARE AT TARGET
8739            NEXT,   J/COMP352D                              ;
     (4725)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,011,,100...0,0,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,111,011]
8740
8741    4273:  ;(FREE)
8742    COMP352D:
8743            P0,     BUMP-VERIFY,                            ;COUNT
8744            P2-T,   D_ASPLO[05]-XOR-BSPLO(R05), SAVE-D[C],  ;COMPARE EXPECTED:RECEIVED, BITWISE
8745            NEXT,   J/GOBUT352D                             ;DATA=(052522)
     (4273)  DCS[0,00,0,0,0,1]  BM[0110,,00,11,,10,01,,110,,111...0,1,0,,0,,0...0,0000...0,,0000,0...,11,000,,,010,111,100]
8746
8747    4274:  ;(FREE)
8748    GOBUT352D:
8749            P0,     BUMP-VERIFY,                            ;COUNT
8750            SETUP,  RETURN/SCOPE352,                        ;GO TO SUBR WHICH:
8751            NEXT,   CALL[DINTOIR=5]                         ;  D -> IR, BUT(INSTRS)
     (4274)  DCS[0,00,0,0,0,1]  BM[0100,,00,01,,01,11,,101,,111...0,0,0,,0,,0...0,0000...0,,0000,0...,11,100,,,010,111,011]
8752
8753
8754
8755    4275:  ;(FREE)
8756    SCOPE352:
8757            P2-T,   D_CSPD(D13), D[C]_0,                    ;RESTORE CONSTANT (000000)
8758            P3,     A"BSPHI[01]_D,                          ;
8759            NEXT,   BUTD(SCOPE),                            ;NO ERROR:  "RESTORE01" (+1, WORD8)
8760                    J/RESTORE01                             ;   ERROR:  "COMP352A"  (-1, WORD8)
     (4275)  DCS[0,00,0,1,0,0]  BM[1010,,10,11,,00,01,,100,,000...0,1,0,,0,,0...0,0100...0,,1011,0...,11,000,,,111,001,101]
8761
8762
8763    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8764
8765    ;       THIS SECTION OF CODE FINISHES RESTORING THE 4 CONSTANTS IN ASPHI/BSPHI
8766    ;       THAT WERE WIPED OUT IN THE PREVIOUS GROUP OF TESTS.
```

```
8767
8768    4715:
8769    RESTORE01:
8770            P2-T,   D_CSPD(D10),                            ;(052525)
8771            P3,     A#BSPHI[07]_D,                          ;
8772            NEXT,   GOTO-PAGE(7),                           ;
8773                    J/RESTORE02                             ;
     (4715)  DCS[0,00,0,0,0,0]  BM[1010..10,11..00,01..111..111...0,1,0...0...0...0,0111...0..1011,0...11,100...000,011,000]
8774
8775    7030:  ;(FREE)
8776    RESTORE02:
8777            P2-T,   D_CSPD(D11), D[C]_0,                    ;(125252)
8778            P3,     A#BSPHI[05]_D,                          ;
8779            NEXT,   J/RESTORE03                             ;
     (7030)  DCS[0,00,0,0,0,0]  BM[1010..10,11..00,01..110..000...0,1,0...0...0...0,0110...0..1011,0...11,000...000,011,010]
8780
8781    7032:  ;(FREE)
8782    RESTORE03:
8783            P2-T,   D_CSPD(D12), D[C]_0,                    ;(177777)
8784            P3,     A#BSPHI[03]_D,                          ;
8785            NEXT,   J/RESTORE04                             ;
     (7032)  DCS[0,00,0,0,0,0]  BM[1010..10,11..00,01..101..000...0,1,0...0...0...0,0101...0..1011,0...11,000...000,011,011]
8786
8787    7033:  ;(FREE)
8788    RESTORE04:
8789            SETUP,  RETURN/TEST361A,                        ;GO TO SUBR THAT RESTORES CURRENT
8790            NEXT,   GOTO-PAGE(7),                           ;  DCS MICROCODE VERSION NUMBER,
8791                    J/INSERTREVNO                           ;  B<15>S(0), INTO B.M. GPR "R5"
     (7033)  DCS[0,00,0,0,0,0]  BM[0110..00,10..11,11..011..111...0,0,0...0...0,0000...0..0000,0...11,100...010,001,110]
8792
8793
8794
8795
8796
8797    ;.PAGE=============================================================================================================
8798
8799
8800    .TOC    *   TEST361-372:  TESTING SR, GUARD, RES, AND XMUX
8801
8802    ;*****************************************************************************
8803    ;*
8804    ;*      TESTS:  361 - 372                               UWORDS: 125 + 117
8805    ;*
8806    ;*      FUNCTIONS:      TESTS THAT SR CAN BE LOADED FROM ALU OUT, READ THRU
8807    ;*                      SR AND FLOAT PORTS OF XMUX, SR CAN BE SHIFTED LEFT, RIGHT,
8808    ;*                      AND NOP, GUARD=ENABLED, DISABLED, SHIFTED, AND THAT
8809    ;*                      ANY "BUTTABLE" BITS CAN BE TESTED.
8810    ;*                      PREVIOUSLY TESTED IN TEST 105 A-E WAS THE ABILITY TO
8811    ;*                      LOAD/READ THE SR THRU XMUX/SR, AND BUT(SR)=0).
8812    ;*                      THESE FUNCTIONS ARE NOT TESTED HERE.
8813    ;*
8814    ;*****************************************************************************
8815
```



```
8816
8817
8818
8819
8820
8821    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
8822
8823    ;*** TEST 361A ***
8824    ;TEST-361A TESTS THAT SR CAN BE LOADED, GUARD CLEARED, WITH PATTERN (052525)(0);
8825    ;READ THRU XMUX-FLTPT PORT = (100125)
8826    6573:
8827    TEST361A:
8828            P0,     LOAD-ENUA(ZTARGET434),                  ;SETUP FOR IR=(000000)/INSTRS TEST
8829                    LOAD-ERROR(TEST361A),                   ;ERROR DIRECTORY KEY
8830                    DCS-CTR(C11.),                          ;COMPARE ENUA:TNUA AT TARGET
8831            NEXT,   J/SETRES361A                            ;
     (6573)  DCS[1,00,1,0,0,0]  BM[0100..00,11..11,00..011..100...0,0,0...0...0...0,0000...0..0000,0...11,000...101,111,000]
8832
8833    6570:
8834    SETRES361A:
8835            P3,     CSPD[16]_EMIT,                          ;CSP GETS
8836            EMITC,  SENDMUX-4567-SEL,                       ;RES REG VALUES
8837                    SR-LOAD, GUARD-EN,                      ;
8838            NEXT,   J/LOADRES361A                           ;
     (6570)  DCS[0,00,0,0,0,0]  BM[0000..10,10..00,00..000..000...0,0,0...0...0...0,0001...1..0000,0...11,000...000,000,001]
8839
8840    6001:  ;(FREE)
8841    LOADRES361A:
8842            P0,     BUMP-VERIFY,                            ;COUNT
8843            P2-T,   RES_CSPB(B16),                          ;STORE RES
8844                    D_ASPHI(C000000), D[C]_1,               ;SET D=ZEROES, D[C]=1
8845            NEXT,   J/LOADSR361A                            ;
     (6001)  DCS[0,00,0,0,0,1]  BM[1111..11,01..11,01..100..000...0,1,0...0...0...0,0000...0..1000,1...11,000...000,000,010]
8846
8847    6002:  ;(FREE)
8848    LOADSR361A:
8849            P2-T,   SR_BSPHI(C052525),                      ;LOAD SR WITH DATA
8850            NEXT,   J/EXPEC361B                             ;
     (6002)  DCS[0,00,0,0,0,0]  BM[1010..01,11..00,00..111..000...0,0,1...0...0...0,0000...0..0000,0...11,000...000,000,011]
8851
8852    6003:  ;(FREE)
8853    EXPEC361B:
8854            P0,     BUMP-VERIFY,                            ;COUNT
8855            P3,     CSPD[16]_EMIT,                          ;EXPECTED VALUE OUT OF XMUX-FLOAT
8856                    EMIT/100125,                            ;(100125)
8857            NEXT,   J/COMP361B                              ;

     (6003)  DCS[0,00,0,0,0,1]  BM[1000..10,00..00,01..010..101...0,0,0...0...0...0,0001...1..0000,0...11,000...000,000,100]
8858
8859    6004:  ;(FREE)
8860    COMP361B:
8861            SETUP,  RETURN/TEST361D,                        ;RETURN TO START OF NEXT SUBTEST
8862            NEXT,   CALL(CSP16XORFLTTOIR-5)                 ;SUBR: CSP(16),XOR,FLOAT -> IR, BUT(INSTRS)
     (6004)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,11..001..111...0,0,0...0...0...0,0000...0..0000,0...11,100...000,011,101]
```

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    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 361D ***
    !TEST 361D CHECKS THAT THE BUT ON SR<1:0> READS THE (052525) IN THE SR CORRECTLY
    6771:
    TEST361D:
            P0,     LOAD-ENUA(ZTARGET403),                  !EXPECTED VALUE "01"&"1" IN SR<1:0>
                    LOAD-ERROR(TEST361D),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/GOBUT361D                             !
 (6771)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,101]

    6005:  !(FREE)
    GOBUT361D:
            SETUP,  RETURN/TEST361E,                        !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                    J/BUTSR1-0                              !GO BUT ON SR<1:0>
 (6005)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,11,10,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,101]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 361E ***
    !TEST-361E CHECKS THAT GD<3:2> IS CLEARED UNDER SR-LOAD, GUARD-ENABLED
    6767:
    TEST361E:
            P0,     LOAD-ENUA(ZTARGET400),                  !EXPECTED VALUE "00" IN GUARD<3:2>
                    LOAD-ERROR(TEST361E),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA AT TARGET
                    BUMP-VERIFY,                            !COUNT
            NEXT,   J/GOBUT361E                             !
 (6767)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,110]

    6006:  !(FREE)
    GOBUT361E:
            SETUP,  RETURN/TEST362A,                        !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                    J/BUTGD3-2                              !GO BUT ON GD<3:2>
 (6006)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,11,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]
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    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 362A ***
    !TEST-362A CHECKS THAT THE SR#GD CAN BE SHIFTED RIGHT 1 POSITION, INSERTING
    !A "1" FROM D<00> INTO SR<15>, SHIFTING THE "1" IN SR<00> INTO GD<3>
    6765:
    TEST362A:
            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/INSTR5 TEST
                    LOAD-ERROR(TEST362A),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C10,),                          !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/SETRES362A                            !
 (6765)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,000,111]

    6007:  !(FREE)
    SETRES362A:
            P0,     BUMP-VERIFY,                            !COUNT
            P3,     CSPD[16]_EMIT,                          !CSP GETS
            EMITC,  SENDMUX-4567-SEL,                       !RES REG VALUES
                    SR-RIGHT, GUARD-EN,                     !
            NEXT,   J/SETDDC362A                            !
 (6007)  DCS[0,00,0,0,0,1]  BM[0010,,10,10,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,000,001,000]

    6010:  !(FREE)
    SETDDC362A:
            P2-T,   D_BSPHI(C000001), D[C]_0,               !SETUP D<00>=1 FOR SHIFT
            NEXT,   J/LOADRES362A                           !
 (6010)  DCS[0,00,0,0,0,0]  BM[1010,,01,11,,00,00,,000,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,001]

    6011:  !(FREE)
    LOADRES362A:
            P2,     RES_CSPB(B16),                          !STORE RES
            P3-T,   SR_SR-RIGHT-1,                          !SHIFT SR RIGHT, GUARD-ENABLED
            NEXT,   J/COMP362A                              !
 (6011)  DCS[0,00,0,0,0,0]  BM[0000,,11,01,,00,00,,000,,000,,,1,0,1,,0,,0,,,0,0000,,,0,,1000,1,,,11,000,,,000,001,010]

    6012:  !(FREE)
    COMP362A:
            P0,     BUMP-VERIFY,                            !COUNT
            P2-T,   D_SR-XOR-BSPHI(C125252), SAVE-D[C],     !D _ (125252)=SR, BITWISE
            NEXT,   J/GOBUT362A                             !
 (6012)  DCS[0,00,0,0,0,1]  BM[0110,,01,11,,00,00,,110,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,001,011]

    6013:  !(FREE)
    GOBUT362A:
            SETUP,  RETURN/TEST362B,                        !RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[DINTOIR-5]                         !SUBR: D -> IR, BUT(INSTR5)

 (6013)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,11,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]





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    !*** TEST 362B ***
    !TEST-362B CHECKS THAT SR-XMUX-FLOAT PORT CAN BE READ, WITH SR=(125252)
    6763:
    TEST362B:
            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/INSTRS TEST
                    LOAD-ERROR(TEST362B),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C8,),                           !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/EXPEC362B                             !
 (6763)  DCS[1.00.1.0.0.0]  BM[0111..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...000.001.100]

    6014:  !(FREE)
    EXPEC362B:
            P0,     BUMP-VERIFY,                            !COUNT
            P3,     CSPD[16]_EMIT,                          !EXPECTED VALUE OF XMUX-FLOAT
                    EMIT/000052,                            !(000052)
            NEXT,   J/COMP362B                              !
 (6014)  DCS[0.00.0.0.0.1]  BM[0000..10.00..00.00..101..010...0.0.0..0..0...0.0001...1..0000.0...11.000...000.001.101]

    6015:  !(FREE)
    COMP362B:
            SETUP,  RETURN/TEST362D,                        !RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[CSP16XORFLTTOIR-5]                 !SUBR: CSP(16),XOR,FLOAT => IR, BUT(INSTRS)
 (6015)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.01..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...000.011.101]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 362D ***
    !TEST-362D CHECKS THAT THE BUT ON SR<1:0> READS THE (125252) IN THE SR CORRECTLY
    6757:
    TEST362D:
            P0,     LOAD-ENUA(ZTARGET405),                  !EXPECTED VALUE "10"#"1" IN SR<1:0>
                    LOAD-ERROR(TEST362D),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/GOBUT362D                             !
 (6757)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...000.001.110]

    6016:  !(FREE)
    GOBUT362D:
            SETUP,  RETURN/TEST362E,                        !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                    J/BUTSR1-0                              !GO BUT ON SR<1:0>
 (6016)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.01..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.101]
```



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    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 362E ***
    !TEST-362E CHECKS THAT GD<3:2> RECEIVED THE "1" IN SR<00> AFTER THE SHIFT RIGHT
    6755:
    TEST362E:
            P0,     LOAD-ENUA(ZTARGET402),                  !EXPECTED VALUE "10" IN GUARD<3:2>
                    LOAD-ERROR(TEST362E),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                           !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/GOBUT362E                             !
 (6755)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.001.111]

    6017:  !(FREE)
    GOBUT362E:
            SETUP,  RETURN/TEST363A,                        !RETURN TO START OF NEXT SUBTEST
            P0,     BUMP-VERIFY,                            !COUNT
            NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                    J/BUTGD3-2                              !GO BUT ON GD<3:2>
 (6017)  DCS[0.00.0.0.0.1]  BM[0110..00.11..11.01..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.100]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 363A ***
    !TEST-363A CHECKS THAT THE SR#GD CAN AGAIN BE SHIFTED RIGHT 1 POSITION, INSERTING
    !A "0" FROM D<00> INTO SR<15>, SHIFTING THE "0" IN SR<00> INTO GD<3>
    6753:
    TEST363A:
            P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/INSTRS TEST
                    LOAD-ERROR(TEST363A),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C9,),                           !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/SETDDC363A                            !
 (6753)  DCS[1.00.1.0.0.0]  BM[0110..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.000]

    6020:  !(FREE)
    SETDDC363A:
            P3-T,   D_NOT-ASPHI(C000001), D[C]_1,           !SETUP D=(177776), D[C]=0 FOR SHIFT RIGHT
            NEXT,   J/SHIFT363A                             !
 (6020)  DCS[0.00.0.0.0.0]  BM[0000..00.00..11.01..000..000...1.1.0..0..0...0.0000...0..0000.0...11.000...000.010.001]

    6021:  !(FREE)
    SHIFT363A:
            P0,     BUMP-VERIFY,                            !COUNT

            P2-T,   SR_SR-RIGHT-1,                          !SHIFT SR RIGHT, GUARD-ENABLED
            NEXT,   J/COMP363A                              !
 (6021)  DCS[0.00.0.0.0.1]  BM[0000..00.00..00.00..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...000.010.010]

    6022:  !(FREE)
    COMP363A:
            P2-T,   D_SR-XOR-ASPHI(C052525), SAVE-D[C],     !D _ (052525)=SR, BITWISE
```

```
                NEXT,   J/GOBUT363A                             !
        (6022)  DCS[0.00.0.0.0.0]  BM[0110..01.11..00.00..111..111...0.1.0..0..0...0.0000...0..0000.0...11.000...000.010.011]

        6023:  !(FREE)
        GOBUT363A:
                SETUP,  RETURN/TEST363B,                        !RETURN TO START OF NEXT SUBTEST
                NEXT,   CALL[DINTOIR-5]                         !SUBR: D => IR, BUT(INSTRS)
        (6023)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.01..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 363B ***
        !TEST-363B CHECKS THE GUARD REGISTER WAS SHIFTED RIGHT ALSO
        6751:
        TEST363B:
                P0,     LOAD-ENUA(ZTARGET401),                  !EXPECTED VALUE "01" IN GUARD<3:2>
                        LOAD-ERROR(TEST363B),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE ENUA:TNUA AT TARGET
                NEXT,   J/GOBUT363B                             !
        (6751)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.100]

        6024:  !(FREE)
        GOBUT363B:
                SETUP,  RETURN/TEST364A,                        !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                        J/BUTGD3-2                              !GO BUT ON GD<3:2>
        (6024)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.00..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.100]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 364A ***
        !TEST-364A/364B CHECK THAT WE ARE ABLE TO FILTER A "1" DOWN TO GD<0>, AND
        !SUBSEQUENTLY ABLE TO RECOVER IT, SO GD<3:0>="0101"
        6747:
        TEST364A:
                P0,     LOAD-ENUA(ZTARGET402),                  !EXPECTED VALUE "10" IN GUARD <3:2>
                        LOAD-ERROR(TEST364A),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C4.),                           !COMPARE ENUA:TNUA AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/SETDDC364A                            !
        (6747)  DCS[1.00.1.0.0.1]  BM[1011..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.101]

        6025:  !(FREE)
        SETDDC364A:
```



```
                P2-T,   D_NOT-ASPHI(C000001), D[C]_1,           !SETUP D=(177776), D[C]=0 FOR SHIFT RIGHT
                NEXT,   J/GOBUT364A                             !  WHERE  SR<15> <- (0)
        (6025)  DCS[0.00.0.0.0.0]  BM[0000..00.00..11.01..000..000...0.1.0..0..0...0.0000...0..0000.0...11.000...000.010.110]

        6026:  !(FREE)
        GOBUT364A:
                SETUP,  RETURN/TEST364B,                        !RETURN TO START OF NEXT SUBTEST
                P3-T,   SR_SR-RIGHT-1,                          !SHIFT SR#GD RIGHT
                NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                        J/BUTGD3-2                              !GO BUT ON GD<3:2>
        (6026)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.00..101..111...1.0.1..0..0...0.0000...0..0000.0...11.100...011.001.100]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 364B ***
        !TEST-364B CHECKS THAT GD<3:2> READS AS "01"
        6745:
        TEST364B:
                P0,     LOAD-ENUA(ZTARGET401),                  !EXPECTED VALUE "01" IN GUARD<3:2>
                        LOAD-ERROR(TEST364B),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C4.),                           !COMPARE ENUA:TNUA AT TARGET
                NEXT,   J/SETDDC364B                            !
        (6745)  DCS[1.00.1.0.0.0]  BM[1011..00.11..11.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11.000...000.010.111]

        6027:  !(FREE)
        SETDDC364B:
                P3-T,   D_BSPHI(C000001), D[C]_0,               !SETUP D, D[C] FOR SR<15>_"1"
                NEXT,   J/GOBUT364B                             !
        (6027)  DCS[0.00.0.0.0.0]  BM[1010..01.11..00.00..000..000...1.1.0..0..0...0.0000...0..0000.0...11.000...000.011.000]

        6030:  !(FREE)
        GOBUT364B:
                SETUP,  RETURN/TEST365A,                        !RETURN TO START OF NEXT SUBTEST
                P2-T,   SR_SR-RIGHT-1,                          !SHIFT SR#GD RIGHT AGAIN
                NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
                        J/BUTGD3-2                              !GO BUT ON GD<3:2>
        (6030)  DCS[0.00.0.0.0.0]  BM[0110..00.11..11.00..011..111...0.0.1..0..0...0.0000...0..0000.0...11.100...011.001.100]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 365A ***
        !TEST-365A CHECKS THAT CAN SHIFT SR-RIGHT, W/GUARD-DISABLED
        6743:
        TEST365A:
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            P0,     LOAD-ENUA(ZTARGET434),                    !SETUP FOR IR=(000000)/INSTR5 TEST
                    LOAD-ERROR(TEST365A),                     !ERROR DIRECTORY KEY
                    DCS-CTR(C10,),                            !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/SETRES365A                              !
  (6743) DCS[1.00.1.0.0.0] BM[0101..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11,000...000,011,001]

   6031: !(FREE)
   SETRES365A:
            P0,     BUMP-VERIFY,                              !COUNT
            P3,     CSPD[16]_EMIT,                            !CSP GETS
            EMITC,  SENDMUX-4567-SEL,                         !RES REG VALUES
                    SR-RIGHT, GUARD-DIS,                      !
            NEXT,   J/LOADRES365A                             !
  (6031) DCS[0.00.0.0.0.1] BM[0010..10.00..00.00..000..000...0.0.0..0..0...0.0001...1..0000.0...11,000...000,011,010]

   6032: !(FREE)
   LOADRES365A:
            P2,     RES_CSPB(B16),                            !STORE RES
            P3-T,   SR_SR-RIGHT-1,                            !SHIFT SR RIGHT, GUARD-DISABLED
            NEXT,   J/EXPEC365A                               !
  (6032) DCS[0.00.0.0.0.0] BM[0000..11.01..00.00..000..000...1.0.1..0..0...0.0000...0..1000.1...11,000...000,011,011]

   6033: !(FREE)
   EXPEC365A:
            P0,     BUMP-VERIFY,                              !COUNT
            P3,     CSPD[16]_EMIT,                            !EXPECTED VALUE OUT OF XMUX-SR
                    EMIT/145252,                              !(145252)
            NEXT,   J/COMP365A                                !
  (6033) DCS[0.00.0.0.0.1] BM[1100..10.10..10.10..101..010...0.0.0..0..0...0.0001...1..0000.0...11,000...000,011,100]

   6034: !(FREE)
   COMP365A:
            SETUP,  RETURN/TEST365B,                          !RETURN TO START OF NEXT SUBTEST
            NEXT,   CALL[CSP16XORSRTOIR-5)                    !SUBR: CSP(16),XOR,SR => IR, BUT(INSTR5)
  (6034) DCS[0.00.0.0.0.0] BM[0110..00.11..11.00..001..111...0.0.0..0..0...0.0000...0..0000.0...11,100...000,011,001]





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   !*** TEST 365B ***
   !TEST-365B CHECKS THAT THE GUARD WASN'T ALTERED ON SHIFT RIGHT/DISABLED
   6741:
   TEST365B:
            P0,     LOAD-ENUA(ZTARGET401),                    !EXPECTED VALUE "01" IN GUARD<3:2>
                    LOAD-ERROR(TEST365B),                     !ERROR DIRECTORY KEY
                    DCS-CTR(C3,),                             !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/GOBUT365B                               !
  (6741) DCS[1.00.1.0.0.0] BM[1100..00.11..11.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11,000...000,011,101]

   6035: !(FREE)
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   GOBUT365B:
            SETUP,  RETURN/TEST366A,                          !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                             !BUT'S ARE ON PAGE 7
                    J/BUTGD3-2                                !GO BUT ON GD<3:2>
  (6035) DCS[0.00.0.0.0.0] BM[0110..00.11..10.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11,100...011,001,100]





   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !*** TEST 366A ***
   !TEST-366A CHECKS THAT SR CAN SHIFT LEFT, GUARD-DISABLED & NOT ALTERED, "0" IN
   !D[C] SHIFTED INTO SR<00>
   6737:
   TEST366A:
            P0,     LOAD-ENUA(ZTARGET434),                    !SETUP FOR IR=(000000)/INSTR5 TEST
                    LOAD-ERROR(TEST366A),                     !ERROR DIRECTORY KEY
                    DCS-CTR(C11,),                            !COMPARE ENUA:TNUA AT TARGET
            NEXT,   J/SETRES366A                              !
  (6737) DCS[1.00.1.0.0.0] BM[0100..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11,000...000,011,110]

   6036: !(FREE)
   SETRES366A:
            P0,     BUMP-VERIFY,                              !COUNT
            P3,     CSPD[16]_EMIT,                            !CSP GETS
            EMITC,  SENDMUX-4567-SEL,                         !RES REG VALUES
                    SR-LEFT, GUARD-DIS,                       !
            NEXT,   J/LOADRES366A                             !
  (6036) DCS[0.00.0.0.0.1] BM[0001..10.00..00.00..000..000...0.0.0..0..0...0.0001...1..0000.0...11,000...000,011,111]

   6037: !(FREE)
   LOADRES366A:
            P2-T,   RES_CSPB(B16),                            !STORE RES
                    D_ZERO, D[C]_ALU07,                       !AND SET D, D[C]
            NEXT,   J/SHIFT366A                               !
  (6037) DCS[0.00.0.0.0.0] BM[0011..11.01..00.00..000..011...0.1.0..0..0...0.0000...0..1000.1...11,000...000,100,000]

   6040: !(FREE)
   SHIFT366A:
            P0,     BUMP-VERIFY,                              !COUNT
            P3-T,   SR_SR-LEFT-1,                             !SHIFT SR LEFT 1, SR<00>_D[C]="0"
            NEXT,   J/EXPEC366A                               !
  (6040) DCS[0.00.0.0.0.1] BM[0000..00.00..00.00..000..000...1.0.1..0..0...0.0000...0..0000.0...11,000...000,100,001]

   6041: !(FREE)
   EXPEC366A:
            P3,     CSPD[16]_EMIT,                            !EXPECTED RESULT AFTER SHIFT
                    EMIT/112524,                              !(112524)
            NEXT,   J/COMP366A                                !
  (6041) DCS[0.00.0.0.0.0] BM[1001..10.01..01.01..010..100...0.0.0..0..0...0.0001...1..0000.0...11,000...000,100,010]
```

```
	6042:	!(FREE)
	COMP366A:
		SETUP,	RETURN/TEST366B,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	CALL[CSP16XORSRTOIR-5]			!SUBR: CSP(16),XOR,SR => IR, BUT(INSTR5)
(6042)	DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,011,001]

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 366B ***
	!TEST-366B CHECKS THAT GUARD WASN'T ALTERED ON SHIFT LEFT/GUARD-DISABLED
	6735:
	TEST366B:
		P0,	LOAD-ENUA(ZTARGET401),			!GUARD SHOULD STILL BE "01"#"01"
			LOAD-ERROR(TEST366B),			!ERROR DIRECTORY KEY
			DCS-CTR(C3,),				!COMPARE ENUA:TNUA AT TARGET
		NEXT,	J/GOBUT366B
(6735)	DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,011]

	6043:	!(FREE)
	GOBUT366B:
		SETUP,	RETURN/TEST366C,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				!BUT'S ARE ON PAGE 7
			J/BUTGD3-2				!GO BUT ON GUARD <3:2>
(6043)	DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,11,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 366C ***
	!TEST-366C CHECKS THAT SR CAN AGAIN SHIFT LEFT, GUARD-DISABLED, SR<00>_D[C]="1"
	6733:
	TEST366C:
		P0,	LOAD-ENUA(ZTARGET434),			!SETUP FOR IR=(000000)/INSTR5 TEST
			LOAD-ERROR(TEST366C),			!ERROR DIRECTORY KEY
			DCS-CTR(C10,),				!COMPARE ENUA:TNUA AT TARGET
		NEXT,	J/SETDDC366C
(6733)	DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,100]

	6044:	!(FREE)
	SETDDC366C:
		P2-T,	D_ASPHI(C177777), D[C]_1,		!SETUP D, D[C]
		NEXT,	J/SHIFT366C				!
(6044)	DCS[0,00,0,0,0,0]  BM[1111,,00,00,,11,01,,101,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,101]
```



```
	6045:	!(FREE)
	SHIFT366C:
		P2-T,	SR_SR-LEFT-1,				!SHIFT SR LEFT 1, SR<00>_D[C]="1"
		NEXT,	J/EXPEC366C
(6045)	DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,110]

	6046:	!(FREE)
	EXPEC366C:
		P0,	BUMP-VERIFY,				!COUNT
		P3,	CSPD[16]_EMIT,				!EXPECTED VALUE AFTER SHIFT
			EMIT/025251,				!(025251)
		NEXT,	J/COMP366C				!
(6046)	DCS[0,00,0,0,0,1]  BM[0010,,10,10,,10,10,,101,,001,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,000,100,111]

	6047:	!(FREE)
	COMP366C:
		SETUP,	RETURN/TEST367A,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	CALL[CSP16XORSRTOIR-5]			!SUBR: CSP(16),XOR,SR => IR, BUT(INSTR5)
(6047)	DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,11,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,011,001]

	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!*** TEST 367A ***
	!TEST-367A CHECKS THAT LOAD/GUARD-DISABLED LOADS SR, GUARD NOT ALTERED
	!CHECK THAT BUTA(CLEAR-FLAGS) CLEARS RES TO SR-LOAD/GUARD-DIS
	6731:
	TEST367A:
		P0,	LOAD-ENUA(ZTARGET401),			!GUARD SHOULD STILL BE "01"#"01" AFTER LOAD
			LOAD-ERROR(TEST367A),			!ERROR DIRECTORY KEY
			DCS-CTR(C6,),				!COMPARE ENUA:TNUA AT TARGET
		NEXT,	J/SETRES367A				!
(6731)	DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,000]

	6050:	!(FREE)
	SETRES367A:
		P0,	BUMP-VERIFY,				!COUNT
		P3,	CSPD[16]_EMIT,				!CSP GETS
		EMITC,	SENDMUX-4567-SEL,			!RES VALUES
			SR-NOP, GUARD-EN,			!FIRST LOAD COMPLEMENT OF THOSE AFTER BUTA(CLEAR-FLAGS)
		NEXT,	J/LOADRES367A				!

(6050)	DCS[0,00,0,0,0,1]  BM[0011,,10,10,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,000,101,001]

	6051:	!(FREE)
	LOADRES367A:
		P0,	BUMP-VERIFY,				!COUNT
		P2-T,	RES_CSPB(B16),				!STORE RES
			D_ZERO, D[C]_ALU07,			!SET D, D[C]
```

```
        P3,     BUTA(CLR-FLAG-RES-UCON),                  !RESET RES TO SR-LOAD, GUARD=DIS
        NEXT,   J/LOADSR367A                              !
(6051)  DCS[0,00,0,0,0,1]  BM[0011,,11,01,,00,00,,000,,011,,,0,1,0,,0,,0,,,0,0000,,,0,,1000,1,,,11,010,,,000,101,010]

    6052:  !(FREE)
    LOADSR367A:
        P2-T,   SR_BSPHI(C052525),                        !SR_(052525)
        NEXT,   J/GOBUT367B                               !
(6052)  DCS[0,00,0,0,0,0]  BM[1010,,01,11,,00,00,,111,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,011]

    6053:  !(FREE)
    GOBUT367B:
        SETUP,  RETURN/TEST370A,                          !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                             !BUT'S ARE ON PAGE 7
                J/BUTGD3-2                                !GO BUT ON GUARD <3:2>
(6053)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 370A ***
    !TEST-370A CHECKS THAT SHIFT LEFT/GUARD-ENABLED SHIFTS GD<3>="0" INTO SR<00>
    6725:
    TEST370A:
        P0,     LOAD-ENUA(ZTARGET434),                    !SETUP FOR IR=(000000)/INSTR5 TEST
                LOAD-ERROR(TEST370A),                     !ERROR DIRECTORY KEY
                DCS-CTR(C10,),                            !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/SETRES370A                              !
(6725)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,100]

    6054:  !(FREE)
    SETRES370A:
        P0,     BUMP-VERIFY,                              !COUNT
        P3,     CSPD[16]_EMIT,                            !CSP GETS
        EMITC,  SENDMUX-4567-SEL,                         !RES VALUES
                SR-LEFT, GUARD-EN,                        !
        NEXT,   J/LOADRES370A                             !
(6054)  DCS[0,00,0,0,0,1]  BM[0001,,10,10,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,000,101,101]

    6055:  !(FREE)
    LOADRES370A:
        P2-T,   RES_CSPB(B16),                            !STORE RES
                D_ASPHI(C000000), D[C]_1,                 !SETUP D, D[C]
        NEXT,   J/SHIFT370A                               !
(6055)  DCS[0,00,0,0,0,0]  BM[1111,,11,01,,11,01,,100,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,1000,1,,,11,000,,,000,101,110]

    6056:  !(FREE)
    SHIFT370A:
        P2-T,   SR_SR-LEFT-1,                             !SHIFT SR LEFT 1, SR<00>_GD<3>="0"
```



```
        NEXT,   J/COMP370A                                !
(6056)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,111]

    6057:  !(FREE)
    COMP370A:
        P2-T,   D_SR-XOR-BSPHI(C125252), SAVE-D[C],       !D _ (125252)=SR,  BITWISE
        NEXT,   J/GOBUT370A
(6057)  DCS[0,00,0,0,0,0]  BM[0110,,01,11,,00,00,,110,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,000]

    6060:  !(FREE)
    GOBUT370A:
        SETUP,  RETURN/TEST370B,                          !RETURN TO START OF NEXT SUBTEST
        NEXT,   CALL[DINTOIR-5]                           !SUBR: D => IR, BUT(INSTR5)
(6060)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 370B ***
    !TEST-370B CHECKS THAT THE GUARD, NOW ENABLED, WAS ALSO SHIFTED LEFT
    6723:
    TEST370B:
        P0,     LOAD-ENUA(ZTARGET402),                    !GUARD IS NOW "10"#"10"
                LOAD-ERROR(TEST370B),                     !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                             !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/GOBUT370B                               !
(6723)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,001]

    6061:  !(FREE)
    GOBUT370B:
        SETUP,  RETURN/TEST370C,                          !RETURN TO START OF NEXT SUBTEST
        P0,     BUMP-VERIFY,                              !COUNT
        NEXT,   GOTO-PAGE(7),                             !BUT'S ARE ON PAGE 7
                J/BUTGD3-2                                !GO BUT ON GUARD <3:2>
(6061)  DCS[0,00,0,0,0,1]  BM[0110,,00,11,,10,10,,001,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]







    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 370C ***

    !TEST-370C CHECKS THAT SHIFT LEFT/GUARD-ENABLED SHIFTS GD<3>="1" INTO SR<00>
    6721:
    TEST370C:
```

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        P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/INSTRS TEST
                LOAD-ERROR(TEST370C),                   !ERROR DIRECTORY KEY
                DCS-CTR(C9,),                           !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/SETDDC370C                            !
 (6721) DCS[1,00,1,0,0,0]  BM[0110,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,010]

    6062:  !(FREE)
    SETDDC370C:
        P0,     BUMP-VERIFY,                            !COUNT
        P2-T,   D_ZERO, D[C]_ALU07,                     !SET D, D[C]
        NEXT,   J/SHIFT370C                             !
 (6062) DCS[0,00,0,0,0,1]  BM[0011,,00,00,,00,00,,000,,011,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,011]

    6063:  !(FREE)
    SHIFT370C:
        P3-T,   SR_SR-LEFT-1,                           !SHIFT SR LEFT, SR<00>_GD<3>="1"
        NEXT,   J/COMP370C                              !
 (6063) DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,1,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,100]

    6064:  !(FREE)
    COMP370C:
        P2-T,   D_SR-XOR-BSPHI(C052525), SAVE-D[C],     !D _ (052525)=SR, BITWISE
        NEXT,   J/GOBUT370C                             !
 (6064) DCS[0,00,0,0,0,0]  BM[0110,,01,11,,00,00,,111,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,101]

    6065:  !(FREE)
    GOBUT370C:
        SETUP,  RETURN/TEST370D,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   CALL[DINTOIR-5]                         !SUBR; D -> IR, BUT(INSTRS)
 (6065) DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]







    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 370D ***
    !TEST-370D CHECKS THAT THE "1" THAT GOT PUT IN GD<0> CAN BE SHIFTED BACK
    6717:
    TEST370D:
        P0,     LOAD-ENUA(ZTARGET401),                  !GUARD IS NOW "01"#"00"
                LOAD-ERROR(TEST370D),                   !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                           !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/GOBUT370D                             !
 (6717) DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,110]

    6066:  !(FREE)
    GOBUT370D:
        SETUP,  RETURN/TEST371A,                        !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
```



```
                J/BUTGD3-2                              !GO BUT ON GUARD <3:2>
 (6066) DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,01,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]







    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 371A ***
    !TEST-371A CHECKS THAT SR-NOP FUNCTION DOES NOTHING
    6715:
    TEST371A:
        P0,     LOAD-ENUA(ZTARGET434),                  !SETUP FOR IR=(000000)/INSTRS TEST
                LOAD-ERROR(TEST371A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C10,),                          !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/SETRES371A                            !
 (6715) DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,110,111]

    6067:  !(FREE)
    SETRES371A:
        P0,     BUMP-VERIFY,                            !COUNT
        P3,     CSPD[16]_EMIT,                          !CSP GETS
        EMITC,  SENDMUX-4567-SEL,                       !RES VALUES
                SR-NOP, GUARD-EN,                       !
        NEXT,   J/LOADRES371A                           !
 (6067) DCS[0,00,0,0,0,1]  BM[0011,,10,10,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,000,111,000]

    6070:  !(FREE)
    LOADRES371A:
        P2-T,   RES_CSPB(B16),                          !STORE RES
                D_ASPHI(C000000), D[C]_1,               !SETUP D, D[C]
        NEXT,   J/SHIFT371A                             !
 (6070) DCS[0,00,0,0,0,0]  BM[1111,,11,01,,11,01,,100,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,1000,1,,,11,000,,,000,111,001]

    6071:  !(FREE)
    SHIFT371A:
        P0,     BUMP-VERIFY,                            !COUNT
        P2-T,   CLK-SR,                                 !DO AN SR-NOP
        NEXT,   J/COMP371A                              !
 (6071) DCS[0,00,0,0,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,010]

    6072:  !(FREE)
    COMP371A:

        P2-T,   D_SR-XOR-BSPHI(C052525), SAVE-D[C],     !D _ (052525)=SR, BITWISE
        NEXT,   J/GOBUT371A                             !
 (6072) DCS[0,00,0,0,0,0]  BM[0110,,01,11,,00,00,,111,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,011]

    6073:  !(FREE)
    GOBUT371A:
        SETUP,  RETURN/TEST371B,                        !RETURN TO START OF NEXT SUBTEST
```

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        P0,     BUMP-VERIFY,                          !COUNT
        NEXT,   CALL[DINTOIR-5]                       !SUBR: D -> IR, BUT(INSTR5)
 (6073) DCS[0,00,0,0,0,1]  BM[0110,,00,11,,10,01,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]







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 !*** TEST 371B ***
 !TEST-371B CHECKS THAT THE GUARD WASN'T ALTERED EITHER
 6713:
 TEST371B:
        P0,     LOAD-ENUA(%TARGET401),                !GUARD IS STILL "01"#"00"
                LOAD-ERROR(TEST371B),                 !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                         !COMPARE ENUA!TNUA AT TARGET
        NEXT,   J/GOBUT371B                           !
 (6713) DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,111,100]

 6074:  !(FREE)
 GOBUT371B:
        SETUP,  RETURN/SCOPE371,                      !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                         !BUT'S ARE ON PAGE 7
                J/BUTGD3-2                            !GO BUT ON GUARD <3:2>
 (6074) DCS[0,00,0,0,0,0]  BM[0110,,00,00,,01,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,100]


 !SCOPE LOOP TEST FOR SR, GUARD, XMUX, RES AREA CODE
 6075:  !(FREE)
 SCOPE371:
        P0,     BUMP-VERIFY,                          !COUNT
        P2,     RES_CSPD(C000000),                    !RESET RES TO SR-LOAD/GUARD-DIS
        NEXT,   PUTD[SCOPE],                          !NO ERROR:  "TEST372A" [+3, WORDS]
                J/TEST372A                            !   ERROR:  "SETRES361A" [-#5, WORDS]
 (6075) DCS[0,00,0,1,0,1]  BM[0000,,10,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0100,,,0,,1000,1,,,11,000,,,101,111,001]




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 !       THE LLOWING TWO SUBROUTINES ARE ALSO USED IN THE ABOVE TESTS:


 7031:  !(FREE)
 CSP16XORSRTOIR5:
        P2-T,   D_SR-XOR-CSPB(B16), SAVE-D[C],        !COMPARE SR-XMUX:EXPECTED VALUE, BITWISE
        NEXT,   J/DINTOIR5                            !  AND PUT IN IR TO DO INSTR5 TEST
 (7031) DCS[0,00,0,0,0,0]  BM[0110,,11,01,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,111,011]
```



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 7035:  !(FREE)
 CSP16XORFLTTOIR5:
        P2-T,   D_FLTPT-XOR-CSPB(B16), SAVE-D[C],     !COMPARE FLTPT-XMUX:EXPECTED VALUE, BITWISE
        NEXT,   J/DINTOIR5                            !  AND PUT IN IR TO DO INSTR5 TEST
 (7035) DCS[0,00,0,0,0,0]  BM[0110,,11,01,,00,01,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,111,011]





 !.PAGE===========================================================================================================

 .TOC    *    TEST372A-372B:  TESTING CUA, PROCESSOR MUX, AND BUTA[SUBR A]

 !******************************************************************************
 !*
 !*      TESTS:  372A - 372B                         UWORDS: 015 + 002
 !*
 !*      FUNCTIONS:      TESTS THAT CUA IS LOADED, AND CAN BE READ THRU PROCESSOR MUX,
 !*                      ALSO TESTS THAT CAN BE PUT INTO D, AND BUT[SUBR A] LOADS
 !*                      D<14:03> INTO RETURN.
 !*
 !******************************************************************************





 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !*** TEST 372A ***
 !TEST-372A CHECKS THE CUA -> D -> SUBR A -> RETURN PATH WITH PATTERN [6222]
 6571:
 TEST372A:
        P0,     LOAD-ENUA(CUA372A),                   !WHERE WE BUT [RETURN] TO
                LOAD-ERROR(TEST372A),                 !ERROR DIRECTORY KEY
                DCS-CTR(C7,),                         !IN 7, MICROWORDS
        NEXT,   J/LOOP372A                            !
 (6571) DCS[1,00,1,0,0,0]  BM[1000,,00,11,,00,10,,010,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,100,000]

 6540:
 LOOP372A:
        SELECT, UCON-PROC,                            !SELECT PROCESSOR UCON CONTROL

        ENABLE, BUSDIN_CUA[14-03],                    !  PUT 0#CUA[11-00]#EXFLAG<2:1>#FOVP ON BUSDIN
        P0,     SET-UCON-CONTROL,                     !LOAD UCON REGISTER AT P0
                BUMP-VERIFY,                          !COUNT
        P3,     BUTA(CUA-TRACK),                      !RESET TRACKING OF CUA
        NEXT,   J/SETDC372A                           !
 (6540) DCS[0,00,0,0,0,1]  BM[0000,,00,00,,01,01,,000,,000,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,001,,,000,111,110]

 6076:  !(FREE)
```

```
9622    SETDC372A:
9623            P2=T,   D_ASPHI(C000000), D[C]_1,               ;SET D[C] FLAG = (1) FOR FIRST LOOP
9624            NEXT,   J/CUA372A                               ;
     (6076)  DCS[0,00,0,0,0,0]  BM[1111..00,00..11,01..100..000...0,1,0..0..0...0,0000...0..0000,0...11,000...010,010,010]
9625
9626    6222:
9627    CUA372A:
9628            P3,     CSPD[16]_BUSDIN, RETURN/BUTERROR6,      ;COPY CUA [WHICH IS ADDRESS OF THIS UWORD] INTO CSP
9629            NEXT,   BUTP(D[C]-B),                           ;IF D[C] SET [PASS 1], GO TO "LOAD372A"
9630                    J/TEST372B                              ;IF D[C] RESET [PASS 2], GO TO "TEST372B"
     (6222)  DCS[0,00,0,0,0,0]  BM[0110..10,01..11,11..110..000...0,0,0..0..0...0,0001...1..0000,0...10,011...111,000,001]
9631
9632    6703:
9633    LOAD372A:
9634            P0,     BUMP-VERIFY,                            ;COUNT
9635            P2=T,   D_CSPB(B16), D[C]_0,                    ;PUT CUA FROM CSP INTO D, RESET D[C]
9636            NEXT,   J/SUBRA372A                             ;
     (6703)  DCS[0,00,0,0,0,1]  BM[1010..11,01..00,00..000...000...0,1,0..0..0...0,0000...0..0000,0...11,000...000,111,111]
9637
9638    6077:  ;(FREE)
9639    SUBRA372A:
9640            SETUP,  RETURN/BUTERROR6,                       ;IF BUTA(SUBR-B) USED INSTEAD
9641            NEXT,   PAGE(7),                                ;SUBROUTINE IS ON PAGE 7
9642                    BUTA(SUBR-A),                           ;LOAD PAGE, LOAD RETURN FROM D
9643                    J/ZTARGET555                            ;THE SUBROUTINE
     (6077)  DCS[0,00,0,0,0,0]  BM[0110..00,01..11,11..110..111...0,0,0..0..0...0,0000...0..0000,0...11,101...101,101,101]
9644
9645    ;NEXT WORD COMES FROM 'ZTARGET555', WHICH DOES ONLY A BUTA(RETURN),
9646    ;WHICH SHOULD RETURN TO 'CUA372A' [-3, WORDS]
9647
9648
9649
9650
9651
9652
9653    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
9654
9655    ;*** TEST 372B ***
9656    ;TEST-372B CHECKS THE CUA -> D -> SUBR A => RETURN PATH WITH PATTERN [5555]
9657    6701:
9658    TEST372B:
9659            P0,     LOAD=ENUA(CUA372B),                     ;WHERE WE BUT(RETURN) TO
9660                    LOAD=ERROR(TEST372B),                   ;ERROR DIRECTORY KEY
9661                    DCS-CTR(C7,),                           ;IN 7, MICROWORDS
9662            NEXT,   J/PAGE372B                              ;
     (6701)  DCS[1,00,1,0,0,0]  BM[1000..00,10..11,01..101..101...0,0,0..0..0...0,0000...0..0000,0...11,000...001,000,000]
9663
9664    6100:  ;(FREE)
9665    PAGE372B:
9666            SETUP,  RETURN/BUTERROR5,                       ;JUNK IN RETURN REGISTER
9667            NEXT,   GOTO-PAGE(5),                           ;XFER TO PAGE 5
9668                    J/SETDC372B                             ;
```



```
     (6100)  DCS[0,00,0,0,0,0]  BM[0101..00,01..11,11..110..101...0,0,0..0..0...0,0000...0..0000,0...11,100...000,000,000]
9669
9670    5000:  ;(FREE)
9671    SETDC372B:
9672            P0,     BUMP-VERIFY,                            ;COUNT
9673            P2=T,   D_ASPHI(C000000), D[C]_1,               ;SET D[C] FLAG = (1) FOR FIRST LOOP
9674            P3,     BUTA(CUA-TRACK),                        ;RESET TRACKING OF CUA
9675            NEXT,   J/CUA372B                               ;
     (5000)  DCS[0,00,0,0,0,1]  BM[1111..00,00..11,01..100...000...0,1,0..0..0...0,0000...0..0000,0...11,001...101,101,101]
9676
9677    5555:
9678    CUA372B:
9679            P3,     CSPD[16]_BUSDIN, RETURN/BUTERROR5,      ;COPY CUA [WHICH IS ADDRESS OF THIS WORD] INTO CSP
9680            NEXT,   BUTR(D[C]-B),                           ;IF D[C] SET [PASS 1], GO TO "LOAD372B"
9681                    J/SCOPE372B                             ;IF D[C] RESET [PASS2], GO TO "SCOPE372B"
     (5555)  DCS[0,00,0,0,0,0]  BM[0101..10,01..11,11..110..000...0,0,0..0..0...0,0001...1..0000,0...10,011...101,000,001]
9682
9683    5503:
9684    LOAD372B:
9685            P2=T,   D_CSPB(B16), D[C]_0,                    ;PUT CUA FROM CSP INTO D, RESET D[C]
9686            NEXT,   J/SUBRA372B                             ;
     (5503)  DCS[0,00,0,0,0,0]  BM[1010..11,01..00,00..000..000...0,1,0..0..0...0,0000...0..0000,0...11,000...010,010,011]
9687
9688    5223:  ;(FREE)
9689    SUBRA372B:
9690            P0,     BUMP-VERIFY,                            ;COUNT
9691            SETUP,  RETURN/BUTERROR5,                       ;IF BUTA(SUBR-B) USED INSTEAD
9692            NEXT,   PAGE(7),                                ;SUBROUTINE IS ON PAGE 7
9693                    BUTA(SUBR-A),                           ;LOAD PAGE, LOAD RETURN FROM D
9694                    J/RESETUCONP                            ;THE SUBR:  RESETS PROC UCON:  BUSDIN_EMIT, EN-CLK-IR
     (5223)  DCS[0,00,0,0,0,1]  BM[0101..00,01..11,11..110..111...0,0,0..0..0...0,0000...0..0000,0...11,101...010,111,001]
9695
9696    ;NEXT WORD COMES FROM 'RESETUCONP', WHICH DOES ONLY A BUTA(RETURN),
9697    ;WHICH SHOULD RETURN TO 'CUA372B' [-3,WORDS]
9698
9699    5501:
9700    SCOPE372B:
9701            NEXT,   GOTO-PAGE(6),                           ;XFER
9702                    BUTD(SCOPE),                            ;NO ERROR:  "TEST373A" [+1,WORDS]
9703                    J/TEST373A                              ;   ERROR:  "LOOP372A" [-12,WORDS]
     (5501)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,100...101,100,001]
9704
9705
9706
9707
9708
9709    ;.PAGE**********************************************************************************************************
9710
9711
9712    .TOC    *   TEST373:  CHECK JAMUPP W/ BUTA(DIAGNOSE), BM EXT BIT FLPADR
9713
9714
```

```
9715    !*************************************************************************************
9716    !*
9717    !*      TEST8:  373 A - B                               UWORD8:  007 + 014
9718    !*
9719    !*      FUNCTIONS:
9720    !*
9721    !*      THE FOLLOWING SET OF TWO TESTS PERFORMS SEVERAL FUNCTIONS:
9722    !*
9723    !*              TEST-373-A CHECKS THAT CONTROL CAN BE PASSED TO THE BASE MACHINE, VIA
9724    !*              BUTA(DIAGNOSE), AND SEVERAL B.M. WORDS EXECUTED.  A BUTA(DIAGNOSE) IN
9725    !*              THE B.M. SHOULD THEN BE ENCOUNTERED, RETURNING CONTROL TO THE DCS VIA
9726    !*              A JAMUPP FORCE.
9727    !*
9728    !*              TEST-373-B THEN CHECKS THAT THE B.M. MACHINE CODE CORRECTLY
9729    !*              ASSERTED THE "FLPADR-L" EXTENSION BIT, FORCING A READ, VIA THE ASP/DF
9730    !*              FIELD MODE, OF A SCRATCHPAD.
9731    !*
9732    !*************************************************************************************
9733
9734
9735
9736    !THIS TEST GOES TO THE B.M. VIA BUTA(DIAGNOSE)
9737    6541:
9738    TEST373A:
9739            P0,     LOAD-ENUA(4777),                        !JAMUPP8 GO HERE IN DCS
9740                    LOAD-ERROR(TEST373A),                   !ERROR DIRECTORY KEY
9741                    DCS-CTR(C7,),                           !COMPARE AT JAMUPP
9742            NEXT,   J/RETURN373A                            !
     (6541)  DCS[1,00,1,0,0,0]  BM[1000,,00,10,,01,11,,111,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,110,010]
9743
9744    6562:
9745    RETURN373A:
9746            P3,     CSPD[00]_EMIT, RETURN/TEST373B,         !RETURN AFTER PROCESSING, TO NEXT TEST
9747            NEXT,   GOTO-PAGE(7),                           !JAMUPP ROUTINE EXPECTS RETURN ADDRESS IN CSP(00)
9748                    J/SETIR373A                             !
     (6562)  DCS[0,00,0,0,0,0]  BM[0110,,10,10,,11,11,,010,,111...0,0,0,,0,,0,,0...0,1111...1,,0000,0,,,11,100,,,000,011,100]
9749
9750    7034:  !(FREE)
9751    SETIR373A:
9752            P2-U,   IR_EMIT, EMIT/000002,                   !SET DF8(2) IN IR
9753            P3,     BUTA(DIAGNOSE),                         !BEGIN THE TRANSFER SEQUENCE
9754            NEXT,   J/SETSR373A                             !
     (7034)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,010...0,0,0,,0,,0,,0...1,1010...0,,0000,0,,,11,011,,,000,011,111]
9755
9756    7037:  !(FREE)
9757    SETSR373A:
9758            P2-T,   SR_CSPD(C052525),                       !SET SR<00>=(1) FOR JAMUPP EXPECTED (BY JAMUPP SERVICER)
9759            NEXT,   GOTO-PAGE(3),                           !SET PAGE TO BE ACTUAL (3)
9760                    J/MED25                                 !POINT UPP TO B.M. DISP, ON PAGE
     (7037)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,011...0,0,1,,0,,0,,0...0,0111...0,,0000,0,,,11,100,,,000,010,000]
9761
9762    !THE SEQUENCE OF CONTROL SHOULD NOW BE COMING FROM THE B.M.:
```



```
9763
9764    !3020:
9765    !MED25:
9766    !       NEXT,   GOTO-PAGE(2),                           !XFER
9767    !               J/MED25A                                !
9768    !
9769    !2071:
9770    !MED25A:
9771    !       P2-T,   D_ASPHI[DF]-TOP, SAVE-D[C],             !READ FROM ASPHI/DF, WITH FLPADR ASSERTED
9772    !                                                       !SINCE DF=(2), THE SPADDR8=(12) WILL BE FORCED
9773    !       P3,     BUTA(DIAGNOSE),                         !ALSO START TO RETURN XFER TO DCS, VIA JAMUPP
9774    !       NEXT,   J/MED19A                                !
9775    !
9776    !2066:
9777    !MED19A:
9778    !       NEXT,   GOTO-PAGE(3),                           !THIS WORD ALSO GETS EXECUTED
9779    !               J/MED19                                 !BUT NOW JAMUPP GETS FORCED, AND WE GO NO FURTHER
9780    !
9781    !*** CONTROL NOW COMES BACK TO DCS JAMUPP POINT ***
9782    !
9783    !4777:
9784    !JAMUPP001:
9785    !       P3-T,   SR_D,                                   !SAVE OLD D IN SR
9786    !       NEXT,   BUTR(SR00),                             !TEST SR<00>:
9787    !                                                       !IF=(0), NOT-EXPECTED JAM, GOTO(JAMUPP003), (SEE JAMUPP ROUTINE)
9788    !               J/JAMUPP003                             !IF=(1), EXPECTED JAM, GOTO(JAMUPP002B)
9789    !
9790    !* COME HERE FOR EXPECTED JAM *
9791    !4757:
9792    !JAMUPP002B:
9793    !       P2-T,   D_CSPD(D00), SAVE-D[C],                 !GET RETURN ADDRESS, STORED IN CSP(00)
9794    !       NEXT,   J/JAMUPP002C                            !
9795    !
9796    !=[4000;4777]
9797    !JAMUPP002C:
9798    !       P0,     RETURN_D[14-03], PAGE(7),               !PUT RETURN ADDRESS INTO RETURN REGISTER
9799    !       P2-T,   D_SR, SAVE-D[C],                        !RESTORE OLD D
9800    !       NEXT,   J/JAMUPP002D                            !
9801    !
9802    !=[7000;7377]
9803    !JAMUPP002D:
9804    !       P2-T,   SR_ZERO,                                !ZERO OUT SR<00>, FURTHER JAMUPP8 NOW ILLEGAL
9805    !       NEXT,   BUTA(RETURN),                           !AND RETURN TO FLOW8
9806    !               J/BUTERROR7                             !ONLY IF ERROR
9807    !
9808

9809    !AT THIS POINT, CONTROL SHOULD NOW RETURN TO THIS POINT; THE NEXT TEST
9810    !THIS TEST NOW CHECKS TO SEE THAT THE B.M. FUNCTION WAS EXECUTED CORRECTLY
9811    !NOTE THAT IN TEST-350 ( A WHILE BACK ), A8BSPMI[12] WERE LOADED WITH (000152) DATA
9812
9813    6572:
9814    TEST373B:
9815            P0,     LOAD-ENUA(ZTARGET425),                  !FOR INSTR5-E78=(425) DECODF
9816                    LOAD-ERROR(TEST373B),                   !ERROR DIRECTORY KEY
```

```
9817                DCS-CTR(C6.),                          ;COMPARE AT TARGET
9818          NEXT,   J/GOBUT373B                          !
     (6577)  DCS[1,00,1,0,0,0]  BM[1001..00.11..11.00..010..101...0.0.0...0...0...0.0000...0..0000.0...11.000...001.000.001]
9819
9820    6101:  1(FREE)
9821    GOBUT373B:
9822          SETUP,  RETURN/SCOPE373,                     ;RETURN TO SCOPE LOOP TEST WORD
9823          NEXT,   CALL(DINTOIR-5)                      ;GO DO D -> DBUF -> IR, BUT(INSTR5)
     (6101)  DCS[0,00,0,0,0,0]  BM[0110..00.00..10.00..010..111...0.0.0...0...0...0.0000...0..0000.0...11.100...010.111.011]
9824
9825
9826
9827    6102:  1(FREE)
9828    SCOPE373:
9829          P0,     BUMP-VERIFY,                         ;COUNT
9830          NEXT,   BUTD[SCOPE],                         ;NO ERROR:  "TEST374"  (+1, WORDS)
9831                  J/TEST374                            ;   ERROR:  "RETURN373A"  (-12, WORDS)
     (6102)  DCS[0,00,0,1,0,1]  BM[0000..00.00..00.00..000..000...0.0.0...0...0...0.0000...0..0000.0...11.000...101.110.011]
9832
9833
9834
9835
9836
9837    1.PAGE=========================================================================================================
9838
9839
9840    .TOC   *   TEST374:  A/B SP REWRITE MODES VERIFICATION
9841
9842
9843    !*****************************************************************************
9844    !*
9845    !*      TESTS:  374 A - F                            UWORDS:  076 + 336
9846    !*
9847    !*      FUNCTIONS:
9848    !*
9849    !*      THE FOLLOWING GROUP OF TWELVE TESTS PERFORMS A VERIFICATION OF THE A/B SP REWRITE
9850    !*      FUNCTIONS:
9851    !*
9852    !*              WR(A,L,A)       WR(A,L,B)       WR(A,H,A)       WR(A,H,B)
9853    !*              WR(B,L,A)       WR(B,L,B)       WR(B,H,A)       WR(B,H,B)
9854    !*              WR(AB,L,A)      WR(AB,L,B)      WR(AB,H,A)      WR(AB,H,B)
9855    !*
9856    !*      EACH FUNCTION IS INVOKED, AND THE RESULTANT SCRATCHPADS ARE CHECKED TO INSURE
9857    !*      THAT (1) ONLY THE RIGHT SCRATCHPADS WERE WRITTEN, AND (2) THE CORRECT ADDRESS
9858    !*      WAS USED FOR THE REWRITE.
9859    !*
9860    !*****************************************************************************
9861
9862    !
9863    !       SUMMARY OF ASP/BSP HI/LO REWRITE FUNCTIONALITY TESTS:
9864    !
9865    !                                                  --DF---  --SF---
9866    !       TEST  REWRITE--FUNCTION   ASP   BSP      ASP BSP  ASP BSP  SR IN
```



```
9867    !       NUMB  A/B HI/LO A/B-ADR   ADDR  ADDR   H-L H-L  H-L H-L  OCTAL
9868    !       ----  --- ----- -------   ----  ----   - - - -  - - - -  ------
9869    !
9870    !        A1    A    LO   A-ADDR   SF/4  DF/2   0 0 0 0  0 1 0 0  002100
9871    !        A2    "    ""   B-ADDR    "     "     0 1 0 0  0 0 0 0
9872    !
9873    !        B1    A    HI   A-ADDR   DF/2  SF/4   1 0 0 0  0 0 0 0  100010
9874    !        B2    "    ""   B-ADDR    "     "     0 0 0 0  1 0 0 0
9875    !
9876    !        C1    B    LO   A-ADDR   DF/4  SF/2   0 0 0 1  0 0 0 0  010001
9877    !        C2    "    ""   B-ADDR    "     "     0 0 0 0  0 0 0 1
9878    !
9879    !        D1    B    HI   A-ADDR   SF/2  DF/4   0 0 0 0  0 0 1 0  001040
9880    !        D2    "    ""   B-ADDR    "     "     0 0 1 0  0 0 0 0
9881    !
9882    !        E1    AB   LO   A-ADDR   SF/4  DF/2   0 0 0 0  0 1 0 1  002520
9883    !        E2    ""   ""   B-ADDR    "     "     0 1 0 1  0 0 0 0
9884    !
9885    !        F1    AB   HI   A-ADDR   DF/4  SF/2   1 0 1 0  0 0 0 0  120012
9886    !        F2    ""   ""   B-ADDR    "     "     0 0 0 0  1 0 1 0
9887    !
9888
9889
9890
9891
9892
9893    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
9894
9895    !*** TEST 374A ***
9896
9897    6563:
9898    TEST374:
9899          P0,     BUMP-VERIFY,                         ;COUNT
9900                  LOAD-ERROR(TEST374),                 ;ERROR DIRECTORY KEY
9901          P3,     CSPD[01]_EMIT,                       ;CONSTANT FOR:
9902          EMITC,  SP-LEFT, GUARD=DIS,                  ;SETUP RES FOR SR FUNCTION
9903                  EMIT07/1,                            ;FLAG BIT FOR TESTING
9904          NEXT,   J/LOADRES374                         !
     (6563)  DCS[1,00,0,0,0,1]  BM[0001..10.00..00.10..000..000...0.0.0...0..0...0.1110...1..0000.0...11.000...001.000.011]
9905
9906    6103:  1(FREF)
9907    LOADRES374:
9908          P0,     DCS-CTR(C15.),                       ;HOLD UP ERROR COUNTER
9909          P2,     RES_CSPD(001),                       ;SR NOW SETUP
9910          NEXT,   GOTO-PAGE(5),                        ;XFR
9911                  J/EXPEC374A1                         !
     (6103)  DCS[0,00,1,0,0,0]  BM[0000..10.00..00.00..000..101...0.0.0...0..0...0.1110...0..1000.1...11.100...010.010.010]
9912
9913    5222:  1(FREF)
9914    EXPEC374A1:
9915          P3,     CSPD[02]_EMIT, EMIT/002100,          ;EXPECTED "SERIAL" REPRESENTATION OF RESULT
9916          NEXT,   J/ZERO374A1                          !
     (5222)  DCS[0,00,0,0,0,0]  BM[0000..10.01..00.01..000..000...0.0.0...0..0...0.1101...1..0000.0...11.000...101.011.110]
```

```
        5536:
        ZERO374A1:
                PO,     BUMP-VERIFY,                            !COUNT
                SETUP,  RETURN/DOWRITE374A1,                    !EXEC SUBR WHICH:
                                                                !(1) (000402) => IR,
                NEXT,   CALL[ZEROSF04DF02]                      !(2) WRITES ZEROES TO A/B SP HI/LO SF/DF
    (5536)  DCS[0,00,0,0,0,1]  BM[0101,,00,01,,00,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,100,001]

        5225:  !(FREE)
        DOWRITE374A1:
                P2-T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
                        ASP-ADDRS-R[SF],                        !ADDRESS ASP WITH SF MODE
                        BSP-ADDRS-R[DF],                        !ADDRESS BSP WITH DF MODE
                P3,     WR(A,LO,A-ADDR),                        !SELECT THE PARTICULAR FUNCTION TO TEST,
                NEXT,   J/GETTEM374A1                           !  USING A-ADDR FOR REWRITE
    (5225)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,11,,000,,000,,,0,1,0,,0,,0,,,0,1110,,,0,,0001,0,,,11,000,,,010,010,110]

        5226:  !(FREE)
        GETTEM374A1:
                P3,     CSPD[00]_EMIT, RETURN/ZERO374A2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
                NEXT,   CALL[SFDFTOSR]                          !
    (5226)  DCS[0,00,0,0,0,0]  BM[0101,,10,01,,00,10,,111,,101,,,0,0,0,,0,,0,,,0,1111,,,1,,0000,0,,,11,100,,,111,100,110]



        5227:  !(FREE)
        ZERO374A2:
                SETUP,  RETURN/DOWRITE374A2,                    !AGAIN GO WRITE ZEROES TO A/B-SP-HI/LO
                NEXT,   CALL[ZEROSF04DF02]                      !
    (5227)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,00,11,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,100,001]

        5230:  !(FREE)
        DOWRITE374A2:
                P2-T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
                        ASP-ADDRS-R[SF],                        !ADDRESS ASP WITH SF MODE
                        BSP-ADDRS-R[DF],                        !ADDRESS BSP WITH DF MODE
                P3,     WR(A,LO,B-ADDR),                        !USE SAME FUNCTION AS ABOVE,
                NEXT,   J/GETTEM374A2                           !  ONLY USE B-ADDR FOR REWRITE THIS TIME
    (5230)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,11,,000,,000,,,0,1,0,,0,,0,,,0,1110,,,0,,0101,0,,,11,000,,,010,011,001]

        5231:  !(FREE)
        GETTEM374A2:
                P3,     CSPD[00]_EMIT, RETURN/TEST374A2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
                NEXT,   CALL[SFDFTOSR]                          !
    (5231)  DCS[0,00,0,0,0,0]  BM[0101,,10,11,,00,00,,100,,101,,,0,0,0,,0,,0,,,0,1111,,,1,,0000,0,,,11,100,,,111,100,110]

        5604:
        TEST374A2:
                PO,     LOAD-ENUA(ZTARGET434),                  !NOW SETUP FOR IR=ZERO COMPARE
                        LOAD-ERROR(TEST374A2),                  !ERROR DIRECTORY KEY
                        DCS-CTR(C6,),                           !COMPARE AT TARGET
```



```
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/GOTEST374A2                           !
    (5604)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,011,010]

        5232:  !(FREE)
        GOTEST374A2:
                SETUP,  RETURN/SCOPE374A,                       !GO EXEC SUBR THAT:
                NEXT,   CALL[DINTOIR-5]                         !  PUTS D => IR, BUT(INSTRS) TO TEST FOR ZERO
    (5232)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,00,11,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]




        5233:  !(FREE)
        SCOPE374A:
                NEXT,   BUTD[SCOPE],                            !NO ERROR:  "EXPEC374B1" (+1, WORDS)
                        J/EXPEC374B1                            !   ERROR:  "ZERO374A1" (-8, WORDS)
    (5233)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,011,111]




        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 374B ***

        5537:
        EXPEC374B1:
                P3,     CSPD[02]_EMIT, EMIT/100010,             !EXPECTED "SERIAL" REPRESENTATION OF RESULT
                NEXT,   J/ZERO374B1                             !
    (5537)  DCS[0,00,0,0,0,0]  BM[1000,,10,00,,00,00,,001,,000,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,101,101,110]

        5556:
        ZERO374B1:
                PO,     BUMP-VERIFY,                            !COUNT
                SETUP,  RETURN/DOWRITE374B1,                    !EXEC SUBR WHICH:
                                                                !(1) (000402) => IR,
                NEXT,   CALL[ZEROSF04DF02]                      !(2) WRITES ZEROES TO A/B SP HI/LO SF/DF
    (5556)  DCS[0,00,0,0,0,1]  BM[0101,,00,01,,00,11,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,100,001]

        5234:  !(FREE)
        DOWRITE374B1:
                P2-T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
                        ASP-ADDRS-R[DF],                        !ADDRESS ASP WITH DF MODE
                        BSP-ADDRS-R[SF],                        !ADDRESS BSP WITH SF MODE
                P3,     WR(A,HI,A-ADDR),                        !SELECT THE PARTICULAR FUNCTION TO TEST,

                NEXT,   J/GETTEM374B1                           !  USING A-ADDR FOR REWRITE
    (5234)  DCS[0,00,0,0,0,0]  BM[1010,,10,01,,00,10,,000,,000,,,0,1,0,,0,,0,,,0,1110,,,0,,1001,0,,,11,000,,,010,011,101]

        5235:  !(FREE)
        GETTEM374B1:
                P3,     CSPD[00]_EMIT, RETURN/ZERO374B2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
```

```
10009            NEXT,   CALL[SFDFTOSR]                          ;
     (5235)  DCS[0,00,0,0,0,0]  BM[0101..10.01..00.11..110..101...0.0.0...0..0...0.1111...1..0000.0...11.100...111.100.110]
10010
10011
10012
10013    5236:  1(FREE)
10014    ZERO374B2:
10015            SETUP,  RETURN/DOWRITE374B2,                    ;AGAIN GO WRITE ZEROES TO A/B-SP-MI/LO
10016            NEXT,   CALL[ZEROSF04DF02]                      ;
     (5236)  DCS[0,00,0,0,0,0]  BM[0101..00.01..00.11..111..111...0.0.0...0..0...0.0000...0..0000.0...11.100...000.100.001]
10017
10018    5237:  1(FREE)
10019    DOWRITE374B2:
10020            P2=T,   D_CSPD(D01), D[C]=0,                    ;DATA WITH BIT<07> SET
10021                    ASP=ADDRS=R[DF],                        ;ADDRESS ASP WITH DF MODE
10022                    BSP=ADDRS=R[SF],                        ;ADDRESS BSP WITH SF MODE
10023            P3,     WR(A,MI,B=ADDR),                        ;USE SAME FUNCTION AS ABOVE,
10024            NEXT,   J/GETTEM374B2                           ;  ONLY USE B=ADDR FOR REWRITE THIS TIME
     (5237)  DCS[0,00,0,0,0,0]  BM[1010..10.01..00.10..000..000...0.1.0...0..0...0.1110...0..1101.0...11.000...010.100.000]
10025
10026    5240:  1(FREE)
10027    GETTEM374B2:
10028            P3,     CSPD[00]_EMIT, RETURN/TEST374B2,        ;(SEE DESCRIP OF SUBR FOR FUNCTION)
10029            NEXT,   CALL[SFDFTOSR]                          ;
     (5240)  DCS[0,00,0,0,0,0]  BM[0101..10.11..00.00..110..101...0.0.0...0..0...0.1111...1..0000.0...11.100...111.100.110]
10030
10031    5606:
10032    TEST374B2:
10033            P0,     LOAD=ENUA(ZTARGET434),                  ;NOW SETUP FOR IR=ZERO COMPARE
10034                    LOAD=ERROR(TEST374B2),                  ;ERROR DIRECTORY KEY
10035                    DCS=CTR(C6,),                           ;COMPARE AT TARGET
10036                    BUMP=VERIFY,                            ;COUNT
10037            NEXT,   J/GOTEST374B2                           ;
     (5606)  DCS[1,00,1,0,0,1]  BM[1001..00.11..11.00..011..100...0.0.0...0..0...0.0000...0..0000.0...11.000...010.100.001]
10038
10039    5241:  1(FREE)
10040    GOTEST374B2:
10041            SETUP,  RETURN/SCOPE374B,                       ;GO EXEC SUBR THAT:
10042            NEXT,   CALL[DINTOIR=5]                         ;  PUTS D => IR, BUT(INSTR5) TO TEST FOR ZERO
     (5241)  DCS[0,00,0,0,0,0]  BM[0101..00.01..01.00..010..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010.111.011]
10043
10044
10045
10046
10047    5242:  1(FREE)
10048    SCOPE374B:
10049            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "EXPEC374C1" (+1, WORDS)
10050                    J/EXPEC374C1                            ;   ERROR:  "ZERO374B1" (-8, WORDS)
     (5242)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0..0...0.0000...0..0000.0...11.000...101.101.111]
10051
10052
10053
```



```
10054
10055    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10056
10057    !*** TEST 374C ***
10058
10059    5557:
10060    EXPEC374C1:
10061            P3,     CSPD[02]_EMIT, EMIT/010001,             ;EXPECTED "SERIAL" REPRESENTATION OF RESULT
10062            NEXT,   J/ZERO374C1                             ;
     (5557)  DCS[0,00,0,0,0,0]  BM[0001..10.00..00.00..000..001...0.0.0...0..0...0.1101...1..0000.0...11.000...101.110.110]
10063
10064    5566:
10065    ZERO374C1:
10066            P0,     BUMP=VERIFY,                            ;COUNT
10067            SETUP,  RETURN/DOWRITE374C1,                    ;EXEC SUBR WHICH:
10068                                                            ;(1) (000204) => IR,
10069            NEXT,   CALL[ZEROSF02DF04]                      ;(2)  WRITES ZEROES TO A/B SP MI/LO SF/DF
     (5566)  DCS[0,00,0,0,0,1]  BM[0101..00.01..01.00..011..111...0.0.0...0..0...0.0000...0..0000.0...11.100...000.011.110]
10070
10071    5243:  1(FREE)
10072    DOWRITE374C1:
10073            P2=T,   D_CSPD(D01), D[C]=0,                    ;DATA WITH BIT<07> SET
10074                    ASP=ADDRS=R[DF],                        ;ADDRESS ASP WITH DF MODE
10075                    BSP=ADDRS=R[SF],                        ;ADDRESS BSP WITH SF MODE
10076            P3,     WR(B,LO,A=ADDR),                        ;SELECT THE PARTICULAR FUNCTION TO TEST,
10077            NEXT,   J/GETTEM374C1                           ;  USING A=ADDR FOR REWRITE
     (5243)  DCS[0,00,0,0,0,0]  BM[1010..10.01..00.10..000..000...0.1.0...0..0...0.1110...0..0010.0...11.000...010.100.100]
10078
10079    5244:  1(FREE)
10080    GETTEM374C1:
10081            P3,     CSPD[00]_EMIT, RETURN/ZERO374C2,        ;(SEE DESCRIP OF SUBR FOR FUNCTION)
10082            NEXT,   CALL[SFDFTOSR]                          ;
     (5244)  DCS[0,00,0,0,0,0]  BM[0101..10.01..01.00..110..101...0.0.0...0..0...0.1111...1..0000.0...11.100...111.100.110]
10083
10084
10085
10086    5246:  1(FREE)
10087    ZERO374C2:
10088            SETUP,  RETURN/DOWRITE374C2,                    ;AGAIN GO WRITE ZEROES TO A/B-SP-MI/LO
10089            NEXT,   CALL[ZEROSF02DF04]                      ;
     (5246)  DCS[0,00,0,0,0,0]  BM[0101..00.01..01.00..111..111...0.0.0...0..0...0.0000...0..0000.0...11.100...000.011.110]
10090
10091    5247:  1(FREE)
10092    DOWRITE374C2:
10093            P2=T,   D_CSPD(D01), D[C]=0,                    ;DATA WITH BIT<07> SET
10094                    ASP=ADDRS=R[DF],                        ;ADDRESS ASP WITH DF MODE

10095                    BSP=ADDRS=R[SF],                        ;ADDRESS BSP WITH SF MODE
10096            P3,     WR(B,LO,B=ADDR),                        ;USE SAME FUNCTION AS ABOVE,
10097            NEXT,   J/GETTEM374C2                           ;  ONLY USE B=ADDR FOR REWRITE THIS TIME
     (5247)  DCS[0,00,0,0,0,0]  BM[1010..10.01..00.10..000..000...0.1.0...0..0...0.1110...0..0110.0...11.000...010.101.000]
10098
10099    5250:  1(FREE)
```

```
10100    GETTEM374C2:
10101            P3,     CSPD[00]_EMIT, RETURN/TEST374C2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
10102            NEXT,   CALL[SFDFTO&R]                          !
     (5250)  DCS[0.00.0.0.0.0]  BM[0101..10.10..10.10..100..101...0.0.0..0..0...0.1111...1..0000.0...11.100...111.100.110]
10103
10104    5524:
10105    TEST374C2:
10106            P0,     LOAD=ENUA(ZTARGET434),                  !NOW SETUP FOR IR=ZERO COMPARE
10107                    LOAD=ERROR(TEST374C2),                  !ERROR DIRECTORY KEY
10108                    DCS-CTR(C6.),                           !COMPARE AT TARGET
10109                    BUMP=VERIFY,                            !COUNT
10110            NEXT,   J/GOTEST374C2                           !
     (5524)  DCS[1.00.1.0.0.1]  BM[1001..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...010.101.001]
10111
10112    5251:  !(FREE)
10113    GOTEST374C2:
10114            SETUP,  RETURN/SCOPE374C,                       !GO EXEC SUBR THAT:
10115            NEXT,   CALL[DINTOIR=5]                         !  PUTS D -> IR, BUT(INSTRS) TO TEST FOR ZERO
     (5251)  DCS[0.00.0.0.0.0]  BM[0101..00.01..01.01..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]
10116
10117
10118
10119
10120    5252:  !(FREE)
10121    SCOPE374C:
10122            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "EXPEC374D1" (+1, WORDS)
10123                    J/EXPEC374D1                            !   ERROR:  "ZERO374C1" (-8, WORDS)
     (5252)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...101.110.111]
10124
10125
10126
10127
10128    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10129
10130    !*** TEST 374D ***
10131
10132    5567:
10133    EXPEC374D1:
10134            P3,     CSPD[02]_EMIT, EMIT/001040,             !EXPECTED "SERIAL" REPRESENTATION OF RESULT
10135            NEXT,   J/ZERO374D1                             !
     (5567)  DCS[0.00.0.0.0.0]  BM[0000..10.00..10.00..100..000...0.0.0..0..0...0.1101...1..0000.0...11.000...101.001.100]
10136
10137    5514:
10138    ZERO374D1:
10139            P0,     BUMP=VERIFY,                            !COUNT
10140            SETUP,  RETURN/DOWRITE374D1,                    !EXEC SUBR WHICH:
10141                                                            !(1) (000204) -> IR,
10142            NEXT,   CALL[ZEROSF02DF04]                      !(2)  WRITES ZEROES TO A/B SP HI/LO SF/DF
     (5514)  DCS[0.00.0.0.0.1]  BM[0101..00.01..01.01..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...000.011.110]
10143
10144    5253:  !(FREE)
10145    DOWRITE374D1:
```



```
10146            P2=T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
10147                    ASP=ADDRS-R[SF],                        !ADDRESS ASP WITH SF MODE
10148                    BSP=ADDRS-R[DF],                        !ADDRESS BSP WITH DF MODE
10149            P3,     WR(B,HI,A=ADDR),                        !SELECT THE PARTICULAR FUNCTION TO TEST,
10150            NEXT,   J/GETTEM374D1                           !  USING A=ADDR FOR REWRITE
     (5253)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.11..000..000...0.1.0..0..0...0.1110...0..1010.0...11.000...010.101.100]
10151
10152    5254:  !(FREE)
10153    GETTEM374D1:
10154            P3,     CSPD[00]_EMIT, RETURN/ZERO374D2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
10155            NEXT,   CALL[SFDFTO&R]                          !
     (5254)  DCS[0.00.0.0.0.0]  BM[0101..10.01..01.01..101..101...0.0.0..0..0...0.1111...1..0000.0...11.100...111.100.110]
10156
10157
10158
10159    5255:  !(FREE)
10160    ZERO374D2:
10161            SETUP,  RETURN/DOWRITE374D2,                    !AGAIN GO WRITE ZEROES TO A/B-SP-HI/LO
10162            NEXT,   CALL[ZEROSF02DF04]                      !
     (5255)  DCS[0.00.0.0.0.0]  BM[0101..00.01..01.01..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...000.011.110]
10163
10164    5256:  !(FREE)
10165    DOWRITE374D2:
10166            P2=T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
10167                    ASP=ADDRS-R[SF],                        !ADDRESS ASP WITH SF MODE
10168                    BSP=ADDRS-R[DF],                        !ADDRESS BSP WITH DF MODE
10169            P3,     WR(B,HI,B-ADDR),                        !USE SAME FUNCTION AS ABOVE,
10170            NEXT,   J/GETTEM374D2                           !  ONLY USE B-ADDR FOR REWRITE THIS TIME
     (5256)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.11..000..000...0.1.0..0..0...0.1110...0..1110.0...11.000...010.101.111]
10171
10172    5257:  !(FREE)
10173    GETTEM374D2:
10174            P3,     CSPD[00]_EMIT, RETURN/TEST374D2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
10175            NEXT,   CALL[SFDFTO&R]                          !
     (5257)  DCS[0.00.0.0.0.0]  BM[0101..10.10..10.00..000..101...0.0.0..0..0...0.1111...1..0000.0...11.100...111.100.110]
10176
10177    5500:
10178    TEST374D2:
10179            P0,     LOAD=ENUA(ZTARGET434),                  !NOW SETUP FOR IR=ZERO COMPARE
10180                    LOAD=ERROR(TEST374D2),                  !ERROR DIRECTORY KEY
10181                    DCS-CTR(C6.),                           !COMPARE AT TARGET
10182                    BUMP=VERIFY,                            !COUNT
10183            NEXT,   J/GOTEST374D2                           !
     (5500)  DCS[1.00.1.0.0.1]  BM[1001..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...010.110.000]
10184
10185    5260:  !(FREE)

10186    GOTEST374D2:
10187            SETUP,  RETURN/SCOPE374D,                       !GO EXEC SUBR THAT:
10188            NEXT,   CALL[DINTOIR=5]                         !  PUTS D -> IR, BUT(INSTRS) TO TEST FOR ZERO

     (5260)  DCS[0.00.0.0.0.0]  BM[0101..00.01..01.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]
10189
10190
```

```
10191
10192
10193    5261:  1(FREE)
10194    SCOPE374D:
10195            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "EXPEC374E1" (+1, WORDS)
10196                    J/EXPEC374E1                    ;   ERROR:  "ZERO374D1" (-8, WORDS)
     (5261)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,001,101]
10197
10198
10199
10200
10201    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10202
10203    !*** TEST 374E ***
10204
10205    5515:
10206    EXPEC374E1:
10207            P3,     CSPD[02]_EMIT, EMIT/002520,     ;EXPECTED "SERIAL" REPRESENTATION OF RESULT
10208            NEXT,   J/ZERO374E1                     ;
     (5515)  DCS[0,00,0,0,0,0]  BM[0000,,10,01,,01,01,,010,,000...0,0,0,,0,,0,,0...0,1101,,,1,,0000,0,,,11,000,,,101,010,110]
10209
10210    5526:
10211    ZERO374E1:
10212            P0,     BUMP-VERIFY,                    ;COUNT
10213            SETUP,  RETURN/DOWRITE374E1,            ;EXEC SUBR WHICH:
10214                                                    ;(1) (000402) -> IR,
10215            NEXT,   CALL[ZEROSF04DF02]              ;(2)  WRITES ZEROES TO A/B SP HI/LO SF/DF
     (5526)  DCS[0,00,0,0,0,1]  BM[0101,,00,01,,01,10,,010,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,000,100,001]
10216
10217    5262:  1(FREE)
10218    DOWRITE374E1:
10219            P2=T,   D_CSPD(D01), D[C]_0,            ;DATA WITH BIT<07> SET
10220                    ASP=ADDRS-R[SF],                ;ADDRESS ASP WITH SF MODE
10221                    BSP=ADDRS-R[DF],                ;ADDRESS BSP WITH DF MODE
10222            P3,     WR(AB,LO,A=ADDR),               ;SELECT THE PARTICULAR FUNCTION TO TEST,
10223            NEXT,   J/GETTEM374E1                   ;  USING A=ADDR FOR REWRITE
     (5262)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,11,,000,,000...0,1,0,,0,,0,,0...0,1110,,,0,,0011,0,,,11,000,,,010,110,011]
10224
10225    5263:  1(FREE)
10226    GETTEM374E1:
10227            P3,     CSPD[00]_EMIT, RETURN/ZERO374E2,        ;(SEE DESCRIP OF SUBR FOR FUNCTION)
10228            NEXT,   CALL[SFDFTOSR]                  ;
     (5263)  DCS[0,00,0,0,0,0]  BM[0101,,10,01,,01,10,,100,,101...0,0,0,,0,,0,,0...0,1111,,,1,,0000,0,,,11,100,,,111,100,110]
10229
10230
10231
10232    5264:  1(FREE)
10233    ZERO374E2:
10234            SETUP,  RETURN/DOWRITE374E2,            ;AGAIN GO WRITE ZEROES TO A/B-SP-HI/LO
10235            NEXT,   CALL[ZEROSF04DF02]              ;
     (5264)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,01,10,,101,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,000,100,001]
10236
```



```
10237    5265:  1(FREE)
10238    DOWRITE374F2:
10239            P2=T,   D_CSPD(D01), D[C]_0,            ;DATA WITH BIT<07> SET
10240                    ASP=ADDRS-R[SF],                ;ADDRESS ASP WITH SF MODE
10241                    BSP=ADDRS-R[DF],                ;ADDRESS BSP WITH DF MODE
10242            P3,     WR(AB,LO,B=ADDR),               ;USE SAME FUNCTION AS ABOVE,
10243            NEXT,   J/GETTEM374E2                   ;  ONLY USE B=ADDR FOR REWRITE THIS TIME
     (5265)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,11,,000,,000...0,1,0,,0,,0,,0...0,1110,,,0,,0111,0,,,11,000,,,010,110,110]
10244
10245    5266:  1(FREE)
10246    GETTEM374F2:
10247            P3,     CSPD[00]_EMIT, RETURN/TEST374E2,        ;(SEE DESCRIP OF SUBR FOR FUNCTION)
10248            NEXT,   CALL[SFDFTOSR]                  ;
     (5266)  DCS[0,00,0,0,0,0]  BM[0101,,10,10,,10,00,,010,,101...0,0,0,,0,,0,,0...0,1111,,,1,,0000,0,,,11,100,,,111,100,110]
10249
10250    5502:
10251    TEST374F2:
10252            P0,     LOAD-FNUA(ZTARGET434),          ;NOW SETUP FOR IR=ZERO COMPARE
10253                    LOAD-ERROR(TEST374E2),          ;ERROR DIRECTORY KEY
10254                    DCS-CTR(C6.),                   ;COMPARE AT TARGET
10255                    BUMP-VERIFY,                    ;COUNT
10256            NEXT,   J/GOTEST374E2                   ;
     (5502)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,010,110,111]
10257
10258    5267:  1(FREE)
10259    GOTEST374F2:
10260            SETUP,  RETURN/SCOPE374E,               ;GO EXEC SUBR THAT:
10261            NEXT,   CALL[DINTOIR=5]                 ;  PUTS D => IR, BUT(INSTR5) TO TEST FOR ZERO
     (5267)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,01,11,,000,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
10262
10263
10264
10265
10266    5270:  1(FREE)
10267    SCOPE374E:
10268            NEXT,   BUTD[SCOPE],                    ;NO ERROR:  "EXPEC374F1" (+1, WORDS)
10269                    J/EXPEC374F1                    ;   ERROR:  "ZERO374E1" (-8, WORDS)
     (5270)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,101,010,111]
10270
10271
10272
10273
10274    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10275
10276    !*** TEST 374F ***
10277
10278    5527:
10279    EXPEC374F1:
10280            P3,     CSPD[02]_EMIT, EMIT/120012,     ;EXPECTED "SERIAL" REPRESENTATION OF RESULT
10281            NEXT,   J/ZERO374F1                     ;
     (5527)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,001,,010...0,0,0,,0,,0,,0...0,1101,,,1,,0000,0,,,11,000,,,101,001,110]
10282
10283    5516:
```

```
10284    ZERO374F1:
10285            P0,     BUMP-VERIFY,                            !COUNT
10286            SETUP,  RETURN/DOWRITE374F1,                    !EXEC SUBR WHICH:
10287                                                            !(1) (000204) -> IR,
10288            NEXT,   CALL[ZEROSF02DF04]                      !(2)  WRITES ZEROES TO A/B SP HI/LO SF/DF
     (5516)  DCS[0,00,0,0,0,1]  BM[0101..00,01..01,11..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...000,011,110]
10289
10290    5271:  !(FREE)
10291    DOWRITE374F1:
10292            P2=T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
10293                    ASP=ADDRS-R[DF],                        !ADDRESS ASP WITH DF MODE
10294                    BSP=ADDRS-R[SF],                        !ADDRESS BSP WITH SF MODE
10295            P3,     WR(AB,HI,A=ADDR),                       !SELECT THE PARTICULAR FUNCTION TO TEST,
10296            NEXT,   J/GETTEM374F1                           !  USING A-ADDR FOR REWRITE
     (5271)  DCS[0,00,0,0,0,0]  BM[1010..10,01..00,10..000..000...0,1,0..0..0...0,1110...0..1011,0...11,000...010,111,010]
10297
10298    5272:  !(FREE)
10299    GETTEM374F1:
10300            P3,     CSPD[00]_EMIT, RETURN/ZERO374F2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
10301            NEXT,   CALL[SFDFTOSR]                          !
     (5272)  DCS[0,00,0,0,0,0]  BM[0101..10,01..01,11..011..101...0,0,0..0..0...0,1111...1..0000,0...11,100...111,100,110]
10302
10303
10304
10305    5273:  !(FREE)
10306    ZERO374F2:
10307            SETUP,  RETURN/DOWRITE374F2,                    !AGAIN GO WRITE ZEROES TO A/B-SP=HI/LO
10308            NEXT,   CALL[ZEROSF02DF04]                      !
     (5273)  DCS[0,00,0,0,0,0]  BM[0101..00,01..01,11..100..111...0,0,0..0..0...0,0000...0..0000,0...11,100...000,011,110]
10309
10310    5274:  !(FREE)
10311    DOWRITE374F2:
10312            P2=T,   D_CSPD(D01), D[C]_0,                    !DATA WITH BIT<07> SET
10313                    ASP=ADDRS-R[DF],                        !ADDRESS ASP WITH DF MODE
10314                    BSP=ADDRS-R[SF],                        !ADDRESS BSP WITH SF MODE
10315            P3,     WR(AB,HI,B=ADDR),                       !USE SAME FUNCTION AS ABOVE,
10316            NEXT,   J/GETTEM374F2                           !  ONLY USE B-ADDR FOR REWRITE THIS TIME
     (5274)  DCS[0,00,0,0,0,0]  BM[1010..10,01..00,10..000..000...0,1,0..0..0...0,1110...0..1111,0...11,000...010,111,101]
10317
10318    5275:  !(FREE)
10319    GETTEM374F2:
10320            P3,     CSPD[00]_EMIT, RETURN/TEST374F2,        !(SEE DESCRIP OF SUBR FOR FUNCTION)
10321            NEXT,   CALL[SFDFTOSR]                          !
     (5275)  DCS[0,00,0,0,0,0]  BM[0101..10,10..10,00..100..101...0,0,0..0..0...0,1111...1..0000,0...11,100...111,100,110]
10322
10323    5504:
10324    TEST374F2:
10325            P0,     LOAD=ENUA(ZTARGET434),                  !NOW SETUP FOR IR=ZERO COMPARE
10326                    LOAD=ERROR(TEST374F2),                  !ERROR DIRECTORY KEY
10327                    DCS=CTR(C6,),                           !COMPARE AT TARGET
10328                    BUMP=VERIFY,                            !COUNT
10329            NEXT,   J/GOTEST374F2                           !
```



```
     (5504)  DCS[1,00,1,0,0,1]  BM[1001..00,11..11,00..011..100...0,0,0..0..0...0,0000...0..0000,0...11,000...010,111,110]
10330
10331    5276:  !(FREE)
10332    GOTEST374F2:
10333            SETUP,  RETURN/SCOPE374F,                       !GO EXEC SUBR THAT:
10334            NEXT,   CALL[DINTOIR=5]                         !  PUTS D -> IR, BUT(INSTRS) TO TEST FOR ZERO
     (5276)  DCS[0,00,0,0,0,0]  BM[0101..00,01..01,11..111..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,111,011]
10335
10336
10337
10338
10339    5277:  !(FREE)
10340    SCOPE374F:
10341            P2,     RES_CSPD(C000000),                      !RESET RES TO SR=LOAD/GUARD=DISABLED
10342            NEXT,   PUTD[SCOPE],                            !NO ERROR:  "TEST375A" (+17, WORDS)
10343                    J/TEST375A                              !   ERROR:  "ZERO374F1" (-6, WORDS)
     (5277)  DCS[0,00,0,1,0,0]  BM[0000..10,00..00,00..000..000...0,0,0..0..0...0,0100...0..1000,1...11,000...101,001,111]
10344
10345
10346
10347
10348    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10349
10350    !       THE FOLLOWING SUBROUTINES ARE USED IN THE ABOVE TESTS (374 A1-F2):
10351    !
10352    !       THIS FIRST SUBROUTINE LOADS THE IR WITH THE APPROPRIATELY
10353    !               SELECTED SF AND DF FIELD VALUES, THEN PROCEEDS TO
10354    !               ZERO OUT THE ASP AND BSP LOCATIONS CORRESPONDING TO
10355    !               THESE VALUES, IN BOTH ASP/BSP HI/LO SP'S.
10356    !
10357    !               NOTE:  THIS SUBR MUST BE ENTERED WITH BUSDIN_EMIT AND
10358    !                       EN CLK IR PROC UCONS ENABLED
10359    !
10360    !               ALSO:  THE WRITE FUNCTION USED IS:   WR(AB,H,A) OR WR(AB,L,A)
10361    !                       WITH A-ADDR = SF OR DF, RESPECTIVELY
10362    !
10363
10364    7036:  !(FREE)
10365    ZEROSF02DF04:
10366            P2=U,   IR_EMIT, EMIT/000204,                   !SF=2, DF=4
10367            NEXT,   J/ZEROSFDF                              !GO ZERO
     (7036)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,10..000..100...0,0,0..0..0...1,1010...0..0000,0...11,000...000,100,010]
10368
10369    7041:  !(FREE)
10370    ZEROSF04DF02:
10371            P2=U,   IR_EMIT, EMIT/000402,                   !SF=4, DF=2
10372            NEXT,   J/ZEROSFDF                              !GO ZERO
     (7041)  DCS[0,00,0,0,0,0]  BM[0000..00,00..01,00..000..010...0,0,0..0..0...1,1010...0..0000,0...11,000...000,100,010]
10373
10374    7042:  !(FREE)
10375    ZEROSFDF:
10376            P2=T,   D_ZERO, SAVE=D[C],                      !ZEROES
10377            P3,     A=BSPHI[DF]_D,                          !
```

```
                NEXT,   J/ZEROSFDFA                                     !
      (7042)  DCS[0,00,0,0,0,0]  BM[0011,,00,00,,00,10,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,1011,0,,,11,000,,,000,100,011]

        7043:  !(FREE)
        ZEROSFDFA:
                P3,     A#BSPLO[DF]_D,                                  !
                NEXT,   J/ZEROSF                                        !
      (7043)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,10,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0011,0,,,11,000,,,000,100,100]

        7044:  !(FREE)
        ZEROSF:
                P2-T,   D_ZERO, SAVE-D[C],                              !ENTER HERE FOR SF ONLY
                P3,     A#BSPHI[SF]_D,                                  !
                NEXT,   J/ZEROSFA                                       !
      (7044)  DCS[0,00,0,0,0,0]  BM[0011,,00,01,,00,11,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,1011,0,,,11,000,,,000,100,101]

        7045:  !(FREE)
        ZEROSFA:
                P3,     A#BSPLO[SF]_D,                                  !
                NEXT,   BUTA(RETURN),                                   !AND RETURN
                        J/BUTERROR7                                     !
      (7045)  DCS[0,00,0,0,0,0]  BM[0000,,00,01,,00,11,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0011,0,,,11,111,,,011,111,110]



        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !       THIS SECOND SUBROUTINE NOW READS BACK ALL THE REGISTERS IN ASP/BSP,
        !               HI/LO, SF/DF THAT THE WRITE COULD HAVE REFERENCED.
        !               IF LOCATION WAS WRITTEN, BIT<07> SHOULD BE SET,
        !               ELSE IT SHOULD REMAIN CLEAR (FROM ZEROSFXXDFXX ROUTINE)
        !               THE BITS ARE SHIFTED SERIALLY INTO THE SR, AND AFTER
        !               TWO WRITES (WHICH GIVES 16. BITS, THE SR JUST FILLED),
        !               THE COMPARE IS MADE BETWEEN EXPECTED:RECEIVED ANSWERS.
        !
        !               NOTE:  THIS SUBR REQUIRES SR-LEFT/GUARD-DISABLED SETUP,
        !                       AND CSP(02) CONTAINS EXPECTED ANSWER.
        !                       CSP(00) CONTAINS RETURN ADDRESS, IN BITS<14:03>.
        !

        5746:
        SFDFTOSR:
                P0,     LOAD-ENUA(ZTARGET777),                          !COMPARE POINT IS AT EXIT
                        LOAD-ERROR(SFDFTOSR),                           !THEORETICALLY THIS CODE SHOULD NEVER BE USED
                        DCS-CTR(C11,),                                  !COMPARE AT TARGET
                NEXT,   GOTO-PAGE(7),                                   !SUBR IS HERE, NOTE OVERLAP W/ BIT<2:0> OF ENUA
                        J/SFDFTOSRAA                                    !
      (5746)  DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,100,000]

        7040:  !(FREE)
        SFDFTOSRAA:
                P2-T,   D_ASPHI[DF], D[C]_ALU07,                        !SR<15,07> = ASPHI/DF
                NEXT,   J/SFDFTOSRA                                     !
```



```
      (7040)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,11,10,,000,,011,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,100,111]

        7047:  !(FREE)
        SFDFTOSRA:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_ASPLO[DF], D[C]_ALU07,                        !SR<14,06> = ASPLO/DF
                NEXT,   J/SFDFTOSRB                                     !
      (7047)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,10,10,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,000]

        7050:  !(FREE)
        SFDFTOSRB:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_BSPHI[DF], D[C]_ALU07,                        !SR<13,05> = BSPHI/DF
                NEXT,   J/SFDFTOSRC                                     !
      (7050)  DCS[0,00,0,0,0,0]  BM[1010,,01,00,,00,00,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,001]

        7051:  !(FREE)
        SFDFTOSRC:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_BSPLO[DF], D[C]_ALU07,                        !SR<12,04> = BSPLO/DF
                NEXT,   J/SFDFTOSRD                                     !
      (7051)  DCS[0,00,0,0,0,0]  BM[1010,,00,00,,00,00,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,010]

        7052:  !(FREE)
        SFDFTOSRD:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_ASPHI[SF], D[C]_ALU07,                        !SR<11,03> = ASPHI/SF
                NEXT,   J/SFDFTOSRE                                     !
      (7052)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,11,11,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,011]

        7053:  !(FREE)
        SFDFTOSRE:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_ASPLO[SF], D[C]_ALU07,                        !SR<10,02> = ASPLO/SF
                NEXT,   J/SFDFTOSRF                                     !
      (7053)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,10,11,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,100]

        7054:  !(FREE)
        SFDFTOSRF:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_BSPHI[SF], D[C]_ALU07,                        !SR<09,01> = BSPHI/SF
                NEXT,   J/SFDFTOSRG                                     !
      (7054)  DCS[0,00,0,0,0,0]  BM[1010,,01,01,,00,00,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,101]

        7055:  !(FREE)
        SFDFTOSRG:

                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
                        D_BSPLO[SF], D[C]_ALU07,                        !SR<08,00> = BSPLO/SF
                NEXT,   J/SFDFTOSRH                                     !
      (7055)  DCS[0,00,0,0,0,0]  BM[1010,,00,01,,00,00,,000,,011,,,0,1,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,000,101,110]

        7056:  !(FREE)
        SFDFTOSRH:
                P2-T,   SR_SR-LEFT-1,                                   !STORE PAST
```

```
10472                   D_CSPD(D00), D[C]_0,                    !RETRIEVE RETURN ADDRESS
10473             NEXT,   J/SFDFTOSRI                             !
     (7056)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,1,1..0..0...0,1111...0..0000,0...11,000...000,101,111]
10474
10475     7057:  !(FREE)
10476     SFDFTOSRI:
10477             P0,     RETURN_D[14-03], PAGE(7),               !PUT RETURN ADDRESS INTO RETURN REGISTER,
10478             P2=T,   D_SP=XOR=CSPD(D02), SAVE=D[C],          !COMPARE RECEIVED:EXPECTED
10479             NEXT,   J/ZTARGET777                            !GO DO A BUTA(RETURN)
     (7057)  DCS[0,00,0,0,0,0]  BM[0110..10,00..00,00..000..111...0,1,0..0..0...0,1101...0..0000,0...11,101...111,111,111]
10480
10481
10482
10483
10484
10485     !.PAGE=============================================================================================================
10486
10487
10488     .TOC    *    TEST375-376:  BYTE WRITE TO ASP/BSP LO, SP ADDRS R=OR=1/FLIPT-INHIBIT
10489
10490
10491     !*****************************************************************************************
10492     !*
10493     !*      TESTS:  375A - 376                              UWORDS:  020 + 017
10494     !*
10495     !*      FUNCTIONS:
10496     !*
10497     !*      THE FOLLOWING SET OF THREE CHECKS TESTS THE FOLLOWING FEATURES OF THE ASP/BSP:
10498     !*
10499     !*      TEST 375 A/B TEST THAT BYTE WRITES CAN BE PERFORMED TO ASP/BSP LO, USING THE
10500     !*      "DAD" EXTENSION BIT COMBINATION.
10501     !*
10502     !*      TEST 376 VERIFIES THAT A FLOATING POINT INSTRUCTION IN THE IR FORCES SF-ADDRS
10503     !*      BIT<02> TO A (0), AND THAT BUTA(R-OR-1) IN THE REFERENCING MICROWORD FORCES
10504     !*      BIT<00> TO A (1).
10505     !*
10506     !*****************************************************************************************
10507
10508
10509
10510     !TEST 375 A CHECKS THAT THE DAD BIT COMBINATION /11 DOES A BYTE WRITE (IE, LO BYTE ONLY)
10511     5517:
10512     TEST375A:
10513             P0,     LOAD=ENUA(ZTARGET432),                  !SETUP FOR INSTRS IR=(000125)/E78/432
10514                     LOAD=ERROR(TEST375A),                   !ERROR DIRECTORY KEY
10515                     DCS=CTR(C11.),                          !COMPARE AT TARGET
10516             NEXT,   J/SETSP375A                             !
     (5517)  DCS[1,00,1,0,0,0]  BM[0100..00,11..11,00..011..010...0,0,0...0..0...0,0000...0..0000,0...11,000...101,000,110]
10517
10518     5506:
10519     SETSP375A:
10520             P2=T,   D_CSPD(C125252),                        !FIRST SETUP SP'S WITH JUNK
10521             P3,     A=BSPLO[06]_D=(A),                      !
10522             NEXT,   GOTO=PAGE(7),                           !XFER FOR DCS=DAD BITS
```



```
10523                   J/FIRST375A                             !
     (5506)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..111..111...0,1,0..0..0...0,0110...0..0011,0...11,100...000,100,110]
10524
10525     7046:  !(FREE)
10526     FIRST375A:
10527             SETUP,  FIRST-1-OR-2,                           !DAD/01, SHOULDN'T CAUSE BYTE WRITE
10528             P2=T,   D_ZERO,                                 !SHOULD WRITE ALL ZEROES
10529             P3,     ASPLO[06]_D,                            !
10530             NEXT,   J/SECOND375A                            !
     (7046)  DCS[0,01,0,0,0,0]  BM[0011..00,00..00,00..111..000...0,1,0..0..0...0,0000...0..0001,0...11,000...000,110,001]
10531
10532     7061:  !(FREE)
10533     SECOND375A:
10534             SETUP,  SECOND-1-OR-2,                          !DAD/10, SHOULDN'T CAUSE BYTE WRITE
10535             P2=T,   D_ZERO,                                 !SHOULD WRITE ALL ZEROES
10536             P3,     BSPLO[06]_D,                            !
10537             NEXT,   J/BYTE375A                              !
     (7061)  DCS[0,10,0,0,0,0]  BM[0011..00,10..00,00..111..000...0,1,0..0..0...0,0000...0..0110,0...11,000...000,110,010]
10538
10539     7062:  !(FREE)
10540     BYTE375A:
10541             SETUP,  BYTE-WRITE,                             !DAD/11, SHOULD CAUSE A BYTE WRITE
10542             P2=T,   D_ASPHI(C052525),                       !WRITE THE (125) IN THE LOW BYTE
10543             P3,     A=BSPLO[06]_D=(B),                      !UPPER BYTE SHOULD BE (000) FROM ABOVE
10544             NEXT,   J/CHECK375A                             !
     (7062)  DCS[0,11,0,0,0,0]  BM[1111..00,10..11,01..111..000...0,1,0..0..0...0,0000...0..0111,0...11,000...000,110,011]
10545
10546     7063:  !(FREE)
10547     CHECK375A:
10548             P2=T,   D_ASPLO(R06),                           !GET THE A SIDE SP
10549             NEXT,   J/GOBUT375A                             !
     (7063)  DCS[0,00,0,0,0,0]  BM[1111..00,00..10,00..111..000...0,1,0..0..0...0,0000...0..0000,0...11,000...000,110,100]
10550
10551     7064:  !(FREE)
10552     GOBUT375A:
10553             SETUP,  RETURN/TEST375B,                        !RETURN TO START OF NEXT SUBTEST
10554             NFXT,   CALL[DINTOIR=5]                         !GO CHECK (000125) OBTAINED
     (7064)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,10..101..111...0,0,0...0..0...0,0000...0..0000,0...11,100...010,111,011]
10555
10556
10557
10558
10559
10560
10561     !TEST 375 B NOW CHECKS THE SAME THING (000125) IS ON THE B SIDE
10562     5625:

10563     TEST375B:
10564             P0,     LOAD=ENUA(ZTARGET432),                  !SETUP FOR INSTRS IR=(000125)/E78/432
10565                     LOAD=ERROR(TEST375B),                   !ERROR DIRECTORY KEY
10566                     DCS=CTR(C7.),                           !COMPARE AT TARGET
10567             NEXT,   J/CHECK375B                             !
     (5625)  DCS[1,00,1,0,0,0]  BM[1000..00,11..11,00..011..010...0,0,0...0..0...0,0000...0..0000,0...11,000...011,000,000]
10568
```

```
10569    5300:  ;(FREE)
10570    CHECK375B:
10571            P2=T,   D_BSPLO(R06),                   ;GET THE B SIDE SP
10572            NEXT,   J/GOBUT375B                     ;
     (5300)  DCS[0,00,0,0,0,0]  BM[1010,,00,10,,00,00,,111,,000...0,1,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,011,000,001]
10573
10574    5301:  ;(FREE)
10575    GOBUT375B:
10576            SETUP,  RETURN/TEST376A,                 ;RETURN TO START OF NEXT SUBTEST
10577            NEXT,   CALL[DINTOIR=5]                 ;GO CHECK (000125) OBTAINED
     (5301)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,10,01,,011,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,010,111,011]
10578
10579
10580
10581
10582
10583    ;  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
10584
10585
10586    ;TEST 376 A NOW DOES THE SF ADDRESS MODE, W/ FLTPT-INHIBIT AND BUTA(R=OR=1) ACTIVE
10587    ;NOTE:
10588    ;       THE ASPHI CONTAINS THE FOLLOWING VALUES IN THESE LOCATIONS:
10589    ;
10590    ;       ASPHI(02)       ASPHI(03)       ASPHI(06)       ASPHI(07)
10591    ;       (052522)        (177777)        (056166)        (052525)
10592    ;
10593
10594    5513:
10595    TEST376A:
10596            P0,     LOAD-ENUA(DOIT376A),             ;MAKE SURE BUTA(R=OR=1) DOESN'T CAUSE A BRANCH
10597                    LOAD-ERROR(TEST376A),            ;ERROR DIRECTORY KEY
10598                    DCS-CTR(C2,),                    ;COMPARE AT TARGET
10599            NEXT,   J/SETIR376A                      ;
     (5513)  DCS[1,00,1,0,0,0]  BM[1101,,00,10,,11,00,,100,,000...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,011,000,010]
10600
10601    5302:  ;(FREE)
10602    SETIR376A:
10603            SETUP,  BUTA(R=OR=1),                    ;SETUP ACTIVE BUT MODIFICATION OF SF BIT<00> ADDRESS
10604            P2=U,   IR_EMIT, EMIT/170600,            ;IR=FLTPT INSTR, SF=(6)
10605            NEXT,   J/DOIT376A                       ;
     (5302)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,01,10,,000,,000...0,0,0,,0,,0,,,1,1010...0,,0000,0,,,10,010,,100,100,000]
10606
10607    5440:
10608    DOIT376A:
10609            P2=T,   D_A-XOR-B,                       ;COMPARE SF/OBTAINED;REGISTER EXPECTED
10610                    BUS-A_ASPHI[SF],                 ;SF ON A GOES FROM (6) -> (2) FROM FLTPT,
10611                                                     ;AND FROM (2) -> (3) FOR (R=OR=1)
10612                    BUS-B_BSPHI(R03),                ;THIS WE EXPECT
10613            NEXT,   J/TEST376A1                      ;
     (5440)  DCS[0,00,0,0,0,0]  BM[0110,,01,11,,11,11,,101,,000...0,1,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,110,001,100]
10614
10615    ;       -       -       -       -       -       -       -       -       -       -       -       -
10616
```



```
10617    ;NOW CHECK THE RIGHT RESULT WAS OBTAINED
10618    5614:
10619    TEST376A1:
10620            P0,     LOAD-ENUA(ZTARGET434),           ;SETUP FOR IR=(000000)/INSTRS COMPARE
10621                    LOAD-ERROR(TEST376A1),           ;ERROR DIRECTORY KEY
10622                    DCS-CTR(C6,),                    ;COMPARE AT TARGET
10623            NEXT,   J/GOBUT376A                      ;
     (5614)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,100...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,011,000,011]
10624
10625    5303:  ;(FREE)
10626    GOBUT376A:
10627            SETUP,  RETURN/SCOPE376,                 ;RETURN TO SCOPE LOOP TEST WORD
10628            NEXT,   CALL[DINTOIR=5]                  ;CHECK FOR (000000)
     (5303)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,10,00,,100,,111...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,100,,010,111,011]
10629
10630
10631
10632    5304:  ;(FREE)
10633    SCOPE376:
10634            P0,     BUMP-VERIFY,                     ;COUNT
10635            NEXT,   BUTD[SCOPE],                     ;NO ERROR:  "TEST410"  (+1, WORDS)
10636                    J/TEST410                        ;   ERROR:  "SETSP375A"  (-12, WORDS)
     (5304)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,,0,0000...0,,0000,0,,,11,000,,101,000,111]
10637
10638
10639
10640
10641
10642    ;.PAGE;=========================================================================================================
10643
10644
10645    .TOC    *    TEST410:  BYTE/BYTE CONSTANT/D=ZERO
10646
10647
10648    ;*****************************************************************************
10649    ;*
10650    ;*      TESTS:  410 A - E                       UWORDS:  044 + 020
10651    ;*
10652    ;*      FUNCTIONS:
10653    ;*
10654    ;*      THE FOLLOWING TESTS RUN A COUNT PATTERN THRU THE IR, MAINTAING TOTALS OF
10655    ;*      THE NUMBER OF TIMES:
10656    ;*
10657    ;*      BYTE=H=LOW, BYTE/1=OR=2=FIRST=HIGH, BYTE/1=OR=2=SECOND=HIGH,
10658    ;*      (D=ZERO)=H=HIGH, AND (D=ZERO)=H=LOW.
10659    ;*
10660    ;*      AT THE END, THE TESTS COMPARE THE EXPECTED COUNTS TO THE RECEIVED COUNTS.
10661    ;*
10662    ;*****************************************************************************
10663
10664
10665    5507:
10666    TEST410:
```

```
10667           P0,     LOAD-ERROR(TEST410),                    !ERROR DIRECTORY KEY
10668                   DCS-CTR(C6,),                           !COMPARE BELOW
10669           NEXT,   GOTO-PAGE(6),                           !XFER
10670                   J/SETBYTEB410                           !
    (5507)  DCS[1,00,1,0,0,0]  BM[1001..00,00..00,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,100...101,110,000]
10671
10672   6560:
10673   SETBYTEB410:
10674           P2=T,   D_ZERO,                                 !ZEROES INTO:
10675           P3,     A:BSPHI[10]_D=[A],                      !ASPHI[10] = BYTE-FIRST
10676           NEXT,   GOTO-PAGE(7),                           !
10677                   J/SETBYTEC410                           !BSPHI[10] = WORD (=-BYTE)
    (6560)  DCS[0,00,0,0,0,0]  BM[0011..00,00..00,00..000..111...0,1,0..0..0...0,0000...0..1011,0...11,100...000,110,000]
10678
10679   7060:  !(FREE)
10680   SETBYTEC410:
10681           P3,     A:BSPLO[10]_D=[B],                      !ASPLO[10] = BYTE-SECOND
10682           NEXT,   J/SETBYTED410                           !BSPLO[10] = IR-DATA
    (7060)  DCS[0,00,0,0,0,0]  BM[0000..00,10..00,00..000..000...0,0,0..0..0...0,0000...0..0111,0...11,000...000,110,110]
10683
10684   7066:  !(FREE)
10685   SETBYTED410:
10686           P3,     A:BSPLO[11]_D=[B],                      !ASPLO[11] = D-NONZERO
10687           NEXT,   GOTO-PAGE(6),                           !BSPLO[11] = D-ZERO
10688                   J/SETBYTEE410                           !
    (7066)  DCS[0,00,0,0,0,0]  BM[0000..00,11..00,00..000..110...0,0,0..0..0...0,0000...0..0111,0...11,100...000,000,000]
10689
10690   6000:  !(FREE)
10691   SETBYTEE410:
10692           P0,     BUMP-VERIFY,                            !COUNT
10693           P3,     CSPD[17]_EMIT, EMIT/000001,             !A (1) IN BYTE-CONSTANT
10694           NEXT,   J/SETBYTEG410                           !  LOCATION IN CSP
    (6000)  DCS[0,00,0,0,0,1]  BM[0000..10,00..00,00..000..001...0,0,0..0..0...0,0000...1..0000,0...11,000...001,000,101]
10695
10696   6105:  !(FREE)
10697   SETBYTEG410:
10698           P2=U,   IR_DBUF=[I],                            !SETUP UCONS FOR D --> IR
10699           P3,     DBUF_D=[I],                             !
10700           NEXT,   J/TESTD410                              !
    (6105)  DCS[0,00,0,0,0,0]  BM[0100..00,00..00,01..000..100...0,0,0..0..0...1,1011...0..0000,0...11,000...111,111,011]
10701
10702
10703
10704   !*** LOOP BACK ENTRY POINT ***
10705
10706   6773:
10707   TESTD410:
10708           P0,     LOAD-ENUA(GOFOR410),                    !COMPARE AT END OF LOOP
10709                   LOAD-ERROR(TESTD410),                   !ERROR DIRECTORY KEY
10710                   DCS-CTR(C15,),                          !RELOAD EACH TIME THROUGH
10711           P2=U,   IR_DBUF,                                !(DON'T CARE HERE)
```



```
10712           P3,     DBUF_D,                                 !COPY IR-DATA FROM D --> DBUF
10713           NEXT,   BUTR(D14-00-EQ-0),                      !TEST D<14:00>H:
10714                   J/DNONZERO410                           !ZERO --> DZERO410, NONZERO --> DNONZERO410
    (6773)  DCS[1,00,1,0,0,0]  BM[0000..00,11..10,11..110..001...0,0,0..0..0...1,1010...0..0000,0...01,101...101,011,001]
10715
10716   !ENTER HERE IF D<14:00> WAS DETECTED AS NON-ZERO
10717   6531:
10718   DNONZERO410:
10719           P2=T,   D_ASPLO[DNONZERO]-PLUS-1,               !BUMP NON ZERO COUNTER
10720           P2=U,   IR_DBUF,                                !COPY IR-DATA FROM DBUF --> IR
10721           P3,     ASPLO[11]_D,                            !SAVE NON ZERO COUNTER
10722                   DBUF_D,                                 !(DON'T CARE HERE)
10723           NEXT,   GOTO-PAGE(7),                           !XFR TO 7 FOR DAD
10724                   J/NEXTPAT410                            !
    (6531)  DCS[0,00,0,0,0,0]  BM[1001..01,11..10,01..000..111...0,1,0..0..0...1,1010...0..0001,0...11,100...000,110,101]
10725
10726   !ENTER HERE IF D<14:00> WAS DETECTED AS ZERO
10727   6533:
10728   DZERO410:
10729           P2=T,   D_BSPLO[DZERO]-PLUS-1,                  !BUMP ZERO COUNTER
10730           P2=U,   IR_DBUF,                                !COPY IR-DATA FROM DBUF --> IR
10731           P3,     BSPLO[11]_D,                            !SAVE ZERO COUNTER
10732                   DBUF_D,                                 !(DON'T CARE NOW)
10733           NEXT,   GOTO-PAGE(7),                           !XFR TO 7 FOR DAD
10734                   J/NEXTPAT410                            !
    (6533)  DCS[0,00,0,0,0,0]  BM[1001..00,11..11,01..000..111...0,1,0..0..0...1,1010...0..0110,0...11,100...000,110,101]
10735
10736   7065:  !(FREE)
10737   NEXTPAT410:
10738           SETUP,  FIRST-1-OR-2,                           !SELECT DAD BITS FOR "BYTEFIRSTR410"
10739           P2=T,   D_BSPLO[IR-DATA]-PLUS-2,                !(INCRE DATA FOR -NEXT- TIME THRU)
10740                   D[C]_COUT15,                            !WHEN THIS SETS WE'RE DONE
10741           P3,     BSPLO[10]_D,                            !SAVE NEXT
10742           NEXT,   J/BYTEFIRST410                          !
    (7065)  DCS[0,01,0,0,0,0]  BM[1100..00,10..11,01..000..110...0,1,0..0..0...0,0000...0..0110,0...11,000...000,111,000]
10743
10744   7070:  !(FREE)
10745   BYTEFIRST410:
10746           SETUP,  SECOND-1-OR-2,                          !SELECT DAD BITS FOR "BYTESECOND410"
10747           P2=T,   D_ASPHI[BYTE-FIRST]-PLUS-CSP[1-0],      !BYTE-FIRST SELECTS EITHER
10748                   SAVE-D[C],                              !CSP(17)=1 OR CSP(13)=0
10749           P3,     ASPHI[10]_D,                            !WRITE BACK
10750           NEXT,   BUTP(BYTE),                             !BYTE --> "BYTESECOND410"
10751                   J/WORD410                               !-BYTE --> "WORD410
    (7070)  DCS[0,10,0,0,0,0]  BM[1001..10,00..11,00..000..111...0,1,0..0..0...0,0100...0..1001,0...01,001...011,110,110]
10752

10753   !ENTER HERE IF BYTE-H NOT ASSERTED, IE IR=(WORD)
10754   7366:
10755   WORD410:
10756           SETUP,  SECOND-1-OR-2,                          !SELECT DAD BITS FOR "BYTESECOND410"
10757           P2=T,   D_BSPHI[WORD]-PLUS-1,                   !BUMP WORD=-BYTE COUNTER
10758                   SAVE-D[C],                              !SAVE PAST CARRYOUT STATUS
```

```
                P3,     BSPHI[10]_D,                            !WRITE BACK
                NEXT,   J/BYTESECOND410                         !NOW GO TRY BYTE-SECOND
        (7366)  DCS[0,10,0,0,0,0]  BM[1001,,01,10,,11,01,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,1110,0,,,11,000,,,011,110,111]

        !ENTER HERE IF BYTE-H WAS ASSERTED, IE IR=(BYTE)
        7367:
        BYTESECOND410:
                SETUP,  NO-DAD,                                 !KEEP FOR NOISE
                P2-T,   D_ASPLO[BYTE-SECOND]-PLUS-CSP[1-0],     !BYTE-SECOND SELECTS EITHER
                        SAVE-D[C],                              !CSP[17]=1 OR CSP[13]=0
                P3,     ASPLO[10]_D,                            !WRITE BACK
                NEXT,   BUTR(D[C]-B),                           !IF SET, SKIP OUT TO TEST-410A
                        J/GOFOR410                              !IF CLEAR, FALL THRU TO  NEXT
        (7367)  DCS[0,00,0,0,0,0]  BM[1001,,10,00,,10,00,,000,,111,,,0,1,0,,0,,0,,,0,0100,,,0,,0001,0,,,10,011,,,011,110,001]

        7361:                                                   !01, P7
        GOFOR410:
                P2-T,   D_BSPLO[IR-DATA],                       !GET DATA FOR IR INTO D
                NEXT,   GOTO-PAGE(6),                           !
                        J/TESTD410                              !LOOP BACK FOR NEXT
        (7361)  DCS[0,00,0,0,0,0]  BM[1010,,00,10,,00,00,,000,,110,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,111,111,011]




        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !TEST 410A CHECKS THAT D<14:00>=ZERO WAS ONLY ASSERTED TWICE
        7363:                                                   !11, P7
        EXPEC410A:
                NEXT,   GOTO-PAGE(6),                           !FOR LOADING DCS-CTR
                        J/TEST410A                              !
        (7363)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,110,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,111,001,001]

        6711:
        TEST410A:
                P0,     LOAD-ENUA(ZTARGET422),                  !FOR IR=(000002) W/INSTRS
                        LOAD-ERROR(TEST410A),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C7,),                           !COMPARE AT TARGET
                NEXT,   J/COMP410A                              !
        (6711)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,010,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,000,110]

        6106:  !(FREE)
        COMP410A:
                P2-T,   D_BSPLO[DZERO],                         !GET DATA
                NEXT,   J/INTOIR410A                            !
        (6106)  DCS[0,00,0,0,0,0]  BM[1010,,00,11,,00,00,,000,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,000,111]

        6107:  !(FREE)
        INTOIR410A:
                SETUP,  RETURN/TEST410B,                        !COPY D --> IR, RESET BUSDIN_EMIT
                NEXT,   CALL[DINTOIR-5]                         ! AND CHECK ITS ALL ZERO
```



```
        (6107)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,00,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]




        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !TEST 410B CHECKS THAT D<14:00>=ZERO WAS NOT ASSERTED
        ! 32768,-2, = 32766, (077776) TIMES
        6704:
        TEST410B:
                P0,     LOAD-ENUA(ZTARGET434),                  !FOR IR=(000000) W/INSTRS
                        LOAD-ERROR(TEST410B),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C8,),                           !COMPARE AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   J/EXPEC410B                             !
        (6704)  DCS[1,00,1,0,0,1]  BM[0111,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,001,000]

        6110:  !(FREE)
        EXPEC410B:
                P3,     CSPD[17]_EMIT, EMIT/077776,             !EXPECTED NUMBER OF TIMES
                NEXT,   J/COMP410B                              !D<14:00> WAS NON ZERO
        (6110)  DCS[0,00,0,0,0,0]  BM[0111,,10,11,,11,11,,111,,110,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,001,001,001]

        6111:  !(FREE)
        COMP410B:
                P3-T,   D_ASPLO[DNONZERO]-MINUS-CSPD[17],       !COMPARE RECEIVED:EXPECTED
                NEXT,   J/GOPUT410B                             !
        (6111)  DCS[0,00,0,0,0,0]  BM[1101,,10,00,,10,01,,000,,000,,,1,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,001,010]

        6112:  !(FREE)
        GOPUT410B:
                SETUP,  RETURN/TEST410C,                        !GO PUT D --> IR
                NEXT,   CALL[DINTOIR-5]                         !  AND CHECK IT-S ALL ZERO
        (6112)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,00,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]




        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !TEST 410C CHECKS THAT BYTE-H WAS NOT ASSERTED 21696,,
        !OR WAS ASSERTED 11072, TIMES IN 32768, ITERATIONS
        6707:
        TEST410C:
                P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO TEST

                        LOAD-ERROR(TEST410C),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C6,),                           !COMPARE AT TARGET
                NEXT,   J/EXPEC410C                             !
        (6707)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,001,011]

        6113:  !(FREE)
```

```
10851    EXPEC410C:
10852            P3,     CSPD[17]_EMIT, EMIT/52300,              ;32768.-#TIMES BYTE-M ASSERTED
10853            NEXT,   J/ASIDE410C                             ;  21696.=(52300)
     (6113)  DCS[0,00,0,0,0,0]  BM[0101..10.01..00.11..000..000...0.0.0...0.0...0.0000...1..0000.0...11.000...001.001.100]
10854
10855    6114:  ;(FREE)
10856    ASIDE410C:
10857            P2=T,   SR_CSPD(D17),                           ;GET ONTO A-SIDE
10858            NEXT,   J/COMP410C                              ;
     (6114)  DCS[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...001.001.101]
10859
10860    6115:  ;(FREE)
10861    COMP410C:
10862            P3=T,   D_SR=MINUS=BSPHI[WORD],                 ;COMPARE EXPEC:RECEIVED
10863            NEXT,   J/GOBUT410C                             ;
     (6115)  DCS[0,00,0,0,0,0]  BM[1101..01.10..00.00..000..000...1.1.0..0..0...0.0000...0..0000.0...11.000...001.001.110]
10864
10865    6116:  ;(FREE)
10866    GOBUT410C:
10867            SETUP,  RETURN/TEST410D,                        ;RETURN TO START OF NEXT SUBTEST
10868            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
10869                    J/BUTD=IS=ZERO                          ;GO CHECK EQUALITY
     (6116)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.10..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
10870
10871
10872
10873
10874    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10875
10876    ;TEST 410D CHECKS THAT BYTE-CONSTANT WAS ASSERTED (4270)=2232.
10877    ;TIMES UNDER "FIRST-1-OR-2"
10878    6727:
10879    TEST410D:
10880            P0,     LOAD=ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
10881                    LOAD=ERROR(TEST410D),                   ;ERROR DIRECTORY KEY
10882                    DCS=CTR(C5,),                           ;COMPARE AT TARGET
10883            NEXT,   J/EXPEC410D                             ;
     (6727)  DCS[1,00,1,0,0,0]  BM[1010..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.001.111]
10884
10885    6117:  ;(FREE)
10886    EXPEC410D:
10887            P0,     BUMP=VERIFY,                            ;COUNT
10888            P3,     CSPD[17]_EMIT,                          ;
10889                    EMIT/004270,                            ;(4270)=2232. TIMES FOR FIRST
10890            NEXT,   J/COMP410D                              ;
     (6117)  DCS[0,00,0,0,0,1]  BM[0000..10.10..00.10..111..000...0.0.0...0..0...0.0000...1..0000.0...11.000...001.010.000]
10891
10892    6120:  ;(FREE)
10893    COMP410D:
10894            P3=T,   D_ASPHI[BYTE-FIRST]=MINUS=CSPD[17],     ;COMPARE RECEIVED:EXPEC
10895            NEXT,   J/GOBUT410D                             ;
     (6120)  DCS[0,00,0,0,0,0]  BM[1101..10.00..11.00..000..000...1.1.0..0..0...0.0000...0..0000.0...11.000...001.010.001]
10896
```



```
10897    6121:  ;(FREE)
10898    GOBUT410D:
10899            SETUP,  RETURN/TEST410E,                        ;RETURN TO START OF NEXT SUBTEST
10900            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
10901                    J/BUTD=IS=ZERO                          ;CHECK EQUALITY
     (6121)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.00..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
10902
10903
10904
10905
10906    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
10907
10908    ;TEST 410E CHECKS THAT BYTE-CONSTANT WAS ASSERTED (3600)=1920.
10909    ;TIMES UNDER "SECOND-1-OR-2"
10910    6705:
10911    TEST410E:
10912            P0,     LOAD=ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
10913                    LOAD=ERROR(TEST410E),                   ;ERROR DIRECTORY KEY
10914                    DCS=CTR(C5,),                           ;COMPARE AT TARGET
10915            NEXT,   J/EXPEC410E                             ;
     (6705)  DCS[1,00,1,0,0,0]  BM[1010..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.010.010]
10916
10917    6122:  ;(FREE)
10918    EXPEC410E:
10919            P0,     BUMP=VERIFY,                            ;COUNT
10920            P3,     CSPD[17]_EMIT,                          ;
10921                    EMIT/003600,                            ;(3600)=1920. TIMES FOR SECOND
10922            NEXT,   J/COMP410E                              ;
     (6122)  DCS[0,00,0,0,0,1]  BM[0000..10.01..11.10..000..000...0.0.0...0..0...0.0000...1..0000.0...11.000...001.010.011]
10923
10924    6123:  ;(FREE)
10925    COMP410E:
10926            P3=T,   D_ASPLO[BYTE=SECOND]=MINUS=CSPD[17],    ;COMPARE RECEIVED:EXPEC
10927            NEXT,   J/GOBUT410E                             ;
     (6123)  DCS[0,00,0,0,0,0]  BM[1101..10.00..10.00..000..000...1.1.0..0..0...0.0000...0..0000.0...11.000...001.010.100]
10928
10929    6124:  ;(FREE)
10930    GOBUT410E:
10931            SETUP,  RETURN/SCOPE410,                        ;RETURN TO SCOPE LOOP TEST WORD
10932            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
10933                    J/BUTD=IS=ZERO                          ;CHECK EQUALITY
     (6124)  DCS[0,00,0,0,0,0]  BM[0110..00.00..10.10..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
10934
10935
10936    6125:  ;(FREE)
10937    SCOPE410:

10938            P0,     BUSDIN_EMIT=[I],                        ;RESET PROC UCON
10939                    EN=CLK=IR[15=00],                       ;
10940            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST500" (+1, WORD8)
10941                    J/TEST500                               ;   ERROR:  "SETBYTEB410" (-34, WORD8)
     (6125)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...101.110.001]
10942
```

```
10943
10944
10945
10946
10947
10948
10949    !.PAGE*****************************************************************************************************
10950
10951
10952    !*** VERSION /V101A0/ ***
10953
10954    .TOC   *   TEST500:  PREFETCH/OVERLAP/SP DEFEAT
10955
10956    !*************************************************************************************
10957    !*
10958    !*      TESTS:  500C - 500F                          UWORDS: 034 + 013
10959    !*
10960    !*      FUNCTIONS:      TESTS 500C - 500F RUN PATTERNS THRU THE IR TO TEST
10961    !*                      THE PREFETCH/OVERLAP ROM & THE SP WRITE DEFEAT LOGIC.
10962    !*
10963    !*************************************************************************************
10964
10965
10966
10967    6561:
10968    TEST500:
10969            P0,     LOAD-ENUA(SETFETCHG500),                ;INTERMEDIATE COMPARE AT START OF LOOP
10970                    LOAD-ERROR(TEST500),                    ;ERROR DIRECTORY KEY
10971                    DCS-CTR(C5,),                           ;COMPARE AT TARGET
10972            NEXT,   J/SETFETCHB500                          !
      (6561)  DCS[1,00,1,0,0,0]  BM[1010,,00,11,,00,01,,011,,001...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000...110,111,110]
10973
10974    6676:
10975    SETFETCHB500:
10976            P2-T,   D_ZERO, D[C]_ALU15,                     ;ZERO
10977                    SR_ZERO,                                ;TO FLAG JAMUPPS AS ILLEGAL -- KEEP ZERO THRU "TEST505"
10978            P3,     A#BSPLO[OVERLAP]_D,                     ;ZERO OVERLAP -A, -B COUNTERS
10979            NEXT,   J/SETFETCHD500                          !
      (6676)  DCS[0,00,0,0,0,0]  BM[0011,,00,00,,10,00,,000,,100...0,1,1,,0,,0...0,0000...0,,0011,0,,,11,000...001,010,110]
10980
10981    6126:  !(FREE)
10982    SETFETCHD500:
10983            P3,     A#BSPHI[PATTERN]_D,                     ;ZERO PATTERN (A AND B)
10984            NEXT,   J/SETFETCHE500                          !
      (6126)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,011,,000...0,0,0,,0,,0...0,0000...0,,1011,0,,,11,000...001,010,111]
10985
10986    6127:  !(FREE)
10987    SETFETCHF500:
10988            P3,     A#BSPHI[PREFETCH]_D,                    ;ZERO PREFETCH-A COUNTER, ALSO B SIDE
10989            NEXT,   J/SETFETCHF500                          !
      (6127)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,00,,000,,000...0,0,0,,0,,0...0,0000...0,,1011,0,,,11,000...001,011,000]
10990
10991    6130:  !(FREE)
10992    SETFETCHF500:
```



```
10993            P0,     BUMP-VERIFY,                            ;COUNT
10994            P3,     CSPD[17]_020010,                        !
10995            NEXT,   J/SETFETCHG500                          ;MASK CONSTANT FOR DATA PATTERN
      (6130)  DCS[0,00,0,0,0,1]  BM[0010,,10,00,,00,00,,001,,000...0,0,0,,0,,0...0,0000...1,,0000,0,,,11,000...001,011,001]
10996
10997    6131:  !(FREE)
10998    SETFETCHG500:
10999            P0,     BUMP-VERIFY,                            ;COUNT
11000            P2-U,   IR_DBUF-[I],                            ;SETUP THESE UCON'S,
11001            P3,     DBUF_D-[I],                             ;DON'T WORRY ABOUT EFFECT HERE
11002            NEXT,   J/TESTD500                              !
      (6131)  DCS[0,00,0,0,0,1]  BM[0100,,00,00,,00,01,,000,,100...0,0,0,,0,,0...1,1011...0,,0000,0,,,11,000...110,111,001]
11003
11004
11005    !*** LOOP-BACK ENTRY POINT ***
11006
11007    6671:
11008    TESTD500:
11009            P0,     LOAD-ENUA(NEXTPAT500),                  ;COMPARE POINT IN LOOP
11010                    LOAD-ERROR(TESTD500),                   ;ERROR DIRECTORY KEY
11011                    DCS-CTR(C4,),                           ;COMPARE AT TARGET
11012            P2-U,   IR_DBUF,                                ;JUST HAPPENS, DON'T CARE NOW
11013            P3,     DBUF_D,                                 ;PUT PATTERN LEFT IN D INTO DBUF
11014            NEXT,   J/LOADIP500                             !
      (6671)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,00,11,,111,,111...0,0,0,,0,,0...1,1010...0,,0000,0,,,11,000...001,011,010]
11015
11016    6132:  !(FREE)
11017    LOADIP500:
11018            P2-U,   IR_DBUF,                                ;PUT PATTERN NOW IN DBUF TO IR
11019            P3,     DBUF_D,                                 ;JUST HAPPENS, DON'T CARE NOW
11020            NEXT,   J/TESTINHBSP500                         !
      (6132)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...1,1010...0,,0000,0,,,11,000...001,011,011]
11021
11022    6133:  !(FREF)
11023    TESTINHBSP500:
11024            P2-T,   D_BSPLO[OVERLAP]-PLUS-1,                ;GET BUMPED OVERLAP COUNT, B-SIDE
11025                    D[C]_0,                                 !
11026            P3,     BSPLO[OVERLAP]_D,                       ;ONLY WRITTEN BACK IF
11027                    BUTA[INSTR-1),                          ;"OVERLAP L" ASSERTED
11028            NEXT,   J/TESTINHASP500                         ;(BRANCH EFFECT OF BUT MASKED)
      (6133)  DCS[0,00,0,0,0,0]  BM[1001,,00,10,,11,01,,000,,000...0,1,0,,0,,0...0,0000...0,,0110,0,,,00,110...111,111,111]
11029
11030    6777:
11031    TESTINHASP500:
11032            P2-T,   D_ASPLO[OVERLAP]-PLUS-1,                ;GET BUMPED OVERLAP COUNT, A-SIDE
11033                    SAVE-D[C],                              !

11034            P3,     ASPLO[OVERLAP]_D,                       ;ONLY WRITTEN BACK IF
11035                    BUTA[INSTR-1),                          !  "OVERLAP L" ASSERTED
11036            NEXT,   J/NEXTPAT500                            ;(BRANCH EFFECT OF BUT MASKED)
      (6777)  DCS[0,00,0,0,0,0]  BM[1001,,01,11,,10,00,,000,,111...0,1,0,,0,,0...0,0000...0,,0001,0,,,00,110...011,111,111]
11037
11038    6377:
11039    NEXTPAT500:
11040            P2-T,   D_ASPHI[PATTERN]-PLUS-020010-PLUS-1,    ;GET NEXT DATA PATTERN IN D
```

```
                D[C]_COUT15,                                  !GET D[C]=OVERFLOW OUT OF BIT<15>
        P3,     A#BSPHI[PATTERN]_D,                           !WRITE BACK UNMASKED NEXT PATTERN
        NEXT,   BUTR(PREFETCH-L),                             !IF ASSERTED, "ASSERTFOV500"
                J/ASSERTFOV500                                !OTHERWISE, "FIXPAT500"
 (6377) DCS[0.00.0.0.0.0]  BM[1100..11.00..11.01..011..110...0.1.0..0..0...0.0000...0..1011.0...10.000...101.010.101]

 !ENTER HERE IF "PREFETCH-L" WAS ASSERTED, LOW
 6525:
 ASSERTFOV500:
        P2-T,   D_ASPHI[PREFETCH]-PLUS-1,                     !"PREFETCH(0)H" ASSERTED, BUMP COUNT
                SAVE-D[C],                                    !(SAVE CARRYOUT)
        P3,     ASPHI[PREFETCH]_D,                            !
        NEXT,   J/FIXPAT500                                   !
 (6525) DCS[0.00.0.0.0.0]  BM[1001..01.11..11.00..000..111...0.1.0..0..0...0.0000...0..1001.0...11.000...101.010.111]

 !ENTER HERE IF "PREFETCH-L" WAS NOT ASSERTED, HIGH
 6527:
 FIXPAT500:
        P2-T,   D_ASPHI[PATTERN]-AND-NOT-020010,              !CLEAR UNNEEDED BITS
                SAVE-D[C],                                    !KEEP D[C] CONSTANT FOR "BUT"
        P3,     A#BSPHI[PATTERN]_D,                           !RESTORE PATTERN, ALSO LEAVE IN D
        NEXT,   BUTR(D[C]-B),                                 !TEST CARRYOUT:
                J/TESTD500                                    !IF CLEAR, NEXT PATTERN AT: "TESTD500" (-6,WORDS)
 (6527) DCS[0.00.0.0.0.0]  BM[0111..11.00..11.01..011..111...0.1.0..0..0...0.0000...0..1011.0...10.011...110.111.001]
                                                              !IF SET, EXIT LOOP TO: "TEST500A" (+1, WORD)


 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !*** TEST 500A ***
 !CHECK THAT REGISTER OPPOSITE ASPHI[PREFETCH], IN BSPHI, STILL ZERO
 6673:
 TEST500A:
        P0,     LOAD-ENUA(ZTARGET434),                        !SETUP FOR IR=(000000)/INSTRS TEST
                LOAD-ERROR(TEST500A),                         !ERROR DIRECTORY KEY
                DCS-CTR(C7,),                                 !COMPARE AT TARGET
                BUMP-VERIFY,                                  !COUNT
        NEXT,   J/COMP500A                                    !
 (6673) DCS[1.00.1.0.0.1]  BM[1000..00.11..11.00..011..100...0.0.0..0..0...0.0000...0..0000.0...11.000...001.011.100]

 6134:  !(FREE)
 COMP500A:
        P2-T,   D_BSPHI[PREFETCH],                            !GET REGISTER
                SAVE-D[C],                                    !
        NEXT,   J/GOBUT500A                                   !
 (6134) DCS[0.00.0.0.0.0]  BM[1010..01.10..00.00..000..111...0.1.0..0..0...0.0000...0..0000.0...11.000...001.011.101]

 6135:  !(FREE)
 GOBUT500A:
        P0,     BUMP-VERIFY,                                  !COUNT
        SETUP,  RETURN/TEST500C,                              !RETURN TO START OF NEXT SUBTEST
        NEXT,   CALL[DINTOIR-5]                               !PUT D -> DBUF -> IR, DO INSTRS BUT FOR (000000)
 (6135) DCS[0.00.0.0.0.1]  BM[0110..00.11..10.10..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.111.011]
```



```
                                                              !
                                                              !*** ALSO SETS UP BUSDIN <- EMIT UPON EXIT ***




 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !*** TEST 500C ***
 !CHECK THAT ASSERTING "OVERLAP L" ONLY ALLOWED A SP REWRITE (DURING
 !A BUT[INSTR-1]) IN ASPLO 4005, TIMES / 16384, DATA PATTERNS
 6726:
 TEST500C:
        P0,     LOAD-ENUA(ZTARGET402),                        !SETUP FOR D =0 TEST
                LOAD-ERROR(TEST500C),                         !ERROR DIRECTORY KEY
                DCS-CTR(C5,),                                 !COMPARE AT TARGET
                BUMP-VERIFY,                                  !COUNT
        NEXT,   J/EXPEC500C                                   !
 (6726) DCS[1.00.1.0.0.1]  BM[1010..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.011.110]

 6136:  !(FREE)
 EXPEC500C:
        P3,     CSPD[EXPEC]_EMIT,                             !EXPECTED COUNT =
                EMIT/7645,                                    !  (7645) = 4005.
        NEXT,   J/COMP500C                                    !
 (6136) DCS[0.00.0.0.0.0]  BM[0000..10.11..11.10..100..101...0.0.0..0..0...0.0000...1..0000.0...11.000...001.011.111]

 6137:  !(FREE)
 COMP500C:
        P0,     BUMP-VERIFY,                                  !COUNT
        P3-T,   D_ASPLO[OVERLAP]-MINUS-CSPB[EXPEC],           !COMPARE RECEIVED:EXPECTED
                SAVE-D[C],                                    !
        NEXT,   J/GOBUT500C                                   !
 (6137) DCS[0.00.0.0.0.1]  BM[1101..11.00..10.00..000..111...1.1.0..0..0...0.0000...0..0000.0...11.000...001.100.000]

 6140:  !(FREE)
 GOBUT500C:
        SETUP,  RETURN/TEST500D,                              !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                                 !BUT TABLE
                J/BUTD-IS-ZERO                                !CHECK EQUALITY
 (6140) DCS[0.00.0.0.0.0]  BM[0110..00.11..11.00..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]





 ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 !*** TEST 500D ***

 !CHECK THAT ASSERTING "OVERLAP L" ALLOWED THE SAME NUMBER OF SP REWRITES
 !TO ASPLO (CHECKED ABOVE) AS TO BSPLO (CHECKED HERE)
 6746:
 TEST500D:
```

```
            P0,     LOAD-ENUA(ZTARGET402),                   !SETUP FOR D=0 TEST
                    LOAD-ERROR(TEST500D),                    !ERROR DIRECTORY KEY
                    DCS-CTR(C4,),                            !COMPARE AT TARGET
            NEXT,   J/COMP500D                               !
   (6746)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,001]

      6141:  !(FREE)
      COMP500D:
            P3-T,   D_ASPLO[OVERLAP]-MINUS-BSPLO[OVERLAP],   !COMPARE A-COUNT:B-COUNT
                    SAVE-D[C],                               !
            NEXT,   J/GOBUT500D                              !
   (6141)  DCS[0,00,0,0,0,0]  BM[1101,,00,10,,10,00,,000,,111,,,1,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,010]

      6142:  !(FREE)
      GOBUT500D:
            P0,     BUMP-VERIFY,                             !COUNT
            SETUP,  RETURN/TEST500E,                         !RETURN TO START OF NEXT SUBTEST
            NEXT,   GOTO-PAGE(7),                            !BUT TABLE
                    J/BUTD-IS-ZERO                           !CHECK EQUALITY
   (6142)  DCS[0,00,0,0,0,1]  BM[0110,,00,11,,10,11,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]





      ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

      !*** TEST 500E ***
      !CHECK THAT "PREFETCH(0)H" WAS ONLY ASSERTED 357, TIMES/16384, DATA PATTERNS
      6736:
      TEST500E:
            P0,     LOAD-ENUA(ZTARGET402),                   !SETUP FOR D=0 TEST
                    LOAD-ERROR(TEST500E),                    !ERROR DIRECTORY KEY
                    DCS-CTR(C5,),                            !COMPARE AT TARGET
            NEXT,   J/EXPEC500E                              !
   (6736)  DCS[1,00,1,0,0,0]  BM[1010,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,011]

      6143:  !(FREE)
      EXPEC500E:
            P0,     BUMP-VERIFY,                             !
            P3,     CSPD[EXPEC]_EMIT,                        !EXPECTED COUNT=
                    EMIT/545,                                ! (545)=357,
            NEXT,   J/COMP500E                               !
   (6143)  DCS[0,00,0,0,0,1]  BM[0000,,10,00,,01,01,,100,,101,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,001,100,100]

      6144:  !(FREE)
      COMP500E:
            P3-T,   D_ASPHI[PREFETCH]-MINUS-CSPB[EXPEC],     !COMPARE RECEIVED:EXPECTED
                    SAVE-D[C],                               !
            NEXT,   J/GOBUT500E                              !
   (6144)  DCS[0,00,0,0,0,0]  BM[1101,,11,00,,11,00,,000,,111,,,1,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,100,101]

      6145:  !(FREE)
```



```
      GOBUT500E:
            SETUP,  RETURN/SCOPE500F,                        !RETURN TO SCOPE LOOP TEST WORD
            NEXT,   GOTO-PAGE(7),                            !BUT TABLE
                    J/BUTD-IS-ZERO                           !CHECK EQUALITY
   (6145)  DCS[0,00,0,0,0,0]  BM[0110,,00,00,,11,00,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]



      6146:  !(FREE)
      SCOPE500F:
            P0,     BUMP-VERIFY,                             !COUNT
                    BUSDIN_EMIT-[I],                         !RESET PROC UCON
                    EN-CLK-IR[15-00],                        !
            NEXT,   BUTD[SCOPE],                             !NO ERROR: "TEST503A" (+1, WORDS)
                    J/TEST503A                               !   ERROR: "$ETFETCHB500" (-27,WORDS)
   (6146)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,110,111,111]





      !.PAGE===========================================================================================


      .TOC    *    TEST503-510:  PROCESSOR UCON TESTS (FLAGS, FPS, PS, BUTM) & ASSOC LOGIC

      !*************************************************************************************
      !*
      !*     TESTS:  503A - 510F                          UWORDS: 214 + 245
      !*
      !*     FUNCTIONS:     TESTS 503A - 510F MANIPULATE THE VARIOUS PROCESSOR UCON
      !*                    FUNCTIONS (FLAGS, EXFLAGS, FPS, PS, CUA) AND RELATED "BUT"
      !*                    TESTS TO SEE THAT ALL ARE FUNCTIONAL,
      !*
      !*************************************************************************************







      ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

      !*** TEST 503 ***

      !TESTS 503 A-I USE DATA PATTERNS OF:
      !       FLAG<8:4,2:0>H = "10101010", EXFLAG<2:1>H = "01",
      !       FPS<7:0>H = "1010 1010"

      ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

      !*** TEST 503A ***
```

```
        ;LOAD FLAGS<8:4,2:0> WITH "10101010", EXFLAGS<2:1> WITH "01", FPS<7:4> WITH "1010",
        ;FPS<3:0> WITH "1010", AND READ BACK THRU "FLAGS#FPS" PORT OF PROCESSOR MUX
        6677:
        TEST503A:
                P0,     LOAD-ENUA(LOADNZW5),                    ;COMPARE 1/2 WAY THRU BM SUBR
                        LOAD-ERROR(TEST503A),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C10.),                          ;COMPARE IN ...
                        BUMP-VERIFY,                            ;COUNT
                NEXT,   J/LOADFLAG503A                          ;
      (6677)  DCS[1.00.1.0.0.1]  BM[0101..00.10..00.11..011..010...0.0.0..0..0...0.0000...0..0000.0...11.000...110.001.100]

        6614:
        LOADFLAG503A:
                P2-U,   IR_EMIT,                                ;(125122)=NOT-FLTPT-H INSTR (NOTE UCON/CSPADDR OVLP)
                                                                ;ALSO NOTE IR=(NOT-PREFETCH), SO PREFETCH-SAVE WILL GET "0"
                                                                ;AFTER SUBSEQUENT JAMUPP (IN LOADFPSCC ROUTINE EXIT)
                P3,     CSPD[05]_EMIT,                          ;INITIAL VALUE:
                        EMIT/125122,                            ;FLAG<8:4,2:0>="10101010", EXFLAG<2:1>="01"
                NEXT,   J/LOADFPS503A                           ;"10101010 0101 0010"
      (6614)  DCS[0.00.0.0.0.0]  BM[1010..10.10..10.01..010..010...0.0.0..0..0...1.1010...1..0000.0...11.000...001.100.111]

        6147:   ;(FREE)
        LOADFPS503A:
                P0,     BUMP-VERIFY,                            ;COUNT
                P3,     CSPD[06]_EMIT,                          ;INITIAL VALUE IN FPS<7:4>:
                        EMIT/052655,                            ;"01010101 1010 1101"
                NEXT,   J/EXPEC503A                             ;
      (6147)  DCS[0.00.0.0.0.1]  BM[0101..10.01..01.10..101..101...0.0.0..0..0...0.1001...1..0000.0...11.000...001.101.000]

        6150:   ;(FREE)
        EXPEC503A:
                ;*** NOTE:  FLAG<8>, UBREAK ENABLE, GETS SET HERE,  KEEP SR=(000000)  [SET IN TEST500] TO FLAG
                ;       THAT ANY SPURIOUS UBREAKS ARE ILLEGAL (IE, CAUSING A JAMUPP SEQUENCE  ***
                P3,     CSPD[02]_EMIT,                          ;EXPECTED VALUE LOADS FLAGS, FPS<7:0>
                        EMIT/125252,                            ;OF "FLAGS#FPS" PORT
                NEXT,   J/MASK503A                              ;"10101010 1010 1010"
      (6150)  DCS[0.00.0.0.0.0]  BM[1010..10.10..10.10..101..010...0.0.0..0..0...0.1101...1..0000.0...11.000...001.101.001]

        6151:   ;(FREE)
        MASK503A:
                P3,     CSPD[04]_EMIT,                          ;MASK OUT (TO ZEROS)
                        EMIT/177777,                            ;LOOK AT ALL THE BITS
                NEXT,   J/LOADFCC503A                           ;
      (6151)  DCS[0.00.0.0.0.0]  BM[1111..10.11..11.11..111..111...0.0.0..0..0...0.1011...1..0000.0...11.000...001.101.010]

        6152:   ;(FREE)
        LOADFCC503A:
                P3,     CSPD[15]_EMIT,                          ;FPS<3:0> COME FROM CSP(15)<3:0>[MD]
                        EMIT/000012,                            ;"1010"
                NEXT,   J/DOFCC503A                             ;
      (6152)  DCS[0.00.0.0.0.0]  BM[0000..10.00..00.00..001..010...0.0.0..0..0...0.0010...1..0000.0...11.000...001.101.011]

        6153:   ;(FREE)
        DOFCC503A:
```



```
                P3,     CSPD[00]_EMIT,                          ;CALL BM SUBR WHICH DOES THE LOAD
                        RETURN/TESTA503A,                       ;RETURN INLINE
                NEXT,   CALL[LOADFPSCC]                         ;
      (6153)  DCS[0.00.0.0.0.0]  BM[0110..10.11..10.01..100..111...0.0.0..0..0...0.1111...1..0000.0...11.100...010.110.100]

        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;NOW CHECK ALL THE RITE BITS WERE SET BY READING THEM BACK

        6714:
        TESTA503A:
                P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TESTA503A),                  ;ERROR DIRECTORY KEY
                        DCS-CTR(C14.),                          ;COMPARE AT TARGET
                P3,     BUTA(CUA-TRACK),                        ;RESET CUA TRACKING AFTER JAMUPP
                NEXT,   J/GOPUT503A                             ;
      (6714)  DCS[1.00.1.0.0.0]  BM[0001..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.001...001.101.100]

        6154:   ;(FREE)
        GOPUT503A:
                SETUP,  RETURN/GOBUT503A,                       ;GO TO SUBR WHICH:
                NEXT,   CALL[FLAGFPSSEQLOD]                     ;1) CSP(05) -> FLAGS, EXFLAGS
      (6154)  DCS[0.00.0.0.0.0]  BM[0110..00.00..11.01..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...000.111.011]
                                                                ;2) CSP(06) -> FPS<7:4>

        6155:   ;(FREE)
        GOBUT503A:
                SETUP,  RETURN/TEST503B,                        ;RETURN TO START OF NEXT SUBTEST
                NEXT,   CALL[FLAGFPSTOD]                        ; FLAGS#FPS.XOR.CSP(02) -> D, BUT(D=0)
      (6155)  DCS[0.00.0.0.0.0]  BM[0110..00.11..00.11..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.010]




        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 503B ***
        ;DO THE "MULTIPLE BUT" ON "FLAG7-H" TO CHECK IT'S CLEAR
        6630:
        TEST503B:
                P0,     LOAD-ENUA(ZTARGET406),                  ;BIT<00> CLEAR
                        LOAD-ERROR(TEST503B),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C4.),                           ;COMPARE AT TARGET
                NEXT,   J/GOBUT503B                             ;
      (6630)  DCS[1.00.1.0.0.0]  BM[1011..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...001.101.110]

        6156:   ;(FREE)
        GOBUT503B:
                SETUP,  RETURN/TEST503C,                        ;RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                        J/BUTMFLAG7                             ;FLAG 7-H IN BIT<00>
```

```
      (6156)  DCS[0,00,0,0,0,0]  BM[0110..00.11..00.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.010.101]
11329
11330
11331
11332
11333    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11334
11335    !*** TEST 503C ***
11336    !DO THE "BUT" ON "FLTPT-PROC-H"="FLAGS-H@EXFLAG1-L" TO CHECK IT'S CLEAR
11337    6632:
11338    TEST503C:
11339            P0,     LOAD-ENUA(ZTARGET402),                  !BIT<00> CLEAR
11340                    LOAD-ERROR(TEST503C),                   !ERROR DIRECTORY KEY
11341                    DCS-CTR(C3,),                           !COMPARE AT TARGET
11342                    BUMP-VERIFY,                            !COUNT
11343            NEXT,   J/GOBUT503C                             !
      (6632)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.101.111]
11344
11345    6157:  !(FREE)
11346    GOBUT503C:
11347            SETUP,  RETURN/TEST503DA,                       !RETURN TO START OF NEXT SUBTEST
11348            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11349                    J/BUTFPPROC                             !FLAGS-H@EXFLAG1-L IN BIT<00>
      (6157)  DCS[0,00,0,0,0,0]  BM[0110..00.11..00.00..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.101.100]
11350
11351
11352
11353
11354    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11355
11356    !*** TEST 503DA ***
11357    !DO THE "MULTIPLE BUT" ON "FLTPT" TO CHECK IT'S CLEAR, IR=(125122), NOT-FLTPT-H INSTR
11358    6601:
11359    TEST503DA:
11360            P0,     LOAD-ENUA(ZTARGET406),                  !BIT<00> CLEAR
11361                    LOAD-ERROR(TEST503DA),                  !ERROR DIRECTORY KEY
11362                    DCS-CTR(C4,),                           !COMPARE AT TARGET
11363            NEXT,   J/GOBUT503DA                            !
      (6601)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.000]
11364
11365    6160:  !(FREE)
11366    GOBUT503DA:
11367            SETUP,  RETURN/TEST503D,                        !RETURN TO START OF NEXT SUBTEST
11368            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11369                    J/BUTNFLTPTS                            !FLTPT-H IN BIT<00>
      (6160)  DCS[0,00,0,0,0,0]  BM[0110..00.11..01.11..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.011.001]
11370
11371
11372
11373
11374    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```



```
11375
11376    !*** TEST 503D ***
11377    !DO AN INSTR-1 FLOATING POINT DECODE, TO CHECK THAT FLAG<4:5> -> BIT<1:0>
11378    6670:
11379    TEST503D:
11380            P0,     LOAD-ENUA(ZTARGET476),                  !INSTR-1 FLTPT, BIT<1:0>="10"
11381                    LOAD-ERROR(TEST503D),                   !ERROR DIRECTORY KEY
11382                    DCS-CTR(C4,),                           !COMPARE AT TARGET
11383            NEXT,   J/LOADIR503D
      (6670)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..111..110...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.001]
11384
11385    6161:  !(FREE)
11386    LOADIR503D:
11387            P0,     BUMP-VERIFY,                            !COUNT
11388            P2=U,   IR_EMIT,                                !IR <- FLTPT INSTR
11389                    EMIT/175252,                            !
11390            NEXT,   J/GOBUT503D                             !
      (6161)  DCS[0,00,0,0,0,1]  BM[1111..00.10..10.10..101..010...0.0.0..0..0...1.1010...0..0000.0...11.000...001.110.010]
11391
11392    6162:  !(FREE)
11393    GOBUT503D:
11394            SETUP,  RETURN/TEST503E,                        !RETURN TO START OF NEXT SUBTEST
11395            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11396                    J/BUTINSTR1                             !FULL WIDTH
      (6162)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.110]
11397
11398
11399
11400
11401    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11402
11403    !*** TEST 503E ***
11404    !READ EXFLAGS<2:1> = "01" IN CUA-PORT<2:1>,
11405    !ALSO "PREFETCH-SAVE-H" = "0"  FROM PREVIOUS SETUP
11406    6700:
11407    TEST503E:
11408            P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=0 TEST
11409                    LOAD-ERROR(TEST503E),                   !ERROR DIRECTORY KEY
11410                    DCS-CTR(C10,),                          !COMPARE AT TARGET
11411            NEXT,   J/EXPEC503E                             !
      (6700)  DCS[1,00,1,0,0,0]  BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.011]
11412
11413    6163:  !(FREE)
11414    EXPEC503E:
11415            P0,     BUMP-VERIFY,                            !COUNT
11416            P3,     CSPD[02]_EMIT,                          !CUA PORT READS AS:
11417                    EMIT/073732,                            !0@CUA<11:00>@EXFLAG<2:1>@PREFETCH
11418            NEXT,   J/GOPUT503E                             !
      (6163)  DCS[0,00,0,0,0,1]  BM[0111..10.01..11.11..011..010...0.0.0..0..0...0.1101...1..0000.0...11.000...001.110.100]
11419
11420    6164:  !(FREE)
11421    GOPUT503E:
11422            SETUP,  RETURN/TEST503F,                        !GO TO SUBR WHICH:
```

```
11423           NEXT,   CALL[CUATOD]                            !PUTS CUA&EXFLAGS,XOR,C&P(02) => D, BUT(D=ZERO)
    (6164)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.111]
11424
11425
11426
11427
11428   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11429
11430   !*** TEST 503F ***
11431   !DO THE "MULTIPLE BUT" ON EXFLAG<2> TO CHECK IT'S CLEAR
11432   6710!
11433   TEST503F!
11434           P0,     LOAD-ENUA(ZTARGET406),                  !BIT<00> CLEAR
11435                   LOAD-ERROR(TEST503F),                   !ERROR DIRECTORY KEY
11436                   DCS-CTR(C4,),                           !COMPARE AT TARGET
11437           NEXT,   J/GOBUT503F                             !
    (6710)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.101]
11438
11439   6165!  !(FREE)
11440   GOBUT503F!
11441           SETUP,  RETURN/TEST503G,                        !RETURN TO START OF NEXT SUBTEST
11442           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11443                   J/BUTMEXFLAG2                           !EXFLAG<2>H IN BIT<00>
    (6165)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.011.011]
11444
11445
11446
11447
11448   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11449
11450   !*** TEST 503G ***
11451   !DO THE "MULTIPLE BUT" ON EXFLAG<1> TO CHECK IT'S SET
11452   6720!
11453   TEST503G!
11454           P0,     LOAD-ENUA(ZTARGET407),                  !BIT<00> SET
11455                   LOAD-ERROR(TEST503G),                   !ERROR DIRECTORY KEY
11456                   DCS-CTR(C4,),                           !COMPARE AT TARGET
11457                   BUMP-VERIFY,                            !COUNT
11458           NEXT,   J/GOBUT503G                             !
    (6720)  DCS[1,00,1,0,0,1]  BM[1011..00.11..11.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.110]
11459
11460   6166!  !(FREE)
11461   GOBUT503G!
11462           SETUP,  RETURN/TEST503H,                        !RETURN TO START OF NEXT SUBTEST
11463           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11464                   J/BUTMEXFLAG1                           !EXFLAG<1>H IN BIT<00>
    (6166)  DCS[0,00,0,0,0,0]  BM[0110..00.11..10.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.010.111]
11465
11466
11467
11468
```



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11469   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11470
11471   !*** TEST 503H ***
11472   !CHECK FPS<5> SET, VIA BUTR
11473   6732!
11474   TEST503H!
11475           P0,     LOAD-ENUA(ZTARGET407),                  !BIT<00> SET
11476                   LOAD-ERROR(TEST503H),                   !ERROR DIRECTORY KEY
11477                   DCS-CTR(C3,),                           !COMPARE AT TARGET
11478                   BUMP-VERIFY,                            !COUNT
11479           NEXT,   J/GOBUT503H                             !
    (6732)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...001.110.111]
11480
11481   6167!  !(FREE)
11482   GOBUT503H!
11483           SETUP,  RETURN/TEST503I,                        !RETURN TO START OF NEXT SUBTEST
11484           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11485                   J/BUTFPS05                              !FPS <05>H IN BIT<00>
    (6167)  DCS[0,00,0,0,0,0]  BM[0110..00.11..11.00..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.010]
11486
11487
11488
11489
11490   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11491
11492   !*** TEST 503I ***
11493   !CHECK FLTPT-FD-H = F(FPS<7:6>,FLAG<5,2,1,EX1>) IS CLEAR
11494   6742!
11495   TEST503I!
11496           P0,     LOAD-ENUA(ZTARGET402),                  !BIT<00> CLEAR
11497                   LOAD-ERROR(TEST503I),                   !ERROR DIRECTORY KEY
11498                   DCS-CTR(C3,),                           !COMPARE AT TARGET
11499           NEXT,   J/GOBUT503I                             !
    (6742)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...001.111.000]
11500
11501   6170!  !(FREE)
11502   GOBUT503I!
11503           P0,     BUMP-VERIFY,                            !COUNT
11504           SETUP,  RETURN/TEST503J,                        !RETURN TO START OF NEXT SUBTEST
11505           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11506                   J/BUTFPFD                               !FLTPT-FD-H IN BIT<00>
    (6170)  DCS[0,00,0,0,0,1]  BM[0110..00.11..11.01..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.111.001]
11507
11508   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11509
11510   !*** TEST 503J ***

11511   !DO THE "MULTIPLE BUT" ON "D<00>" TO CHECK IT'S CLEAR  (D WAS ZEROED IN TEST503E, ABOVE)
11512   6756!
11513   TEST503J!
11514           P0,     LOAD-ENUA(ZTARGET406),                  !BIT<00> CLEAR
11515                   LOAD-ERROR(TEST503J),                   !ERROR DIRECTORY KEY
11516                   DCS-CTR(C4,),                           !COMPARE AT TARGET
```

```
11517           NEXT,   J/GOBUT503J                             !
      (6756)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,000...001,111,001]
11518
11519     6171:  !(FREE)
11520     GOBUT503J:
11521           SETUP,  RETURN/TEST503K,                        !RETURN TO START OF NEXT SUBTEST
11522           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11523                   J/BUTMD00                               !D<00>=H IN BIT<00>
      (6171)  DCS[0,00,0,0,0,0]  BM[0110..00,11..01,00..110..111...0,0,0..0...0...0,0000...0..0000,0...11,100...011,010,001]
11524
11525
11526     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11527
11528     !*** TEST 503K ***
11529     !DO THE "MULTIPLE BUT" ON "FLTPT" TO CHECK IT'S SET, IR=(175252), FLTPT=H INSTR
11530     6646:
11531     TEST503K:
11532           P0,     LOAD-ENUA(ZTARGET407),                  !BIT<00> SET
11533                   LOAD-ERROR(TEST503K),                   !ERROR DIRECTORY KEY
11534                   DCS-CTR(C4,),                           !COMPARE AT TARGET
11535                   BUMP-VERIFY,                            !COUNT
11536           NEXT,   J/GOBUT503K                             !
      (6646)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..000..111...0,0,0..0..0...0,0000...0..0000,0...11,000...001,111,010]
11537
11538     6172:  !(FREE)
11539     GOBUT503K:
11540           SETUP,  RETURN/SCOPE503,                        !RETURN TO SCOPE LOOP TEST WORD
11541           NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11542                   J/BUTMFLTPTS                            !FLTPT=H IN BIT<00>
      (6172)  DCS[0,00,0,0,0,0]  BM[0110..00,00,..11,11..011...111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,011,001]
11543
11544
11545
11546
11547
11548
11549     6173:  !(FREE)
11550     SCOPE503:
11551           P0,     BUSDIN_EMIT-[I],                        !RESET PROC UCONS
11552                   EN-CLK-IR[15-00],                       !
11553           NEXT,   BUTD[SCOPE],                            !NO ERROR: "TEST504A" (+1, WORDS)
11554                   J/TEST504A                              !   ERROR: "LOADFLAGS03A" (-34, WORDS)
      (6173)  DCS[0,00,0,1,0,0]  BM[0000..00,00,..00,01..000..100...0,0,0..0..0...1,1001...0..0000,0...11,000...110,001,101]
11555
11556
11557
11558
11559
11560
11561
11562
11563
```



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11564     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11565
11566     !*** TEST 504 ***
11567
11568     !TESTS 504 A-I USE DATA PATTERNS OF:
11569     !       FLAG<8:4,2:0>H = "01010101", EXFLAG<2:1>H = "10",
11570     !       FPS<7:0>H = "0101 0101"
11571
11572     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11573
11574     !*** TEST 504A ***
11575     !LOAD FLAGS<8:4,,2:0> WITH "01010101", EXFLAGS<2:1> WITH "10", FPS<7:4> WITH "0101",
11576     !FPS<3:0> WITH "0101", AND READ BACK THRU "FLAGS&FPS" PORT OF PROCESSOR MUX
11577     6615:
11578     TEST504A:
11579           P0,     LOAD-ENUA(4777),                        !SETUP FOR COMPARE 1/2 WAY + 1 THRU BM SUBR
11580                   LOAD-ERROR(TEST504A),                   !ERROR DIRECTORY KEY
11581                   DCS-CTR(C11,),                          !COMPARE AT ...
11582           NEXT,   J/LOADFLAG504A                          !
      (6615)  DCS[1,00,1,0,0,0]  BM[0100..00,10..01,11..111..111...0,0,0..0...0...0,0000...0..0000,0...11,000...110,010,010]
11583
11584     6622:
11585     LOADFLAG504A:
11586           P2-U,   IR_EMIT,                                !ALSO NOTE IR=(NOT-PREFETCH), SO PREFETCH-SAVE WILL GET "0"
11587                                                           !AFTER SUBSEQUENT JAMUPP (IN LOADFPSCC ROUTINE EXIT)
11588           P3,     CSPD[05]_EMIT,                          !INITIAL VALUE:
11589                   EMIT/052644,                            !FLAG<8:4,2:0>="01010101", EXFLAG<2:1>="10"
11590           NEXT,   J/LOADFPS504A                           !"01010101 1010 0100"
      (6622)  DCS[0,00,0,0,0,0]  BM[0101..10,01..01,10..100..100...0,0,0...0...0...1,1010...1..0000,0...11,000...001,111,100]
11591
11592     6174:  !(FREE)
11593     LOADFPS504A:
11594           P3,     CSPD[06]_EMIT,                          !INITIAL VALUE IN FPS<7:4>:
11595                   EMIT/125133,                            !"10101010 0101 1011"
11596           NEXT,   J/EXPEC504A                             !
      (6174)  DCS[0,00,0,0,0,0]  BM[1010..10,10..10,01..011..011...0,0,0...0...0...0,1001...1..0000,0...11,000...001,111,101]
11597
11598     6175:  !(FREE)
11599     EXPEC504A:
11600           P3,     CSPD[02]_EMIT,                          !EXPECTED VALUE LOADS FLAGS, FPS<7:0>
11601                   EMIT/052525,                            !OF "FLAGS&FPS" PORT
11602           NEXT,   J/LOADFCC504A                           !"01010101 0101 0101"
      (6175)  DCS[0,00,0,0,0,0]  BM[0101..10,01..01,01..010..101...0,0,0...0...0...0,1101...1..0000,0...11,000...001,111,110]
11603
11604     6176:  !(FREF)
11605     LOADFCC504A:
11606           P3,     CSPD[15]_EMIT,                          !FPS<3:0> COME FROM CSP(15)<3:0>[MD]
11607                   EMIT/000005,                            !"0101"
11608           NEXT,   J/DOFCC504A                             !
      (6176)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..101...0,0,0...0...0...0,0010...1..0000,0...11,000...001,111,111]
11609
11610     6177:  !(FREE)
11611     DOFCC504A:
11612           P3,     CSPD[00]_EMIT,                          !CALL BM SUBR WHICH DOES THE LOAD
```

```
11613                   RETURN/TESTA504A,                       !RETURN INLINE
11614            NEXT,  CALL[LOADFPSCC]                         !
     (6177)  DCS[0,00,0,0,0,0]  BM[0110..10,11..11,10..110..111...0,0,0..0..0...0,1111...1..0000,0...11,100...010,110,100]
11615
11616    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11617
11618    !NOW CHECK ALL THE RITE BITS WERE SET BY READING THEM BACK
11619
11620    6766!
11621    TESTA504A!
11622            P0,    LOAD-ENUA(ZTARGET402),                   !SETUP FOR D=ZERO TEST
11623                   LOAD-ERROR(TESTA504A),                  !ERROR DIRECTORY KEY
11624                   DCS-CTR(C14,),                          !COMPARE AT TARGET
11625                   BUMP-VERIFY,                            !COUNT
11626            P3,    BUTA(CUA-TRACK),                        !RESET CUA TRACKING AFTER JAMUPP
11627            NEXT,  J/GOPUT504A                             !
     (6766)  DCS[1,00,1,0,0,1]  BM[0001..00,11..11,00..000..010...0,0,0..0..0...0,0000...0..0000,0...11,001...010,000,000]
11628
11629    6200!  !(FREE)
11630    GOPUT504A!
11631            SETUP, RETURN/GOBUT504A,                       !GO TO SUBR WHICH:
11632            NEXT,  CALL[FLAGFPS$EQLOD]                     !1) CSP(05) -> FLAGS, EXFLAGS
     (6200)  DCS[0,00,0,0,0,0]  BM[0110..00,01..00,00..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...000,111,011]
11633                                                          !2) CSP(06) -> FPS<7:4>
11634
11635    6201!  !(FREE)
11636    GOBUT504A!
11637            SETUP, RETURN/TEST504B,                        !RETURN TO START OF NEXT SUBTEST
11638            NEXT,  CALL[FLAGFPS$TOD]                       ! FLAGS=FPS,XOR,CSP(02) -> D, BUT(D=0)
     (6201)  DCS[0,00,0,0,0,0]  BM[0110..00,11..10,11..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,101,010]
11639
11640
11641
11642    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11643
11644    !*** TEST 504B ***
11645    !DO THE "MULTIPLE BUT" ON "FLAG7-H" TO CHECK IT'S SET
11646    6730!
11647    TEST504B!
11648            P0,    LOAD-ENUA(ZTARGET407),                   !BIT<00> SET
11649                   LOAD-ERROR(TEST504B),                   !ERROR DIRECTORY KEY
11650                   DCS-CTR(C4,),                           !COMPARE AT TARGET
11651            NEXT,  J/GOBUT504B                             !
     (6730)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..111...0,0,0..0..0...0,0000...0..0000,0...11,000...010,000,010]
11652
11653    6202!  !(FREE)
11654    GOBUT504B!
11655            SETUP, RETURN/TEST504C,                        !RETURN TO START OF NEXT SUBTEST
11656            NEXT,  GOTO-PAGE(7),                           !BUT TABLE
11657                   J/BUTMFLAG7                             !FLAG7-H IN BIT<00>
```



```
     (6202)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,00..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,010,101]
11658
11659
11660
11661
11662    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11663
11664    !*** TEST 504C ***
11665    !DO THE "BUT" ON "FLTPT-PROC-H"="FLAG<5>-H*EXFLAG<1>-L" TO CHECK IT'S SET
11666    6740!
11667    TEST504C!
11668            P0,    LOAD-ENUA(ZTARGET403),                   !BIT<00> SET
11669                   LOAD-ERROR(TEST504C),                   !ERROR DIRECTORY KEY
11670                   DCS-CTR(C3,),                           !COMPARE AT TARGET
11671                   BUMP-VERIFY,                            !COUNT
11672            NEXT,  J/GOBUT504C                             !
     (6740)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,00..000..011...0,0,0..0..0...0,0000...0..0000,0...11,000...010,000,011]
11673
11674    6203!  !(FREE)
11675    GOBUT504C!
11676            SETUP, RETURN/TEST504D,                        !RETURN TO START OF NEXT SUBTEST
11677            NEXT,  GOTO-PAGE(7),                           !BUT TABLE
11678                   J/BUTFPPROC                             !FLAG5-H*EXFLAG1-L IN BIT<00>
     (6203)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,01..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,101,100]
11679
11680
11681
11682
11683    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11684
11685    !*** TEST 504D ***
11686    !DO AN INSTR-1 FLOATING POINT DECODE, TO CHECK THAT FLAG<4:5> -> BIT<1:0>
11687    6750!
11688    TEST504D!
11689            P0,    LOAD-ENUA(ZTARGET475),                   !INSTR-1 FLTPT, BIT<1:0>="01"
11690                   LOAD-ERROR(TEST504D),                   !ERROR DIRECTORY KEY
11691                   DCS-CTR(C4,),                           !COMPARE AT TARGET
11692            NEXT,  J/LOADIR504D                            !
     (6750)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..111..101...0,0,0..0..0...0,0000...0..0000,0...11,000...010,000,100]
11693
11694    6204!  !(FREE)
11695    LOADIR504D!
11696            P0,    BUMP-VERIFY,                            !COUNT
11697            P2=U,  IR_EMIT,                                !IR <- FLTPT INSTR
11698                   EMIT/172525,                            !
11699            NEXT,  J/GOBUT504D                             !

     (6204)  DCS[0,00,0,0,0,1]  BM[1111..00,01..01,01..010..101...0,0,0..0..0...1,1010...0..0000,0...11,000...010,000,101]
11700
11701    6205!  !(FREE)
11702    GOBUT504D!
11703            SETUP, RETURN/TEST504E,                        !RETURN TO START OF NEXT SUBTEST
11704            NEXT,  GOTO-PAGE(7),                           !BUT TABLE
11705                   J/BUTINSTR1                             !FULL WIDTH
```

```
      (6205)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,11,10,,000,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,110]
11706
11707
11708
11709
11710    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11711
11712    !*** TEST 504E ***
11713    !READ EXFLAG8<2:1>="10" IN CUA-PORT<2:1>
11714    !ALSO "PREFETCH-SAVE-M"="0" FROM PREVIOUS SETUP
11715    6760!
11716    TEST504E!
11717            PO,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=0 TEST
11718                    LOAD-ERROR(TEST504E),                   !ERROR DIRECTORY KEY
11719                    DCS-CTR(C10,),                          !COMPARE AT TARGET
11720            NEXT,   J/EXPEC504E                             !
      (6760)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,000,110]
11721
11722    6206!  !(FREE)
11723    EXPEC504E!
11724            PO,     BUMP-VERIFY,                            !COUNT
11725            P3,     CSPD[02]_EMIT,                          !CUA PORT READS AS!
11726                    EMIT/073734,                            !@CUA<11:00>@EXFLAG<2:1>@PREFETCH
11727            NEXT,   J/GOPUT504E                             !
      (6206)  DCS[0,00,0,0,0,1]  BM[0111,,10,01,,11,11,,011,,100,,,0,0,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,010,000,111]
11728
11729    6207!  !(FREE)
11730    GOPUT504E!
11731            SFTUP,  RETURN/TEST504F,                         !GO TO SUBR WHICH!
11732            NEXT,   CALL[CUATOD]                            !PUTS CSR:EXFLAG8,XOR,CSP(02) -> D, BUT(D=ZERO)
      (6207)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,01,11,,010,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,111]
11733
11734
11735
11736
11737    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11738
11739    !*** TEST 504F ***
11740    !DO THE "MULTIPLE BUT" ON EXFLAG<2> TO CHECK IT'S SET
11741    6672!
11742    TEST504F!
11743            PO,     LOAD-ENUA(ZTARGET407),                  !BIT<00> SET
11744                    LOAD-ERROR(TEST504F),                   !ERROR DIRECTORY KEY
11745                    DCS-CTR(C4,),                           !COMPARE AT TARGET
11746            NEXT,   J/GOBUT504F                             !
      (6672)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,000]
11747
11748    6210!  !(FREE)
11749    GOBUT504F!
11750            SFTUP,  RETURN/TEST504G,                         !RETURN TO START OF NEXT SUBTEST
11751            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11752                    J/BUTMEXFLAG2                           !EXFLAG<2>H IN BIT 0
```



```
      (6210)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,00,,010,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,011,011]
11753
11754
11755
11756
11757    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11758
11759    !*** TEST 504G ***
11760    !DO THE "MULTIPLE BUT" ON EXFLAG<1> TO CHECK IT'S CLEAR
11761    6702!
11762    TEST504G!
11763            PO,     LOAD-ENUA(ZTARGET406),                  !BIT<00> CLEAR
11764                    LOAD-ERROR(TEST504G),                   !ERROR DIRECTORY KEY
11765                    DCS-CTR(C4,),                           !COMPARE AT TARGET
11766                    BUMP-VERIFY,                            !COUNT
11767            NEXT,   J/GOBUT504G                             !
      (6702)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,00,,000,,110,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,001]
11768
11769    6211!  !(FREE)
11770    GOBUT504G!
11771            SFTUP,  RETURN/TEST504H,                         !RETURN TO START OF NEXT SUBTEST
11772            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11773                    J/BUTMEXFLAG1                           !EXFLAG<1>H IN BIT 0
      (6211)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,00,,110,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,010,111]
11774
11775
11776
11777
11778    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11779
11780    !*** TEST 504H ***
11781    !CHECK FPS<5> CLEAR, VIA BUTR
11782    6706!
11783    TEST504H!
11784            PO,     LOAD-ENUA(ZTARGET406),                  !BIT<00> CLEAR
11785                    LOAD-ERROR(TEST504H),                   !ERROR DIRECTORY KEY
11786                    DCS-CTR(C3,),                           !COMPARE AT TARGET
11787                    BUMP-VERIFY,                            !COUNT
11788            NEXT,   J/GOBUT504H                             !
      (6706)  DCS[1,00,1,0,0,1]  BM[1100,,00,11,,11,00,,000,,110,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,010]
11789
11790    6212!  !(FREE)
11791    GOBUT504H!
11792            SETUP,  RETURN/TEST504I,                         !RETURN TO START OF NEXT SUBTEST
11793            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
11794                    J/BUTFPS05                              !FPS<05> IN BIT<00>

      (6212)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,01,,110,,111,,,0,0,0,,0,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,001,010]
11795
11796
11797
11798
```

```
        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 504I ***
        ;CHECK FLTPT-FD-H = F(FPS<7:6>,FLAG<5,2,1,EX1>) IS SET
        6716:
        TEST504I:
                P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<00> SET
                        LOAD-ERROR(TEST504I),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C3,),                           ;COMPARE AT TARGET
                NEXT,   J/GOBUT504I                             ;
    (6716)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,001,011]

        6213:  ;(FREE)
        GOBUT504I:
                P0,     BUMP-VERIFY,                            ;COUNT
                SETUP,  RETURN/SCOPE504,                        ;RETURN TO SCOPE LOOP TEST WORD
                NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
                        J/BUTFPFD                               ;FLTPT-FD-H IN BIT<00>
    (6213)  DCS[0,00,0,0,0,1]  BM[0110,,00,01,,00,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,111,001]



        6214:  ;(FREE)
        SCOPE504:
                P0,     BUSDIN_EMIT-[I],                        ;RESET PROC UCON
                        EN-CLK-IR[15-00],                       ;
                NEXT,   BUTD[SCOPE],                            ;NO ERROR: "TEST505A" (+1, WORDS)
                        J/TEST505A                              ;   ERROR: "LOADFLAG504A" (-27, WORDS)
    (6214)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,110,010,011]









        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 505 ***

        ;TESTS 505 A-C USE DATA PATTERNS OF:
        ;       FLAG<8:4,2:0>H = "11111000", EXFLAG<2:1>H = "10",
        ;       FPS<7:0>H = "0101 0101"

        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 505A ***
        ;CHECK THAT BUTA(CLEAR-FLAG-RES-UCON) ONLY CLEARS SHORT-TERM FLAGS
        6623:
        TEST505A:
                P0,     LOAD-ENUA(ZTARGET402),                  ;SERUP FOR D=ZERO TEST
```



```
                        LOAD-ERROR(TEST505A),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C15,),                          ;COMPARE AT TARGET
                NEXT,   J/LOAD505A                              ;
    (6623)  DCS[1,00,1,0,0,0]  BM[0000,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,010,000]

        6620:
        LOAD505A:
                P3,     CSPD[05]_EMIT,                          ;LOAD FLAGS<8:4,2:0>,
                        EMIT/177406,                            ;EXFLAG<2:1> WITH ALL 1-S
                NEXT,   J/EXPEC505A                             ;
    (6620)  DCS[0,00,0,0,0,0]  BM[1111,,10,11,,11,00,,000,,110,,,0,0,0,,0,,0,,,0,1010,,,1,,0000,0,,,11,000,,,010,001,101]

        6215:  ;(FREE)
        EXPEC505A:
                P0,     BUMP-VERIFY,                            ;COUNT
                P3,     CSPD[02]_EMIT,                          ;AFTER BUTA(CLR-FLAG-,,,), EXPECT THIS IN FLAGS#FPS PORT:
                        EMIT/174125,                            ;"11111000 0101 0101"
                NEXT,   J/SETFLAG505A                           ;
    (6215)  DCS[0,00,0,0,0,1]  BM[1111,,10,10,,00,01,,010,,101,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,010,001,110]

        6216:  ;(FREE)
        SETFLAG505A:
                P0,     BUMP-VERIFY,                            ;COUNT
                SETUP,  RETURN/BUTCLR505A,                      ;GO TO SUBR WHICH:
                NEXT,   CALL[FLAGLOD]                           ;PUTS CSP(05) INTO THE FLAGS
    (6216)  DCS[0,00,0,0,0,1]  BM[0110,,00,01,,00,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,000,111,110]

        6217:  ;(FREE)
        BUTCLR505A:
                P0,     DCS-CTR(C9,),                           ;POINT COUNTER AT TARGET
                P3,     BUTA(CLR-FLAG-RES-UCON),                ;CLEAR SHORT-TERM FLAGS
                NEXT,   J/GOPUT505A                             ;
    (6217)  DCS[0,00,1,0,0,0]  BM[0110,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,010,,,010,010,000]

        6220:  ;(FREE)
        GOPUT505A:
                SETUP,  RETURN/TEST505B,                        ;GO TO SUBR WHICH:
                NEXT,   CALL[FLAGFPSTOD]                        ;FLAGS#FPS,XOR,CSP(2) => D, BUT(D=ZERO)
    (6220)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,010]




        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 505B ***

        ;CHECK EXFLAG<2> NOT CLEARED, VIA BUTM
        6712:
        TEST505B:
                P0,     LOAD-ENUA(ZTARGET407),                  ;BIT<00> SET
                        LOAD-ERROR(TEST505B),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C4,),                           ;COMPARE AT TARGET
```

```
11895                   BUMP=VERIFY,                            ;COUNT
11896           NEXT,   J/GOBUT505B                             ;
     (6712)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,00,,000,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,010,001]
11897
11898   6221:  ;(FREE)
11899   GOBUT505B:
11900           SETUP,  RETURN/TEST505C,                        ;RETURN TO START OF NEXT SUBTEST
11901           NEXT,   GOTO=PAGE(7),                           ;BUT TABLE
11902                   J/BUTMEXFLAG2                           ;EXFLAG<2> IN BIT<00>
     (6221)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,10,10,,010,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,011,011]
11903
11904
11905
11906
11907   ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11908
11909   ;*** TEST 505C ***
11910   ;CHECK EXFLAG<1> WAS CLEARED, VIA BUTM
11911   6722:
11912   TEST505C:
11913           P0,     LOAD=ENUA(ZTARGET406),                  ;BIT<00> CLEAR
11914                   LOAD=ERROR(TEST505C),                   ;ERROR DIRECTORY KEY
11915                   DCS=CTR(C4,),                           ;COMPARE AT TARGET
11916           NEXT,   J/GOBUT505C                             ;
     (6722)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,110...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,010,011]
11917
11918   6223:  ;(FREE)
11919   GOBUT505C:
11920           SETUP,  RETURN/SCOPE505,                        ;RETURN TO SCOPE LOOP TEST WORD
11921           NEXT,   GOTO=PAGE(7),                           ;BUT TABLE
11922                   J/BUTMEXFLAG1                           ;EXFLAG<1> IN BIT<00>
     (6223)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,00,10,,100,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,010,111]
11923
11924   6224:  ;(FREF)
11925   SCOPE505:
11926           P0,     BUMP=VERIFY,                            ;COUNT
11927                   BUSDIN_EMIT=[I],                        ;EMIT FOR CONSTANTS
11928           P3,     FLAG[8-0]_D[15-8]=[I],                  ;ZERO ALL FLAGS, D WAS LEFT
11929                   FPS[7-4]_D[7-4]=[I],                    ;  ZERO FROM TEST505A, IF ALL OK,
11930           NEXT,   BUTD[SCOPE],                            ;NO ERROR: "TEST506A" (+1, WORDS)
11931                   J/TEST506A                              ;   ERROR: "LOAD505A" (-9, WORDS)
     (6224)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,01,,100,,001...0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,110,010,001]
11932
11933
11934
11935
11936
11937
11938   ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11939
11940   ;*** TEST 506 ***
11941
```



```
11942   ;TESTS 506 A-E USE A "0-1-1010-1010" PATTERN IN PS<15,13,7:4,3:0>
11943
11944   ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
11945
11946   ;* TEST 506A *
11947   ;LOAD UP PS<HI,MID,LO> IN ORDER, READ BACK THRU PS PORT OF PROC MUX
11948   ;  ALSO CHECK THAT BUTA(CLR=FLAG-RES-UCON) CLEARS UCON REGISTER, SO THAT:
11949   ;     (1) BUSDIN_EMIT IS SELECTED, VIA UCON-SELECT(1)=L=LOW, AND
11950   ;     (2) MAKE SURE THAT THE OTHER UCON BIT LATCHES ARE ALSO CLEARED
11951   6621:
11952   TEST506A:
11953           P0,     LOAD=ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
11954                   LOAD=ERROR(TEST506A),                   ;ERROR DIRECTORY KEY
11955                   DCS=CTR(C15,),                          ;STALL FOR NOW
11956           NEXT,   J/EXPEC506A                             ;
     (6621)  DCS[1,00,1,0,0,0]  BM[0000,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,001,010]
11957
11958   6612:
11959   EXPEC506A:
11960           P3,     CSPD[02]_EMIT,                          ;EXPECTED VALUE TO BE READ OUT OF
11961                   EMIT/030252,                            ;PS AFTER LOADING:
11962           NEXT,   J/SETUCON506A                           ;"0011 0000 1010 1010"
     (6612)  DCS[0,00,0,0,0,0]  BM[0011,,10,00,,00,10,,101,,010...0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,010,010,101]
11963
11964   6225:  ;(FREE)
11965   SETUCON506A:
11966           P0,     BUSDIN_FLAGS=FPS=[I],                   ;TAKE EMIT OFF BUSDIN, FLAG=FPS=(000005)
11967           P3,     BUTA(CLR=FLAG-RES-UCON),                ;THIS SHOULD NOW CLEAR THE UCON REGISTER,
11968                                                           ;  SETTING UCON=SELECT(1)=L; FORCING BUSDIN_EMIT
11969           NEXT,   J/PSHI506A                              ;
     (6225)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,000,,000...0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,010,,,010,010,110]
11970
11971   6226:  ;(FREE)
11972   PSHI506A:
11973           P0,     BUMP=VERIFY,                            ;COUNT
11974           P3,     CSPD[05]_EMIT,                          ;VALUE IN D WHEN LOAD PS<15,13>:
11975                   EMIT/063125,                            ;"0110 0110 0101 0101"
11976           NEXT,   J/PSMID506A                             ;
     (6226)  DCS[0,00,0,0,0,1]  BM[0110,,10,01,,10,01,,010,,101...0,0,0,,0,,0,,,0,1010,,,1,,0000,0,,,11,000,,,010,010,111]
11977
11978   6227:  ;(FREE)
11979   PSMID506A:
11980           P3,     CSPD[06]_EMIT,                          ;VALUE IN D WHEN LOAD PS<7:4>:
11981                   EMIT/143245,                            ;"1100 0110 1010 0101"
11982           NEXT,   J/PSLO506A                              ;
     (6227)  DCS[0,00,0,0,0,0]  BM[1100,,10,01,,10,10,,100,,101...0,0,0,,0,,0,,,0,1001,,,1,,0000,0,,,11,000,,,010,011,000]
11983
11984   6230:  ;(FREE)
11985   PSLO506A:
11986           P0,     BUMP=VERIFY,                            ;COUNT
11987           P3,     CSPD[07]_EMIT,                          ;VALUE IN D WHEN LOAD PS<3:0>:
11988                   EMIT/143132,                            ;"1100 0110 0101 1010"
11989           NEXT,   J/FUDGEPS506A                           ;
     (6230)  DCS[0,00,0,0,0,1]  BM[1100,,10,01,,10,01,,011,,010...0,0,0,,0,,0,,,0,1000,,,1,,0000,0,,,11,000,,,010,011,001]
```

```
11990
11991    6231:  !(FREE)
11992    FUDGEP8506A:
11993            SETUP,  RETURN/LOADUCON506A,                    !GO TO SUBR WHICH:
11994                                                            !1) CSP(05) -> PS<15,13>
11995                                                            !2) CSP(06) -> PS<7:4>
11996            NEXT,   CALL[PSSEQLOD]                          !3) CSP(07) -> PS<3:0>
     (6231)  DCS[0,00,0,0,0,0]  BM[0111..00,00..01,10..111..111...0,0,0...0..0...0.0000...0..0000,0...11,100...001,000,000]
11997
11998    7067:  !(FREE)
11999    LOADUCON506A:
12000            SETUP,  UCON=PROC,                              !SETUP FOR UCON=PROC:
12001            ENABLE, BUSDIN_FLAGS#FPS=[1],                   !FLAGS#FPS=(000005)
12002                    EN=CLK=PS[15=12], EN=CLK=PS[7=4],       !SETUP FOR CLOCKING PS BITS
12003                    EN=CLK=PS[3=0],                         !
12004            P0,     SET=UCON=CONTROL,                       !WRITE THE UCON REGISTER AT P0,
12005            P3,     BUTA(CLR=FLAG=RES=UCON),                !BUT AT P3, NOW CLEAR IT OUT
12006            NEXT,   J/DOIT506A                              !
     (7067)  DCS[0,00,0,0,0,0]  BM[1000..00,00..11,01..010..010...0,0,0...0..0...1.1001...0..0000,0...11,010...000,111,010]
12007
12008    7072:  !(FREE)
12009    DOIT506A:
12010            P2=T,   D_ZERO,                                 !SETUP D WITH A (000000)
12011            NEXT,   GOTO=PAGE(6),                           !XFER
12012                    J/LOADDCS506A                           !
     (7072)  DCS[0,00,0,0,0,0]  BM[0011..00,00..00,00..000..110...0,1,0...0..0...0.0000...0..0000,0...11,100...001,000,100]
12013
12014    6104:  !(FREE)
12015    LOADDCS506A:
12016            P0,     DCS=CTR(C9,),                           !COMPARE AT TARGET
12017            P2,     UCON=OPERATION,                         !IF THE UCON REGISTER WASN'T CLEARED, ABOVE,
12018            NEXT,   GOTO=PAGE(7),                           !  THE PS SHOULD BE OVER-WRITTEN WITH (000000),
12019                    J/GOBUT506A                             !    IN SOME COMBINATION OF PS<15:12,7:4,3:0>
     (6104)  DCS[0,00,1,0,0,0]  BM[0110..00,00..00,00..000..111...0,0,0...0..0...1.1010...0..0000,0...11,100...000,111,001]
12020
12021    7071:  !(FREE)
12022    GOBUT506A:
12023            SETUP,  RETURN/TEST506B,                        !RETURN TO START OF NEXT SUBTEST
12024            NEXT,   CALL[PSTOD]                             !  PS=XOR=CSP(02) -> D, BUT(D=ZERO)
     (7071)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,01..100..111...0,0,0...0..0...0.0000...0..0000,0...11,100...010,101,011]
12025
12026
12027
12028
12029    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12030
12031    !* TEST 506B *
12032    !CHECK THAT BUTP(PS15) SHOWS PS<15>H CLEAR
12033    6754:
12034    TEST506B:
12035            P0,     LOAD=ENUA(ZTARGET402),                  !BIT<00> CLEAR
```



```
12036                    LOAD=ERROR(TEST506B),                   !ERROR DIRECTORY KEY
12037                    DCS=CTR(C3,),                           !COMPARE AT TARGET
12038            NEXT,   J/GOBUT506B                             !
     (6754)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..010...0,0,0...0..0...0.0000...0..0000,0...11,000...010,011,011]
12039
12040    6233:  !(FREE)
12041    GOBUT506B:
12042            SETUP,  RETURN/TEST506C,                        !RETURN TO START OF NEXT SUBTEST
12043            NEXT,   GOTO=PAGE(7),                           !BUT TABLE HERE
12044                    J/BUTPS15                               !PS<15>H IN BIT<00>
     (6233)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,00..100..111...0,0,0...0..0...0.0000...0..0000,0...11,100...011,100,011]
12045
12046
12047
12048
12049    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12050
12051    !* TEST 506C *
12052    !CHECK THAT BUTM(PS03) SHOWS PS<03>H SET
12053    6744:
12054    TEST506C:
12055            P0,     LOAD=ENUA(ZTARGET407),                  !BIT<00> SET
12056                    LOAD=ERROR(TEST506C),                   !ERROR DIRECTORY KEY
12057                    DCS=CTR(C4,),                           !COMPARE AT TARGET
12058                    BUMP=VERIFY,                            !COUNT
12059            NEXT,   J/GOBUT506C                             !
     (6744)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..000..111...0,0,0...0..0...0.0000...0..0000,0...11,000...010,011,100]
12060
12061    6234:  !(FREE)
12062    GOBUT506C:
12063            SETUP,  RETURN/TEST506D,                        !RETURN TO START OF NEXT SUBTEST
12064            NEXT,   GOTO=PAGE(7),                           !BUT TABLE HERE
12065                    J/BUTMPS[N]                             !PS[N]=PS<03>H IN BIT<00>
     (6234)  DCS[0,00,0,0,0,0]  BM[0110..00,11..10,11..100..111...0,0,0...0..0...0.0000...0..0000,0...11,100...011,010,011]
12066
12067
12068
12069
12070    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12071
12072    !* TEST 506D *
12073    !CHECK THAT WHEN FLAG<0>H=L AND PS<04>H=L,
12074    !  MASKED-PS[T]-H=FLAG<0>L=PS<04>H, IS LOW
12075    6734:
12076    TEST506D:
12077            P0,     LOAD=ENUA(ZTARGET406),                  !BIT<00> CLEAR

12078                    LOAD=ERROR(TEST506D),                   !ERROR DIRECTORY KEY
12079                    DCS=CTR(C4,),                           !COMPARE AT TARGET
12080            NEXT,   J/GOBUT506D                             !
     (6734)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..110...0,0,0...0..0...0.0000...0..0000,0...11,000...010,011,101]
12081
12082    6235:  !(FREE)
```

```
12083    GOBUT506D:
12084            P0,     BUMP-VERIFY,                            ;COUNT
12085            SETUP,  RETURN/TEST506E,                        ;RETURN TO START OF NEXT SUBTEST
12086            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE HERE
12087                    J/BUTMNASKPS[I]                         ;FLAG IF PS<07>H IN BIT<00>
     (6235)  DCS[0,00,0,0,0,1]  BM[0110..00.11..00.00..101..111...0.0.0..0.0...0.0000...0..0000.0...11,100...011,001,111]
12088
12089
12090
12091
12092    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12093
12094    ;* TEST 506E *
12095    ;CHECK THAT INTR-HIGH=H=SERVICE(0)H*NOT(MASKED-PS[T]=H) IS HIGH,
12096    ;  WHEN SERVICE(0)H=HIGH, MASKED-PS[T]=H=LOW
12097    ;NOTE:  THE SUBR CALLED SHOULD SET SERVICE(0)H=HIGH (NEGATED) BY CLEARING OUT ALL ITS INPUT CONDITIONS
12098    6605:
12099    TEST506E:
12100            P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<04> SET
12101                    LOAD-ERROR(TEST506E),                   ;ERROR DIRECTORY KEY
12102                    DCS-CTR(C9,),                           ;COMPARE AT TARGET
12103            NEXT,   J/CLEAR506E                             ;
     (6605)  DCS[1,00,1,0,0,0]  BM[0110..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11,000...010,011,110]
12104
12105    6236:  ;(FREE)
12106    CLEAR506E:
12107            P0,     BUMP-VERIFY,                            ;COUNT
12108            SETUP,  RETURN/GOBUT506E,                       ;GO TO SUBR WHICH CLEARS OUT
12109            NEXT,   CALL[CLEAR-I-O-B]                       ;  ALL THE UNIBUS/I-O/SERVICE LATCHES  (NO UNIBUS INIT)
     (6236)  DCS[0,00,0,0,0,1]  BM[0110..00.01..00.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,011,000]
12110
12111    6237:  ;(FREE)
12112    GOBUT506E:
12113            SETUP,  RETURN/SCOPE506,                        ;RETURN TO SCOPE LOOP TEST WORD
12114            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE HERE
12115                    J/BUTINTRHIGH                           ;INTR HIGH H IN BIT<01>
     (6237)  DCS[0,00,0,0,0,0]  BM[0110..00.01..01.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11,100...011,101,101]
12116
12117
12118
12119
12120    6240:  ;(FREE)
12121    SCOPE506:
12122            P0,     BUSDIN_EMIT-[I],                        ;KEEP EMIT FOR CONSTANTS
12123            P2,     PS_D-[I],                               ;ZERO PS; D LEFT ZERO FROM
12124                                                            ;PREVIOUS TESTS IF ALL OK
12125            NEXT,   BUTD[SCOPE],                            ;NO ERROR; "TEST507A" (+1, WORDS)
12126                    J/TEST507A                              ;   ERROR; "MASK506A" (-16. WORDS)
     (6240)  DCS[0,00,0,1,0,0]  BM[1000..00.00..00.01..010..010...0.0.0..0..0...1.1011...0..0000.0...11,000...110,001,011]
12127
12128
```



```
12129
12130
12131
12132
12133    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12134
12135    ;*** TEST 507 ***
12136
12137    ;TESTS 507 A-F USE A "1-0-0101-0101" PATTERN IN PS<15,13,7:4,3:0>
12138
12139    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12140
12141    ;* TEST 507A *
12142    ;LOAD UP PS<HI,MID,LO> IN ORDER, READ BACK THRU PS PORT OF PROC MUX
12143    6613:
12144    TEST507A:
12145            P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
12146                    LOAD-ERROR(TEST507A),                   ;ERROR DIRECTORY KEY
12147                    DCS-CTR(C15,),                          ;STALL FOR NOW
12148            NEXT,   J/EXPEC507A                             ;
     (6613)  DCS[1,00,1,0,0,0]  BM[0000..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11,000...110,000,010]
12149
12150    6602:
12151    EXPEC507A:
12152            P3,     CSPD[02]_EMIT,                          ;EXPECTED VALUE TO BE READ OUT OF
12153                    EMIT#140125,                            ;PS AFTER LOADING:
12154            NEXT,   J/PSHI507A                              ;1"1100 0000 0101 0101"
     (6602)  DCS[0,00,0,0,0,0]  BM[1100..10.00..00.01..010..101...0.0.0..0..0...0.1101...1..0000.0...11,000...010,100,001]
12155
12156    6241:  ;(FREE)
12157    PSHI507A:
12158            P0,     BUMP-VERIFY,                            ;COUNT
12159            P3,     CSPD[05]_EMIT,                          ;VALUE IN D WHEN LOAD PS<15,13>:
12160                    EMIT/113252,                            ;1"1001 0110 1010 1010"
12161            NEXT,   J/PSMID507A                             ;
     (6241)  DCS[0,00,0,0,0,1]  BM[1001..10.01..10.10..101..010...0.0.0..0..0...0.1010...1..0000.0...11,000...010,100,010]
12162
12163    6242:  ;(FREE)
12164    PSMID507A:
12165            P3,     CSPD[06]_EMIT,                          ;VALUE IN D WHEN LOAD PS<7:4>:
12166                    EMIT/033122,                            ;1"0011 0110 0101 1010"
12167            NEXT,   J/PSLO507A                              ;
     (6242)  DCS[0,00,0,0,0,0]  BM[0011..10.01..10.01..010..010...0.0.0..0..0...0.1001...1..0000.0...11,000...010,100,011]
12168
12169    6243:  ;(FREE)
12170    PSLO507A:

12171            P0,     BUMP-VERIFY,                            ;COUNT
12172            P3,     CSPD[07]_EMIT,                          ;VALUE IN D WHEN LOAD PS<3:0>:
12173                    EMIT/033245,                            ;1"0011 0110 1010 0101"
12174            NEXT,   J/FUDGEPS507A                           ;
     (6243)  DCS[0,00,0,0,0,1]  BM[0011..10.01..10.10..100..101...0.0.0..0..0...0.1000...1..0000.0...11,000...010,100,100]
12175
12176    6244:  ;(FREE)
12177    FUDGEPS507A:
```

```
12178           SETUP,  RETURN/LOADDC8507A,                     ;GO TO SUBR WHICH:
12179           NEXT,   CALL[PSSEQLOD]                          ;1) CSP(05) -> PS<15,13>
     (6244)  DCS[0,00,0,0,0,0]  BM[0110..00,01..01,00..101..111...0,0,0...0..0...0,0000...0..0000,0...11,100...001,000,000]
12180                                                           ;2) CSP(06) -> PS<7:4>
12181                                                           ;3) CSP(07) -> PS<3:0>
12182
12183   6245:  !(FREE)
12184   LOADDC8507A:
12185           P0,     DCS-CTR(C9.),                           ;COMPARE AT TARGET
12186           NEXT,   J/GOBUT507A                             ;
     (6245)  DCS[0,00,1,0,0,0]  BM[0110..00,00..00,00..000..000...0,0,0...0..0...0,0000...0..0000,0...11,000...010,100,110]
12187
12188   6246:  !(FREE)
12189   GOBUT507A:
12190           SETUP,  RETURN/TEST507B,                        ;RETURN TO START OF NEXT SUBTEST
12191           NEXT,   CALL[PSTOD]                             ;  CSP(02)=XOR-PS -> D, BUT(D=ZERO)
     (6246)  DCS[0,00,0,0,0,0]  BM[0110..00,11..10,10..100..111...0,0,0...0..0...0,0000...0..0000,0...11,100...010,101,011]
12192
12193
12194
12195
12196   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12197
12198   !* TEST 507B *
12199   !CHECK THAT BUTR(PS15) SHOWS PS<15>H SET
12200   6724:
12201   TEST507B:
12202           P0,     LOAD=ENUA(ZTARGET403),                  ;BIT<00> SET
12203                   LOAD=ERROR(TEST507B),                   ;ERROR DIRECTORY KEY
12204                   DCS-CTR(C3.),                           ;COMPARE AT TARGET
12205           NEXT,   J/GOBUT507B                             ;
     (6724)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..011...0,0,0...0..0...0,0000...0..0000,0...11,000...010,100,111]
12206
12207   6247:  !(FREE)
12208   GOBUT507B:
12209           SETUP,  RETURN/TEST507C,                        ;RETURN TO START OF NEXT SUBTEST
12210           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE HERE
12211                   J/BUTPS15                               ;PS<15>H IN BIT<00>
     (6247)  DCS[0,00,0,0,0,0]  BM[0110..00,11..00,01..001..111...0,0,0...0..0...0,0000...0..0000,0...11,100...011,100,011]
12212
12213
12214
12215
12216   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12217
12218   !* TEST 507C *
12219   !CHECK THAT BUTN(PS03) SHOWS PS<03>H CLEAR
12220   6611:
12221   TEST507C:
12222           P0,     LOAD=ENUA(ZTARGET406),                  ;BIT<00> CLEAR
12223                   LOAD=ERROR(TEST507C),                   ;ERROR DIRECTORY KEY
```



```
12224                   DCS-CTR(C4.),                           ;COMPARE AT TARGET
12225                   BUMP-VERIFY,                            ;COUNT
12226           NEXT,   J/GOBUT507C                             ;
     (6611)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..000..110...0,0,0...0..0...0,0000...0..0000,0...11,000...010,101,000]
12227
12228   6250:  !(FREE)
12229   GOBUT507C:
12230           SETUP,  RETURN/TEST507D,                        ;RETURN TO START OF NEXT SUBTEST
12231           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE HERE
12232                   J/BUTNPS[N]                             ;PS[N]=PS<03>H IN BIT<00>
     (6250)  DCS[0,00,0,0,0,0]  BM[0110..00,10..11,01..111..111...0,0,0...0..0...0,0000...0..0000,0...11,100...011,010,011]
12233
12234
12235
12236
12237   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12238
12239   !* TEST 507D *
12240   !CHECK THAT WHEN FLAG<0>H=L AND PS<04>H=H,
12241   !  MASKED-PS[T]-H=FLAG<0>L*PS<04>H, IS HIGH
12242   6557:
12243   TEST507D:
12244           P0,     LOAD=ENUA(ZTARGET407),                  ;BIT<00> SET
12245                   LOAD=ERROR(TEST507D),                   ;ERROR DIRECTORY KEY
12246                   DCS-CTR(C4.),                           ;COMPARE AT TARGET
12247           NEXT,   J/GOBUT507D                             ;
     (6557)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..111...0,0,0...0..0...0,0000...0..0000,0...11,000...010,101,001]
12248
12249   6251:  !(FREE)
12250   GOBUT507D:
12251           P0,     BUMP-VERIFY,                            ;COUNT
12252           SETUP,  RETURN/TEST507E,                        ;RETURN TO START OF NEXT SUBTEST
12253           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE HERE
12254                   J/BUTMMASKPS[T]                         ;FLAG<0>L*PS<04>H IN BIT<00>
     (6251)  DCS[0,00,0,0,0,1]  BM[0110..00,11..01,11..100..111...0,0,0...0..0...0,0000...0..0000,0...11,100...011,001,111]
12255
12256
12257
12258
12259   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12260
12261   !* TEST 507E *
12262   !CHECK THAT INTR-HIGH-H=SERVICE(0)H=NOT(MASKED-PS[T]-H) IS LOW,
12263   !  WHEN SERVICE(0)H=HIGH, MASKED-PS[T]-H=HIGH
12264   6674:
12265   TEST507F:

12266           P0,     LOAD=ENUA(ZTARGET401),                  ;BIT<01> CLEAR
12267                   LOAD=ERROR(TEST507E),                   ;ERROR DIRECTORY KEY
12268                   DCS-CTR(C3.),                           ;COMPARE AT TARGET

12269                   BUMP-VERIFY,                            ;COUNT
12270           NEXT,   J/GOBUT507E                             ;
     (6674)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,00..000..001...0,0,0...0..0...0,0000...0..0000,0...11,000...010,101,011]
```

```
12271
12272    6253:  !(FREE)
12273    GOBUT507E:
12274            SETUP,  RETURN/TEST507F,                        !RETURN TO START OF NEXT SUBTEST
12275            NEXT,   GOTO-PAGE(7),                           !BUT TABLE HERE
12276                    J/BUTINTRHIGH                           !INTR HIGH H IN BIT<01>
      (6253)  DCS[0,00,0,0,0,0]  BM[0110..00,11..01,00..111..111...0,0,0..0...0...0.0000...0..0000,0...11,100...011,101,101]
12277
12278
12279
12280    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12281
12282    !* TEST 507F *
12283    !CHECK THAT PS[C]-H CAN BE READ AS A "1" THRU D[C]_CINMUX=PS[C], AND D[C]_PS[C]
12284    !  IT WAS PREVIOUSLY CHECKED, IN ALU LOGIC TESTS, THAT THESE WERE OK WITH PS[C]="0"
12285    6647:
12286    TEST507F:
12287            P0,     LOAD-ENUA(ZTARGET407),                  !SETUP FOR SR<3:0> = "0111"
12288                    LOAD-ERROR(TEST507F),                   !ERROR DIRECTORY KEY
12289                    DCS-CTR(C7,),                           !COMPARE AT TARGET
12290            NEXT,   J/CIN507F                               !
      (6647)  DCS[1,00,1,0,0,0]  BM[1000..00,11..11,00..000..111...0,0,0..0...0...0.0000...0..0000,0...11,000...010,101,100]
12291
12292    6254:  !(FREE)
12293    CIN507F:
12294            P0,     BUMP-VERIFY,                            !COUNT
12295            P2-T,   D_ZERO, D[C]_CINMUX,                    !SET D[C]=CINMUX=PS[C]=(1)
12296                    SR_ZERO,                                !SET SR<3:0>="0000"
12297            P3,     BSPLO[17]_D,                            !B-SIDE COPY OF SR
12298            NEXT,   J/SETPS507F                             !
      (6254)  DCS[0,00,0,0,0,1]  BM[0011..00,11..00,00..011..000...0,1,1..0..0...0.0000...0..0110,0...11,000...010,101,110]
12299
12300    6256:  !(FREE)
12301    SETPS507F:
12302            P2-T,   D_A-PLUS-B-PLUS-D[C], D[C]_PS[C],       !SET D[C]=PS[C]=(1)
12303                    SR_A-PLUS-B-PLUS-D[C],                  !D, SR, BSP <- SR-LEFT-1, SR<02> <- PREV D[C] = CINMUX/PS[C]
12304                            BUS-A_SR,                       !
12305                            BUS-B_BSPLO(R17),               !
12306            P3,     BSPLO[17]_D,                            !SAVE ON B-SIDE
12307            NEXT,   J/SETSR507F                             !
      (6256)  DCS[0,00,0,0,0,0]  BM[0100..00,11..00,00..011..001...0,1,1..0..0...0.0000...0..0110,0...11,000...010,101,111]
12308
12309    6257:  !(FREE)
12310    SETSR507F:
12311            P0,     BUMP-VERIFY,                            !COUNT
12312            P2-T,   D_A-PLUS-B-PLUS-D[C], D[C]_ALU15,       !SET D[C]=0
12313                    SR_A-PLUS-B-PLUS-D[C],                  !D, SR, BSP <- SR-LEFT-1, SR<01> <- PREV D[C] = PS[C]
12314                            BUS-A_SR,                       !
12315                            BUS-B_BSPLO(R17),               !
12316            P3,     BSPLO[17]_D,                            !SAVE ON B-SIDE
12317            NEXT,   J/SETCIN507F                            !
      (6257)  DCS[0,00,0,0,0,1]  BM[0100..00,11..00,00..011..100...0,1,1..0..0...0.0000...0..0110,0...11,000...010,110,000]
12318
```



```
12319    6260:  !(FREE)
12320    SETCIN507F:
12321            P2-T,   D_A-PLUS-B-PLUS-PS[C], D[C]_ALU15,      !SET D[C]=0
12322                    SR_A-PLUS-B-PLUS-PS[C],                 !D, SR, BSP <- SR-LEFT-1, SR<00> <- CIN/PS[C]
12323                            BUS-A_SR,                       !
12324                            BUS-B_BSPLO(R17),               !
12325            NEXT,   J/GOBUT507F                             !
      (6260)  DCS[0,00,0,0,0,0]  BM[0001..00,11..00,00..011..100...0,1,1..0..0...0.0000...0..0000,0...11,000...010,110,001]
12326
12327    6261:  !(FREE)
12328    GOBUT507F:
12329            SETUP,  RETURN/SCOPE507,                        !RETURN TO SCOPE LOOP TEST WORD
12330            NEXT,   GOTO-PAGE(7),                           !BUT TABLE
12331                    J/BUTSR3=0                              !CHECK THAT WE GOT "0111" = (07)
      (6261)  DCS[0,00,0,0,0,0]  BM[0110..00,01..01,10..010..111...0,0,0..0...0...0.0000...0..0000,0...11,100...010,111,110]
12332
12333
12334
12335
12336
12337    6262:  !(FREE)
12338    SCOPE507:
12339            P0,     BUSDIN_EMIT-[I],                        !KEEP EMIT FOR CONSTANTS
12340            P2,     PS_D-[I],                               !ZERO PS; D LEFT ZERO FROM
12341                                                            !PREVIOUS TESTS IF ALL OK
12342            NEXT,   BUTD(SCOPE),                            !NO ERROR: "TEST510A" (+1, WORDS)
12343                    J/TEST510A                              !   ERROR: "EXPEC507A" (-21, WORDS)
      (6262)  DCS[0,00,0,1,0,0]  BM[1000..00,00,00..00,01..010..010...0,0,0..0...0...1.1011...0..0000,0...11,000...110,000,011]
12344
12345
12346
12347
12348
12349
12350    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12351
12352    !*** TEST 510 ***
12353
12354    !TESTS 510 A-F USE PS<7:5>H="111", PS<4>H="1", VARIOUS FLAG<7,0>H COMBINATIONS,
12355    !  TO TEST THE INTR-HIGH-H, SERVICE-H, AND MASKED-PS(T)-H LOGIC
12356
12357    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12358
12359    !* TEST 510A *
12360    !CHECK THAT BG-SERVICE(0)H=HIGH WHEN PS<7:5>H="111" (PSW PRIORITY 7); EG, BR>PS-H=LOW, SINCE NO
12361    !  EXTERNAL UNIBUS DEVICE CAN THEN REQUEST AN INTERRUPT (IE, IT IS MASKED OUT)

12362    6603:
12363    TEST510A:
12364            P0,     LOAD-ENUA(ZTARGET407),                  !BIT<02> SET
12365                    LOAD-ERROR(TEST510A),                   !ERROR DIRECTORY KEY
12366                    DCS-CTR(C5,),                           !COMPARE AT TARGET
12367            NEXT,   J/SETONE510A                            !
      (6603)  DCS[1,00,1,0,0,0]  BM[1010..00,11..11,00..000..111...0,0,0..0...0...0.0000...0..0000,0...11,000...110,000,110]
```

```
12368
12369    6606:
12370    SETONES510A:
12371            P2=T,    D_ALL-ONES, SAVE-D[C],                 !ALL ONES FOR LOAD PRIORITY 7
12372            NEXT,    J/LOADPRIO510A                         !
     (6606)  DCS[0.00.0.0.0.0]  BM[1111..00.00..11.01..101..111...0.1.0..0..0...0.0000...0..0000.0...11.000...010.110.011]
12373
12374    6263:  !(FREE)
12375    LOADPRIO510A:
12376            P0,      BUSDIN_EMIT=[I],                       !KEEP IT ON
12377            P3=T,    PS[7=4]_D[7=4]=[I],                    !PRIO 7, T-BIT (PS04) SET
12378            NEXT,    J/GOBUT510A                            !
     (6263)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..010..000...1.0.0..0..0...1.1011...0..0000.0...11.000...010.110.100]
12379
12380    6264:  !(FREE)
12381    GOBUT510A:
12382            SETUP,   RETURN/TEST510B,                       !RETURN TO START OF NEXT SUBTEST
12383            NEXT,    GOTO=PAGE(7),                          !BUT TABLE
12384                     J/BUTBGSERVL                           !BG-SERVICE(0)H IN BIT<02>
     (6264)  DCS[0.00.0.0.0.0]  BM[0110..00.11..01.11..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.110]
12385
12386
12387
12388
12389
12390    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12391
12392    !* TEST 510B *
12393    !CHECK THAT BUT[ NOT(BG-SERVICE(0)H) + NOT(FLTPT-SERVICE-L) ] IN BIT<03>
12394    !  SEES BG-SERVICE(0)H=HIGH, FLTPT-SERVICE-L=HIGH, AND THUS IS NOT ASSERTED (=LOW)
12395    6675:
12396    TEST510B:
12397            P0,      LOAD-ENUA(ZTARGET407),                 !BIT<03> CLEAR
12398                     LOAD-ERROR(TEST510B),                  !ERROR DIRECTORY KEY
12399                     DCS-CTR(C3,),                          !COMPARE AT TARGET
12400            NEXT,    J/GOBUT510B                            !
     (6675)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...010.110.101]
12401
12402    6265:  !(FREE)
12403    GOBUT510B:
12404            SETUP,   RETURN/TEST510C,                       !RETURN TO START OF NEXT SUBTEST
12405            NEXT,    GOTO=PAGE(7),                          !BUT TABLE
12406                     J/BUTBGFPSERV                          !RESULT IN BIT<03>
     (6265)  DCS[0.00.0.0.0.0]  BM[0110..00.11..00.01..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.111]
12407
12408
12409
12410
12411
12412    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12413
12414    !* TEST 510C *
```



```
12415    !CHECK THAT SERVICE-H=INTR-HIGH-H=BG-SERVICE(0)H=NOT(FLAG<7>H) IS HIGH,
12416    !  WHEN INTR-HIGH-H=LOW, BG-SERVICE(0)H=HIGH, FLAG<7>H=LOW
12417    6616:
12418    TEST510C:
12419            P0,      LOAD-ENUA(ZTARGET403),                 !BIT<00> SET
12420                     LOAD-ERROR(TEST510C),                  !ERROR DIRECTORY KEY
12421                     DCS-CTR(C3,),                          !COMPARE AT TARGET
12422            NEXT,    J/GOBUT510C                            !
     (6616)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...010.110.110]
12423
12424    6266:  !(FREE)
12425    GOBUT510C:
12426            SETUP,   RETURN/TEST510D,                       !RETURN TO START OF NEXT SUBTEST
12427            NEXT,    GOTO=PAGE(7),                          !BUT TABLE
12428                     J/BUTSERVICE                           !SERVICE-H IN BIT<00>
     (6266)  DCS[0.00.0.0.0.0]  BM[0110..00.11..00.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.101]
12429
12430
12431
12432    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12433
12434    !* TEST 510D *
12435    !SET ONLY FLAG<0>H, FLAG<7>H, LEAVE PS<04>H SET,
12436    !CHECK MASKED-PS[T]-H=PS<04>H=FLAG<0>L IS LOW
12437    6600:
12438    TEST510D:
12439            P0,      LOAD-ENUA(ZTARGET406),                 !BIT<00> CLEAR
12440                     LOAD-ERROR(TEST510D),                  !ERROR DIRECTORY KEY
12441                     DCS-CTR(C7,),                          !COMPARE AT TARGET
12442                     BUMP-VERIFY,                           !COUNT
12443            NEXT,    J/FLAG510D                             !
     (6600)  DCS[1.00.1.0.0.1]  BM[1000..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...010.110.111]
12444
12445    6267:  !(FREE)
12446    FLAG510D:
12447            P3,      CSPD[01]_EMIT,                         !
12448                     EMIT/040401,                           !BITS FOR FLAG<7,0> ONLY, BIT<00> OF D
12449            NEXT,    J/ENFLAG510D                           !
     (6267)  DCS[0.00.0.0.0.0]  BM[0100..10.00..01.00..000..001...0.0.0..0..0...0.1110...1..0000.0...11.000...010.111.000]
12450
12451    6270:  !(FREE)
12452    ENFLAG510D:
12453            P3=T,    D_CSPD(D01), D[C]_0,                   !INTO D
12454            NEXT,    J/SETFLAG510D                          !
     (6270)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1110...0..0000.0...11.000...010.111.001]
12455
12456    6271:  !(FREE)
12457    SETFLAG510D:
12458            P3=T,    FLAG[8-0]_D[15-8]=[I],                 !SET FLAGS<7,0>H ONLY
12459            NEXT,    J/GOBUT510D                            !
     (6271)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..000..001...1.0.0..0..0...1.1011...0..0000.0...11.000...010.111.010]
12460
12461    6272:  !(FREE)
```

```
12462    GOBUT510D:
12463            SETUP,  RETURN/TEST510DA,                       ;RETURN TO START OF NEXT SUBTEST
12464            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE HERE
12465                    J/BUTMMASKPS[T]                         ;FLAG<6>L=PS<04>H IN BIT<00>
     (6272)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,00,01,,111,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,001,111]
12466
12467
12468
12469
12470    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12471
12472    !*** TEST 510DA ***
12473    !DO THE "MULTIPLE BUT" ON "D<00>H" TO CHECK IT'S SET  (DURING TEST510D, ABOVE)
12474    6617!
12475    TEST510DA:
12476            P0,     LOAD=ENUA(ZTARGET407),                  ;BIT<00> SET
12477                    LOAD=ERROR(TEST510DA),                  ;ERROR DIRECTORY KEY
12478                    DCS=CTR(C4,),                           ;COMPARE AT TARGET
12479                    BUMP=VERIFY,                            ;COUNT
12480            NEXT,   J/GOBUT510DA                            !
     (6617)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,00,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,010,111,011]
12481
12482    6273!  !(FREE)
12483    GOBUT510DA:
12484            SETUP,  RETURN/TEST510E,                        ;RETURN TO START OF NEXT SUBTEST
12485            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE
12486                    J/BUTMD00                               ;D<00>=H IN BIT<00>
     (6273)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,00,00,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,010,001]
12487
12488
12489
12490
12491    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12492
12493    !* TEST 510E *
12494    !CHECK THAT SERVICE=H=INTR=HIGH=H=BG=SERVICE(0)H=NOT(FLAG<7>H) IS HIGH,
12495    !  WHEN INTR=HIGH=H=HIGH, BG=SERVICE(0)H=HIGH, FLAG<7>H=HIGH
12496    6604!
12497    TEST510E:
12498            P0,     LOAD=ENUA(ZTARGET403),                  ;BIT<00> SET
12499                    LOAD=ERROR(TEST510E),                   ;ERROR DIRECTORY KEY
12500                    DCS=CTR(C4,),                           ;COMPARE AT TARGET
12501            NEXT,   J/ZEROD510E                             !
     (6604)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,011...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,010,111,100]
12502
12503    6274!  !(FREE)
12504    ZEROD510E:
12505            P2-T,   D_ZERO, DIC=ALU15,                      ;ZEROES FOR BELOW
12506            NEXT,   J/GOBUT510E                             !
     (6274)  DCS[0,00,0,0,0,0]  BM[0011,,00,00,,00,00,,000,,100...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,010,111,101]
12507
12508    6275!  !(FREE)
```



```
12509    GOBUT510E:
12510            P0,     BUMP=VERIFY,                            ;COUNT
12511            SETUP,  RETURN/TEST510F,                        ;RETURN TO START OF NEXT SUBTEST
12512            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE HERE
12513                    J/BUTSERVICE                            ;SERVICE=H IN BIT<00>
     (6275)  DCS[0,00,0,0,0,1]  BM[0110,,00,11,,00,01,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,101]
12514
12515
12516
12517
12518    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12519
12520    !* TEST 510F *
12521    !CHECK THAT SERVICE=H=INTR=HIGH=H=BG=SERVICE(0)H=NOT(FLAG<7>H) IS LOW,
12522    !  WHEN INTR=HIGH=H=HIGH, BG=SERVICE(0)H=HIGH, FLAG<7>H=LOW
12523    6610!
12524    TEST510F:
12525            P0,     LOAD=ENUA(ZTARGET402),                  ;BIT<00> CLEAR
12526                    LOAD=ERROR(TEST510F),                   ;ERROR DIRECTORY KEY
12527                    DCS=CTR(C4,),                           ;COMPARE AT TARGET
12528            NEXT,   J/ZEROFLAG510E                          !
     (6610)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,010,111,110]
12529
12530    6276!  !(FREE)
12531    ZEROFLAG510E:
12532            P2,     PS_D=[I],                               ;ZERO PS-T-BIT, AND ALL THE OTHERS,
12533                    FPS[7-4]_D[7-4]=[I],                    ;ZERO THE FPS
12534            P3,     FLAG[8-0]_D[15-8]=[I],                  ;ZERO FLAGS (D ZEROED ABOVE)
12535            NEXT,   J/GOBUT510F                             !
     (6276)  DCS[0,00,0,0,0,0]  BM[1000,,00,00,,00,01,,110,,011...0,0,0,,0,,0...1,1011...0,,0000,0,,,11,000,,,010,111,111]
12536
12537    6277!  !(FREE)
12538    GOBUT510F:
12539            SETUP,  RETURN/SCOPE510,                        ;RETURN TO SCOPE LOOP TEST WORD
12540            NEXT,   GOTO=PAGE(7),                           ;BUT TABLE HERE
12541                    J/BUTSERVICE                            ;SERVICE=H IN BIT<00>
     (6277)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,10,00,,000,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,101]
12542
12543
12544
12545
12546
12547    5300!  !(FREE)
12548    SCOPE510:
12549            P0,     BUSDIN_EMIT=[I],                        ;KEEP EMIT FOR CONSTANTS
12550            P9,     PS_D=[I],                               ;ZERO PS; D LEFT ZERO FROM

12551                                                            ;PREVIOUS TESTS IF ALL OK
12552            NEXT,   BUTD[SCOPE],                            ;NO ERROR: "TEST511A" (+11. WORDS)
12553                    J/TEST511A                              !   ERROR: "SETONES510A" (-20. WORDS)
     (5300)  DCS[0,00,0,1,0,0]  BM[1000,,00,00,,00,01,,010,,010...0,0,0,,0,,0...1,1011...0,,0000,0,,,11,000,,,110,000,111]
12554
12555
```

```
        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !
        !       THIS FIRST SUBROUTINE COPIES:
        !               CSP(06) -> FPS<7:4>
        !               CSP(05) -> FLAGS<8:4,2:0>, EXFLAG<2:1>
        !       THEN RETURNS
        !
        7073:  !(FREE)
        FLAGFPSSEQLOD:
                P3-T,   D_CSPD(D06), D[C]_0,                    !GET VALUE TO LOAD TO FPS<7:4>H
                NEXT,   J/FLAGFPS02                             !
    (7073)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1001...0..0000.0...11.000...000.111.101]

        7075:  !(FREE)
        FLAGFPS02:
                P0,     BUSDIN_EMIT-[I],                        !
                P3-T,   FPS[7-4]_D[7-4]-[I],                    !LOAD FPS<7:4>H FROM D<7:4>H
                NEXT,   J/FLAGFPS03                             !
    (7075)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..100..000...1.0.0..0..0...1.1011...0..0000.0...11.000...000.111.110]

        7076:  !(FREE)
        FLAGFPS03:
                P3-T,   D_CSPD(D05), D[C]_0,                    !GET VALUE TO LOAD TO FLAGS<8:0>H,
                NEXT,   J/FLAGFPS04                             !EXFLAG<2:1>H
    (7076)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1010...0..0000.0...11.000...000.111.111]

        7077:  !(FREE)
        FLAGFPS04:
                P0,     BUSDIN_EMIT-[I],                        !KEEP IT ON
                P3-T,   FLAG[8-0]_D[15-8]-[I],                  !LOAD FLAGS FROM D
                NEXT,   BUTA(RETURN),                           !AND RETURN
                        J/BUTERROR7                             !
    (7077)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..000..001...1.0.0..0..0...1.1011...0..0000.0...11.111...011.111.110]

        !
        !       THIS SECOND SUBROUTINE COPIES:
        !               CSP(05) -> PS<15:12>
        !               CSP(06) -> PS<7:4>
        !               CSP(07) -> PS<3:0>
        !       THEN RETURNS
        !
        7100:  !(FREE)
        PSSEQLOD:
                P3-T,   D_CSPD(D05), D[C]_0,                    !GET VALUE TO LOAD PS<15:12>H
                NEXT,   J/PSSEQLOD02                            !
    (7100)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1010...0..0000.0...11.000...001.000.001]

        7101:  !(FREE)
        PSSEQLOD02:
                P0,     BUSDIN_EMIT-[I],                        !
                P3-T,   PS[15-12]_D[15#13]-[I],                 !LOAD PS<15-12>H FROM D<15,13>H
                NEXT,   J/PSSEQLOD03                            !
```



```
    (7101)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..000..010...1.0.0..0..0...1.1011...0..0000.0...11.000...001.000.010]

        7102:  !(FREE)
        PSSEQLOD03:
                P3-T,   D_CSPD(D06), D[C]_0,                    !GET VALUE TO LOAD PS<7:4>H
                NEXT,   J/PSSEQLOD04                            !
    (7102)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1001...0..0000.0...11.000...001.000.011]

        7103:  !(FREE)
        PSSEQLOD04:
                P0,     BUSDIN_EMIT-[I],                        !
                P3-T,   PS[7-4]_D[7-4]-[I],                     !LOAD PS<7:4>H FROM D<7:4>H
                NEXT,   J/PSSEQLOD05                            !
    (7103)  DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..010..000...1.0.0..0..0...1.1011...0..0000.0...11.000...001.000.100]

        7104:  !(FREE)
        PSSEQLOD05:
                P3-T,   D_CSPD(D07), D[C]_0,                    !GET VALUE TO LOAD TO PS<3:0>H
                NEXT,   J/PSSEQLOD06                            !
    (7104)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...1.1.0..0..0...0.1000...0..0000.0...11.000...001.000.101]

        7105:  !(FREE)
        PSSEQLOD06:
                P0,     BUSDIN_EMIT-[I],                        !KEEP IT ON
                P2-T,   PS[3-0]_D[3-0]-[I],                     !LOAD PS<3:0>H FROM D<3:0>H
                NEXT,   BUTA(RETURN),                           !AND RETURN
                        J/BUTERROR7                             !
    (7105)  DCS[0.00.0.0.0.0]  BM[1000..00.00..00.01..000..000...0.0.0..0..0...1.1011...0..0000.0...11.111...011.111.110]





        !.PAGE==========================================================================================


        .TOC    *    TEST511:  MFSS LOGIC TESTS


        !*************************************************************************
        !*
        !*      TESTS:  511 A - B                               UWORDS:  022 + 060
        !*
        !*      FUNCTIONS:
        !*
        !*      THE FOLLOWING TESTS VERIFY THAT THE "MF SAME STACK" LOGIC OPERATES

        !*      CORRECTLY, AND THAT THE "SR6-H" DECODE IS CORRECT.
        !*
        !*************************************************************************



        !
        !       SUMMARY OF "MF SAME STACK H" LOGIC TESTS
```

```
        !
        !       MF SAME STACK H = FLAG2-H * IR8-H * IR7-H * IR6-L * (PS15-H*PS13-H)-H
        !
        !       TEST    PS15,13H  FLAG2H  IR8-6H/SR6H  MFSS-H   DATA
        !       ----    --------  ------  -----------  ------   ------
        !
        !        A1        0-0       1       110-1        1     002601
        !
        !        A2        0-1       1       110-1        0     022600
        !
        !        A3        1-1       1       110-1        1     122601
        !
        !        A4        1-0       1       110-1        0     102600
        !
        !
        !        B1        0-0       0       110-1        0     000600
        !
        !        B2        0-0       1       010-0        0     002200
        !
        !        B3        0-0       1       100-0        0     002400
        !
        !        B4        0-0       1       111-0        0     002700
        !
        !
        !
        !       TESTING SUBR USED FOR ABOVE TESTS USES THE DATA AS FOLLOWS:
        !
        !       DATA<15,13> -> PS<15,13>,  DATA<10> -> FLAG<2>,
        !       DATA<8:6> -> IR<8:6>,  DATA<0> = EXPECTED MFSS-H OUTPUT


        6232:  !(FREE)
        MFSS01:
                P2-U,   IR_DBUF-[I],                            !DONT CARE ABOUT AFFECT, ONLY SET
                P3,     DBUF_D-[I],                             !THESE UCONS UP
                NEXT,   J/MFSS02                                !
     (6232)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,011,000,010]

        6302:  !(FREE)
        MFSS02:
                P2-T,   D_CSP8(817), D[C]_ALU00,                !GET DATA INTO D, D[C]_EXPECTED MFSS-H
                P2-U,   IR_DBUF,                                !IGNORE FOR NOW
                P3,     DBUF_D,                                 !GET DATA INTO DBUF, TO GO TO IR NEXT
                NEXT,   J/MFSS03                                !
     (6302)  DCS[0,00,0,0,0,0]  BM[1010,,11,00,,00,00,,000,,010,,,0,1,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,011,000,011]

        6303:  !(FREE)
        MFSS03:
                P0,     BUMP-VERIFY,                            !COUNT
                P2-U,   IR_DBUF,                                !SETUP IR<8:6> FROM DATA<8:6>
                P3,     DBUF_D,                                 !IGNORE FOR NOW
                NEXT,   J/MFSS04                                !
     (6303)  DCS[0,00,0,0,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,011,000,100]
```



```
        6304:  !(FREE)
        MFSS04:
                P0,     BUSDIN_EMIT-[I],                        !RESET
                P3,     FLAG[8-0]_D[15-8]-[I],                  !SETUP FLAG<2> FROM DATA<10>
                        PS[15-12]_D[15*13]-[I],                 !SETUP PS<15,13> FROM D<15,13>
                NEXT,   BUTR(D[C]-A),                           !IF EXPECT MFSS-H=(1), J/MFSS06
                        J/MFSS05                                !IF EXPECT MFSS-H=(0), J/MFSS05
     (6304)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,011,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,01,111,,,101,101,010]

        !* COME HERE IF EXPECT MFSS-H=(0)
        6552:
        MFSS05:
                P0,     LOAD-ENUA(MFSSEXPEC0),                  !SETUP FOR (0)
                        LOAD-ERROR(MFSS05),                     !ERROR DIRECTORY KEY
                        DCS-CTR(C1,),                           !COMPARE AT TARGET
                        BUMP-VERIFY,                            !COUNT
                NEXT,   BUTR(MFSS),                             !TEST MFSS:  (0)=MFSSEXPEC0, (1)=MFSSEXPEC1
                        J/MFSSEXPEC0                            !
     (6552)  DCS[1,00,1,0,0,1]  BM[1110,,00,11,,01,01,,100,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,01,100,,,101,100,101]

        !* COME HERE IF EXPECT MFSS-H=(1)
        6553:
        MFSS06:
                P1,     LOAD-ENUA(MFSSEXPEC1),                  !SETUP FOR (0)
                        LOAD-ERROR(MFSS06),                     !ERROR DIRECTORY KEY
                        DCS-CTR(C1,),                           !COMPARE AT TARGET
                NEXT,   BUTR(MFSS),                             !TEST MFSS:  (0)=MFSSEXPEC0, (1)=MFSSEXPEC1
                        J/MFSSEXPEC0                            !
     (6553)  DCS[1,00,1,0,0,0]  BM[1110,,00,11,,01,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,01,100,,,101,100,101]


        !* COME HERE IF MFSS-H TESTS AS A (0)
        6545:
        MFSSEXPEC0:
                P0,     BUSDIN_EMIT-[I],                        !RESET PROC UCON
                NEXT,   BUTA(RETURN),                           !AND RETURN
                        J/BUTERROR6                             !*** COMPARE DONE HERE ***
     (6545)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,000,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,111,,,011,111,110]

        !* COME HERE IF MFSS-H TESTS AS A (1)
        6547:
        MFSSEXPEC1:
                P0,     BUSDIN_EMIT-[I],                        !RESET PROC UCON
                NEXT,   BUTA(RETURN),                           !AND RETURN
                        J/BUTERROR6                             !*** COMPARE DONE HERE ***
     (6547)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,000,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,111,,,011,111,110]


        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !       THE TESTS ACTUALLY START HERE:

        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
12754    6607:
12755    TEST511A:
12756            P0,     LOAD=ERROR(TEST511A),                   !ERROR DIRECTORY KEY
12757            P3,     CSPD[17]_EMIT, EMIT/002601,             !* TEST 511 A1 DATA *
12758            NEXT,   J/GOTEST511A1                           !
      (6607)  DCS[1,00,0,0,0,0]  BM[0000..10.01..01.10..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...101.101.000]
12759
12760    6550:
12761    GOTEST511A1:
12762            SETUP,  RETURN/TEST511A2,                       !GO DO THE TEST
12763            NEXT,   CALL[MFSS-TEST]                         !
      (6550)  DCS[0,00,0,0,0,0]  BM[0111..00.00..01.11..100..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
12764
12765
12766    7074:  1(FREE)
12767    TEST511A2:
12768            P3,     CSPD[17]_EMIT, EMIT/022600,             !* TEST 511 A2 DATA *
12769            NEXT,   J/GOTEST511A2                           !
      (7074)  DCS[0,00,0,0,0,0]  BM[0010..10.01..01.10..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...001.000.111]
12770
12771    7107:  1(FREE)
12772    GOTEST511A2:
12773            SETUP,  RETURN/TEST511A3,                       !GO DO THE TEST
12774            NEXT,   CALL[MFSS-TEST]                         !
      (7107)  DCS[0,00,0,0,0,0]  BM[0111..00.00..10.01..000..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
12775
12776
12777    7110:  1(FREE)
12778    TEST511A3:
12779            P3,     CSPD[17]_EMIT, EMIT/122601,             !* TEST 511 A3 DATA *
12780            NEXT,   J/GOTEST511A3                           !
      (7110)  DCS[0,00,0,0,0,0]  BM[1010..10.01..01.10..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...001.001.001]
12781
12782    7111:  1(FREE)
12783    GOTEST511A3:
12784            SETUP,  RETURN/TEST511A4,                       !GO DO THE TEST
12785            NEXT,   CALL[MFSS-TEST]                         !
      (7111)  DCS[0,00,0,0,0,0]  BM[0111..00.00..10.01..010..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
12786
12787
12788    7112:  1(FREE)
12789    TEST511A4:
12790            P3,     CSPD[17]_EMIT, EMIT/102600,             !* TEST 511 A4 DATA *
12791            NEXT,   J/GOTEST511A4                           !
      (7112)  DCS[0,00,0,0,0,0]  BM[1000..10.01..01.10..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...001.001.011]
12792
12793    7113:  1(FREE)
12794    GOTEST511A4:
12795            SETUP,  RETURN/SCOPE511A,                       !GO DO THE TEST
12796            NEXT,   CALL[MFSS-TEST]                         !
      (7113)  DCS[0,00,0,0,0,0]  BM[0110..00.01..10.00..001..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
```



```
12797
12798
12799    6301:  1(FREE)
12800    SCOPE511A:
12801            P3,     CSPD[17]_EMIT, EMIT/002601,             !RESET DATA FOR TEST 511 A1
12802            NEXT,   RUTD[SCOPE],                            !NO ERROR:  "TEST511B1" (+1, WORD8)
12803                    J/TEST511B1                             !   ERROR:  "GOTEST511A1" (-7, WORD8)
      (6301)  DCS[0,00,0,1,0,0]  BM[0000..10.01..01.10..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...101.101.001]
12804
12805
12806
12807
12808    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
12809
12810
12811    6551:
12812    TEST511B1:
12813            P3,     CSPD[17]_EMIT, EMIT/000600,             !* TEST 511 B1 DATA *
12814            NEXT,   J/GOTEST511B1                           !
      (6551)  DCS[0,00,0,0,0,0]  BM[0000..10.00..01.10..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...101.101.100]
12815
12816    6554:
12817    GOTEST511B1:
12818            SETUP,  RETURN/TEST511B2,                       !GO DO THE TEST
12819            NEXT,   CALL[MFSS-TEST]                         !
      (6554)  DCS[0,00,0,0,0,0]  BM[0111..00.00..10.00..110..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
12820
12821
12822    7106:  1(FREE)
12823    TEST511B2:
12824            P3,     CSPD[17]_EMIT, EMIT/002200,             !* TEST 511 B2 DATA *
12825            NEXT,   J/GOTEST511B2                           !
      (7106)  DCS[0,00,0,0,0,0]  BM[0000..10.01..00.10..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...001.001.101]
12826
12827    7115:  1(FREE)
12828    GOTEST511B2:
12829            SETUP,  RETURN/TEST511B3,                       !GO DO THE TEST
12830            NEXT,   CALL[MFSS-TEST]                         !
      (7115)  DCS[0,00,0,0,0,0]  BM[0111..00.00..10.01..110..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
12831
12832
12833    7116:  1(FREE)
12834    TEST511B3:
12835            P3,     CSPD[17]_EMIT, EMIT/002400,             !* TEST 511 B3 DATA *
12836            NEXT,   J/GOTEST511B3                           !
      (7116)  DCS[0,00,0,0,0,0]  BM[0000..10.01..01.00..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...001.001.111]
12837
12838    7117:  1(FREE)
12839    GOTEST511B3:
12840            SETUP,  RETURN/TEST511B4,                       !GO DO THE TEST
12841            NEXT,   CALL[MFSS-TEST]                         !
      (7117)  DCS[0,00,0,0,0,0]  BM[0111..00.00..10.10..000..110...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.010]
```

```
12842
12843
12844    7120:  !(FREE)
12845    TEST511B4:
12846            P3,     CSPD[17]_EMIT, EMIT/002700,             !* TEST 511 B4 DATA *
12847            NEXT,   J/GOTEST511B4                           !
      (7120)  DCS[0,00,0,0,0,0]  BM[0000,,10,01,,01,11,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,001,010,001]
12848
12849    7121:  !(FREE)
12850    GOTEST511B4:
12851            SETUP,  RETURN/SCOPE511B,                       !GO DO THE TEST
12852            NEXT,   CALL[MFSS-TEST]                         !
      (7121)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,10,00,,101,,110,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,011,010]
12853
12854
12855    6305:  !(FREE)
12856    SCOPE511B:
12857            P3,     CSPD[17]_EMIT, EMIT/000800,             !RESET DATA FOR TEST 511 B1
12858            NEXT,   SUTD[SCOPE],                            !NO ERROR:  "SETUP512A" (+1, WORDS)
12859                    J/SETUP512A                             !   ERROR:  "GOTEST511B1" (-7, WORDS)
      (6305)  DCS[0,00,0,1,0,0]  BM[0000,,10,00,,01,10,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,101,101,101]
12860
12861
12862
12863
12864
12865    !.PAGE=============================================================================================================
12866
12867
12868    .TOC    *   TEST512:  KT SRC/DST ADDRESSING LOGIC TESTS
12869
12870
12871
12872    !*****************************************************************************************
12873    !*
12874    !*      TESTS:  512 A - E                               UWORDS:  044 + 062
12875    !*
12876    !*      FUNCTIONS:
12877    !*
12878    !*      THE FOLLOWING TEN TESTS VERIFY THE KT-SRC/DST-ADDRS ROM OUTPUT AND INPUT LINES
12879    !*      FUNCTION CORRECTLY, IN RESPECT TO NO STUCK ONE/ZERO CONDITIONS.
12880    !*
12881    !*****************************************************************************************
12882
12883
12884    !       KT SRC/DST LOGIC EQUATIONS:     (IMPLEMENTED IN ROM)
12885    !
12886    !       KT-SRC-ADDRS-3 =        NOT-F2,AND,SR6,AND,PS15
12887    !                       .OR.    F2,AND,SR6,AND,NOT-SM0,AND,PS15
12888    !                       .OR.    F2,AND,SR6,AND,SM0,AND,PS13,AND,NOT-FLTPT
12889    !                       .OR.    SR6,AND,PS15,AND,FLTPT
12890    !
12891    !       KT-DST-ADDRS-3 =        NOT-F1,AND,DR6,AND,PS15
```



```
12892    !                       .OR.    F1,AND,DR6,AND,NOT-DM0,AND,PS15
12893    !                       .OR.    F1,AND,DR6,AND,DM0,AND,PS13,AND,NOT-FLTPT
12894    !                       .OR.    DR6,AND,PS15,AND,FLTPT
12895    !
12896    !
12897    !       SUMMARY OF KT ASP/BSP SRC/DST STACK POINTER ADDRESSING LOGIC:
12898    !
12899    !       TEST     PS     FLAG                                              KT-SRC  KT-DST
12900    !       NUMB    15:13H  2:1H     IR     FLTL    SM0H    SR6H    DM0H    DR6H   ADR-H   ADR=H   HOW READ:
12901    !       ----    ------  ----    ------  ----    ----    ----    ----    ----   ------  ------  ------------
12902    !
12903    !        A1      1,0     1,1    172206   0       0       0       1       1       0               ASPHI[SF]=(02)
12904    !        A2                                                                             1       BSPHI[DF]=(16)
12905    !
12906    !        B1      0,1     1,0    070606   1       1       1       1       1               0       ASPHI[DF]=(06)
12907    !        B2                                                                     1               BSPHI[SF]=(16)
12908    !
12909    !        C1      0,1     1,1    134606   1       0       1       1       1               1       ASPHI[DF]=(16)
12910    !        C2                                                                     0               BSPHI[SF]=(06)
12911    !
12912    !        D1      1,0     0,1    160612   1       1       1       0       0       1               ASPHI[SF]=(16)
12913    !        D2                                                                             0       BSPHI[DF]=(02)
12914    !
12915    !        E1      1,0     1,1    150626   1       1       1       0       1               1       ASPHI[DF]=(16)
12916    !        E2                                                                     0               BSPHI[SF]=(06)
12917    !
12918    !
12919    !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
12920    !
12921    !
12922    !       KT SRC/DST STACK POINTER ADDRESS MODE TEST SUBROUTINE:
12923    !
12924    !       ENTER WITH:     CSP(17) = VALUE TO GO INTO IR, TO SETUP FLTPT/SM0/SR6/DM0/DR6
12925    !                       CSP(16) = BIT<15,13> -> PS<15,13>
12926    !                                 BIT<10:09> -> FLAG<2:1>
12927    !                                 ** BIT<00> IS AN INTERNAL FLAG TO INDICATE WHICH REGISTER
12928    !                                       TO PUT IN THE SR ON EXIT:
12929    !                                       BIT<00> = (1) -> ASPHI[DF],  BIT<00> = (0) -> ASPHI[SF]
12930    !
12931
12932    7114:  !(FREE)
12933    KTSRCDST01:
12934            P2-T,   D_CSPD(D17), D[C]_0,                    !INITIAL DATA TO GO INTO IR
12935            NEXT,   J/KTSRCDST02                            !
      (7114)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,001,010,011]
12936
12937    7123:  !(FREF)
12938    KTSRCDST02:
12939            P2-U,   IR_DBUF=[I],                            !IGNORE FOR NOW
12940            P3,     DBUF_D=[I],                             !COPY IR DATA FROM D -> DBUF
12941            NEXT,   J/KTSRCDST03                            !
      (7123)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,001,010,100]
12942
12943    7124:  !(FREE)
```

```
KTSRCDST03:
        P2-U,   IR_DBUF,                                        !COPY IR DATA FROM DBUF -> IR
        P3-T,   D_CSPB(B16), D[C]_ALU00,                        !GET PS/FLAGS/REGISTER SELECT DATA
        P3,     DBUF_D,                                         !D[C] = REGISTER SELECT FLAG
        NEXT,   J/KTSRCDST04                                    !
 (7124) DCS[0.00.0.0.0.0]  BM[1010..11.01..00.00..000..010...1.1.0..0..0...1.1010...0..0000.0...11.000...001.010.101]

   7125: !(FREE)
   KTSRCDST04:
        P0,     BUSDIN_EMIT-[I],                                !KEEP IT ON
        P3,     PS[15-12]_D[15#13]-[I],                         !SETUP PS<15,13> AS REQUIRED
                FLAG[8-0]_D[15-8]-[I],                          !SETUP FLAG<2:1> AS REQUIRED
        NEXT,   J/KTSRCDST04B                                   !
 (7125) DCS[0.00.0.0.0.0]  BM[0000..00.00..00.01..000..011...0.0.0..0..0...1.1011...0..0000.0...11.000...001.010.110]

   7126: !(FREE)
   KTSRCDST04B:
                                                                !THIS WORD NEEDED FOR 1 UWORD DELAY FOR ROM TO SETTLE
        P2-T,   D_CSPD(C052525), SAVE-D[C],                     !DATA PATTERN IN SCRATCH PAD ADDRESS [02]
        P3,     A#BSPHI[02]_D,                                  !BIT<3:0> = (05)
        NEXT,   BUTR(D[C]-B),                                   !KEY=(1) -> READ ASPHI[DF] -> SR
                J/KTSRCDST05                                    !KEY=(0) -> READ ASPHI[SF] -> SR
 (7126) DCS[0.00.0.0.0.0]  BM[1010..10.10..00.00..101..111...0.1.0..0..0...0.0111...0..1011.0...10.011...011.011.101]

   !ENTER HERE IF D[C] CLEAR, SF SELECTED
   7335:
   KTSRCDST05:
        P2-T,   SR_ASPHI[SF],                                   !USE ASP/SF
        NEXT,   J/BUTSR3-0                                      !AND NOW GO CHECK WHOM WAS READ
 (7335) DCS[0.00.0.0.0.0]  BM[1111..00.00..11.11..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...010.111.110]

   !ENTER HERE IF D[C] SET, DF SELECTED
   7337:
   KTSRCDST06:
        P2-T,   SR_ASPHI[DF],                                   !USE ASP/DF
        NEXT,   J/BUTSR3-0                                      !AND NOW GO CHECK WHOM WAS READ
 (7337) DCS[0.00.0.0.0.0]  BM[1111..00.00..11.10..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...010.111.110]


   !* WE ALSO NEED TWO ENTRY POINTS TO READ BSP SF & DF:

   7127: !(FREE)
   KTSRCDST07:
        P2-T,   SR_BSPHI[SF],                                   !USE BSP/SF
        NEXT,   J/BUTSR3-0                                      !AND NOW GO CHECK WHOM WAS READ
 (7127) DCS[0.00.0.0.0.0]  BM[1010..01.01..00.00..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...010.111.110]


   7130: !(FREE)
   KTSRCDST08:
        P2-T,   SR_BSPHI[DF],                                   !USE BSP/DF
        NEXT,   J/BUTSR3-0                                      !AND NOW GO CHECK WHOM WAS READ
 (7130) DCS[0.00.0.0.0.0]  BM[1010..01.00..00.00..000..000...0.0.1..0..0...0.0000...0..0000.0...11.000...010.111.110]
```



```

   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !      ***  KT SRC/DST ENTERS HERE ***

   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


   !THESE FIRST TWO WORDS DO SOME PRELIMINAR SETUP OF SCRATCHPAD LOCATIONS (06)/(16)
   6555:
   SETUP512A:
        P2-T,   D_CSPD(C125252), D[C]_0,                        !
        P3,     A#BSPHI[06]_D,                                  !KERNAL SP LOCATION:
        NEXT,   J/SETUP512B                                     !  BIT<3:0> = (12) = SP-ADDRESS(06)
 (6555) DCS[0.00.0.0.0.0]  BM[1010..10.10..00.00..111..000...0.1.0..0..0...0.0110...0..1011.0...11.000...011.000.111]

   6307: !(FREE)
   SETUP512B:
        P2-T,   D_CSPD(C000000), D[C]_0,                        !
        P3,     A#BSPHI[16]_D,                                  !USER SP LOCATION:
        NEXT,   J/TEST512A1                                     !  BIT<3:0> = (00) = SP-ADDRESS(16)
 (6307) DCS[0.00.0.0.0.0]  BM[1010..10.10..00.00..011..000...0.1.0..0..0...0.0100...0..1011.0...11.000...101.100.010]

                                                                !A,BSPHI[02] = (052525)
                                                                !  BIT<3:0> = (05) = SP-ADDRESS(02)

                                                                !A,BSPHI[12] = (000152)
                                                                !  BIT<3:0> = (12) = SP-ADDRESS(12)
                                                                !  (NOT USED UNLESS ERROR)


   !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

   !* TEST 512 A1 *

   !      TEST 512 A 1-2 SETS UP FOR:  ASP-SF-ADDRESS=(02), BSP-DF-ADDRESS=(16)
   6542:
   TEST512A1:
        P0,     LOAD-ENUA(ZTARGET405),                          !BIT<3:0> = (05) = SP-ADDRESS(02)
                LOAD-ERROR(TEST512A1),                          !ERROR DIRECTORY KEY
                DCS-CTR(C11,),                                  !COMPARE AT TARGET
        NEXT,   J/SETIR512A1                                    !
 (6542) DCS[1.00.1.0.0.0]  BM[0100..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...101.110.100]

   6564:
   SETIR512A1:

        P0,     BUMP-VERIFY,                                    !COUNT
        P3,     CSPD[17]_EMIT, EMIT/172206,                     !SETUP IR:  FLTPT/SM0/SR6/DM0/DP6
        NEXT,   J/SETPSFLAGS12A1                                !
 (6564) DCS[0.00.0.0.0.1]  BM[1111..10.01..00.10..000..110...0.0.0..0..0...0.0000...1..0000.0...11.000...011.001.000]

   6310: !(FREE)
   SETPSFLAGS12A1:
        P3,     CSPD[16]_EMIT, EMIT/103000,                     !BIT<15,13> -> PS<15,13>,
```

```
13041                                                                   !BIT<10:9>  -> FLAGS<2:1>
13042            NEXT,   J/GOTEST512A1                                  !BIT<00> IS REGISTER KEY (SEE SUBR)
     (6310)  DCS[0,00,0,0,0,0]  BM[1000,,10,01,,10,00,,000,,000...0,0,0,,0,,0...0,0001...1,,0000,0,,,11,000,,,011,001,001]
13043
13044     6311:  !(FREE)
13045     GOTEST512A1:
13046            SETUP,  RETURN/TEST512A2,                               !GO EXEC KT SRC/DST TEST SUBR AT
13047            NEXT,   CALL[KTSRCDST]                                 !  INITIALIZATION POINT
     (6311)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,11,00,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,001,100]
13048
13049
13050
13051     !* TEST 512A2 NOW READS THE COMPLEMENTARY REGISTER TO THAT USED IN TEST512A1, INTO THE SR
13052     6544:
13053     TEST512A2:
13054            P0,     LOAD=ENUA(ZTARGET400),                          !BIT<3:0> = (00) = SP-ADDRESS(16)
13055                    LOAD=ERROR(TEST512A2),                          !ERROR_DIRECTORY KEY
13056                    DCS=CTR(C4,),                                   !COMPARE AT TARGET
13057            NEXT,   J/GOTEST512A2                                   !
     (6544)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,001,010]
13058
13059     6312:  !(FREE)
13060     GOTEST512A2:
13061            SETUP,  RETURN/SCOPE512A,                               !READ REGISTER BSPHI[DF] TO SR,
13062            NEXT,   CALL[KTDSTBSP]                                  !  THEN DO BUT(SR3=0)
     (6312)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,10,01,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,011,000]
13063
13064
13065     6313:  !(FREE)
13066     SCOPE512A:
13067            P0,     BUSDIN_EMIT=[I],                                !RESET PROC UCON
13068                    EN=CLK=IR[15=00],                               !
13069            NEXT,   BUTD[SCOPE],                                    !NO ERROR:  "TEST512B1"  (+1, WORDS)
13070                    J/TEST512B1                                     !   ERROR:  "SETIR512A1"  (-5, WORDS)
     (6313)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,01,,000,,100...0,0,0,,0,,0...1,1001...0,,0000,0,,,11,000,,,101,110,101]
13071
13072
13073
13074
13075     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13076
13077     !* TEST 512 B1 *
13078
13079     !       TEST 512 B 1-2 SETS UP FOR:  ASP=DF=ADDRESS=(06), BSP=SF=ADDRESS=(16)
13080     6565:
13081     TEST512B1:
13082            P0,     LOAD=ENUA(ZTARGET412),                          !BIT<3:0> = (12) = SP-ADDRESS(06)
13083                    LOAD=ERROR(TEST512B1),                          !ERROR DIRECTORY KEY
13084                    DCS=CTR(C11,),                                  !COMPARE AT TARGET
13085            NEXT,   J/SETIR512B1                                    !
     (6565)  DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,00,,001,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,011,110]
13086
```



```
13087     6536:
13088     SETIR512B1:
13089            P0,     BUMP=VERIFY,                                    !COUNT
13090            P3,     CSPD[17]_EMIT, EMIT/070606,                     !SETUP IR:  FLTPT/SM0/SR6/DM0/DR6
13091            NEXT,   J/SETPSFLAG512B1                                !
     (6536)  DCS[0,00,0,0,0,1]  BM[0111,,10,00,,01,10,,000,,110...0,0,0,,0,,0...0,0000...1,,0000,0,,,11,000,,,011,001,100]
13092
13093     6314:  !(FREE)
13094     SETPSFLAG512B1:
13095            P3,     CSPD[16]_EMIT, EMIT/022001,                     !BIT<15,13> -> PS<15,13>,
13096                                                                    !BIT<10:9>  -> FLAGS<2:1>
13097            NEXT,   J/GOTEST512B1                                   !BIT<00> IS REGISTER KEY (SEE SUBR)
     (6314)  DCS[0,00,0,0,0,0]  BM[0010,,10,01,,00,00,,000,,001...0,0,0,,0,,0...0,0001...1,,0000,0,,,11,000,,,011,001,101]
13098
13099     6315:  !(FREE)
13100     GOTEST512B1:
13101            SETUP,  RETURN/TEST512B2,                               !GO EXEC KT SRC/DST TEST SUBR AT
13102            NEXT,   CALL[KTSRCDST]                                  !  INITIALIZATION POINT
     (6315)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,11,00,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,001,100]
13103
13104
13105
13106     !* TEST 512B2 NOW READS THE COMPLEMENTARY REGISTER TO THAT USED IN TEST512B1, INTO THE SR
13107     6546:
13108     TEST512B2:
13109            P0,     LOAD=ENUA(ZTARGET400),                          !BIT<3:0> = (00) = SP-ADDRESS(16)
13110                    LOAD=ERROR(TEST512B2),                          !ERROR DIRECTORY KEY
13111                    DCS=CTR(C4,),                                   !COMPARE AT TARGET
13112            NEXT,   J/GOTEST512B2                                   !
     (6546)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,001,110]
13113
13114     6316:  !(FREE)
13115     GOTEST512B2:
13116            SETUP,  RETURN/TEST512C1,                               !READ REGISTER BSPHI[SF] TO SR,
13117            NEXT,   CALL[KTSRCBSP]                                  !  THEN DO BUT(SR3=0)
     (6316)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,11,01,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,010,111]
13118
13119
13120
13121
13122
13123
13124     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13125
13126     !* TEST 512 C1 *
13127
13128     !       TEST 512 C 1-2 SETS UP FOR:  ASP=DF=ADDRESS=(16), BSP=SF=ADDRESS=(06)
13129     6556:
13130     TEST512C1:
13131            P0,     LOAD=ENUA(ZTARGET400),                          !BIT<3:0> = (00) = SP-ADDRESS(16)
13132                    LOAD=ERROR(TEST512C1),                          !ERROR DIRECTORY KEY
13133                    DCS=CTR(C11,),                                  !COMPARE AT TARGET
```

```
13134            NEXT,   J/SETIR512C1                                    !
     (6556)  DCS[1,00,1,0,0,0]  BM[0100..00.11..11.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,000...011,001,111]
13135
13136     6317:  !(FREE)
13137     SETIR512C1:
13138            P0,     BUMP=VERIFY,                                    !COUNT
13139            P3,     CSPD[17]_EMIT, EMIT/134606,                     !SETUP IR:  FLTPT/SM0/SR6/DM0/DR6
13140            NEXT,   J/SETPSFLAG512C1                                !
     (6317)  DCS[0,00,0,0,0,1]  BM[1011..10.10..01.10..000..110...0.0.0..0..0...0.0000...1..0000.0...11,000...011,010,000]
13141
13142     6320:  !(FREE)
13143     SETPSFLAG512C1:
13144            P3,     CSPD[16]_EMIT, EMIT/023001,                     !BIT<15,13> -> PS<15,13>,
13145                                                                    !BIT<10:9>  -> FLAGS<2:1>
13146            NEXT,   J/GOTEST512C1                                   !BIT<00> IS REGISTER KEY (SEE SUBR)
     (6320)  DCS[0,00,0,0,0,0]  BM[0010..10.01..10.00..000..001...0.0.0..0..0...0.0001...1..0000.0...11,000...011,010,001]
13147
13148     6321:  !(FREE)
13149     GOTEST512C1:
13150            SETUP,  RETURN/TEST512C2,                               !GO EXEC KT SRC/DST TEST SUBR AT
13151            NEXT,   CALL[KTSRCDST]                                  !  INITIALIZATION POINT
     (6321)  DCS[0,00,0,0,0,0]  BM[0110..00.10..11.10..110..111...0.0.0..0..0...0.0000...0..0000.0...11,100...001,001,100]
13152
13153
13154
13155     !* TEST 512C2 NOW READS THE COMPLEMENTARY REGISTER TO THAT USED IN TEST512C1, INTO THE SR
13156     6566:
13157     TEST512C2:
13158            P0,     LOAD=ENUA(ZTARGET412),                          !BIT<3:0> = (12) = SP-ADDRESS(06)
13159                    LOAD=ERROR(TEST512C2),                          !ERROR DIRECTORY KEY
13160                    DCS=CTR(C4,),                                   !COMPARE AT TARGET
13161            NEXT,   J/GOTEST512C2                                   !
     (6566)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..001..010...0.0.0..0..0...0.0000...0..0000.0...11,000...011,010,010]
13162
13163     6322:  !(FREE)
13164     GOTEST512C2:
13165            SETUP,  RETURN/SCOPE512C,                               !READ REGISTER BSPHI[SP] TO SR,
13166            NEXT,   CALL[KTSRCBSP]                                  !  THEN DO BUT(SR3=0)
     (6322)  DCS[0,00,0,0,0,0]  BM[0110..00.01..10.10..011..111...0.0.0..0..0...0.0000...0..0000.0...11,100...001,010,111]
13167
13168
13169     6323:  !(FREE)
13170     SCOPE512C:
13171            P0,     BUSDIN_EMIT=[I],                                !RESET PROC UCON
13172                    EN-CLK-IR[15=00],                               !
13173            NEXT,   BUTD[SCOPE],                                    !NO ERROR:  "TEST512D1"  (+1, WORDS)
13174                    J/TEST512D1                                     !   ERROR:  "SETIR512B1"  (-11, WORDS)
     (6323)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11,000...101,011,111]
13175
13176
13177
13178
```



```
13179     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13180
13181     !* TEST 512 D1 *
13182
13183     !       TEST 512 D 1-2 SETS UP FOR:  ASP=SP=ADDRESS=(16), BSP=DP=ADDRESS=(02)
13184     6537:
13185     TEST512D1:
13186            P0,     LOAD=ENUA(ZTARGET400),                          !BIT<3:0> = (00) = SP-ADDRESS(16)
13187                    LOAD=ERROR(TEST512D1),                          !ERROR DIRECTORY KEY
13188                    DCS=CTR(C11,),                                  !COMPARE AT TARGET
13189            NEXT,   J/SETIR512D1                                    !
     (6537)  DCS[1,00,1,0,0,0]  BM[0100..00.11..11.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,000...110,010,110]
13190
13191     6626:
13192     SETIR512D1:
13193            P0,     BUMP=VERIFY,                                    !COUNT
13194            P3,     CSPD[17]_EMIT, EMIT/160612,                     !SETUP IR:  FLTPT/SM0/SR6/DM0/DR6
13195            NEXT,   J/SETPSFLAG512D1                                !
     (6626)  DCS[0,00,0,0,0,1]  BM[1110..10.00..01.10..001..010...0.0.0..0..0...0.0000...1..0000.0...11,000...011,010,100]
13196
13197     6324:  !(FREE)
13198     SETPSFLAG512D1:
13199            P3,     CSPD[16]_EMIT, EMIT/101000,                     !BIT<15,13> -> PS<15,13>,
13200                                                                    !BIT<10:9>  -> FLAGS<2:1>
13201            NEXT,   J/GOTEST512D1                                   !BIT<00> IS REGISTER KEY (SEE SUBR)
     (6324)  DCS[0,00,0,0,0,0]  BM[1000..10.00..10.00..000..000...0.0.0..0..0...0.0001...1..0000.0...11,000...011,010,101]
13202
13203     6325:  !(FREE)
13204     GOTEST512D1:
13205            SETUP,  RETURN/TEST512D2,                               !GO EXEC KT SRC/DST TEST SUBR AT
13206            NEXT,   CALL[KTSRCDST]                                  !  INITIALIZATION POINT
     (6325)  DCS[0,00,0,0,0,0]  BM[0110..00.10..11.11..110..111...0.0.0..0..0...0.0000...0..0000.0...11,100...001,001,100]
13207
13208
13209
13210     !* TEST 512D2 NOW READS THE COMPLEMENTARY REGISTER TO THAT USED IN TEST512D1, INTO THE SR
13211     6576:
13212     TEST512D2:
13213            P0,     LOAD=ENUA(ZTARGET405),                          !BIT<3:0> = (05) = SP-ADDRESS(02)
13214                    LOAD=ERROR(TEST512D2),                          !ERROR DIRECTORY KEY
13215                    DCS=CTR(C4,),                                   !COMPARE AT TARGET
13216            NEXT,   J/GOTEST512D2                                   !
     (6576)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11,000...011,010,110]
13217
13218     6326:  !(FREE)
13219     GOTEST512D2:

13220            SETUP,  RETURN/TEST512E1,                               !READ REGISTER BSPHI[DP] TO SR,
13221            NEXT,   CALL[KTDSTBSP]                                  !  THEN DO BUT(SR3=0)
     (6326)  DCS[0,00,0,0,0,0]  BM[0110..00.10..11.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11,100...001,011,000]
13222
13223
13224
```

```
! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!* TEST 512 E1 *

!       TEST 512 E 1-2 SETS UP FOR:  ASP-DF-ADDRESS=(16), BSP-SF-ADDRESS=(06)
6577:
TEST512E1:
        P0,     LOAD-ENUA(ZTARGET400),               !BIT<3:0> = (00) = SP-ADDRESS(16)
                LOAD-ERROR(TEST512E1),               !ERROR DIRECTORY KEY
                DCS-CTR(C11,),                       !COMPARE AT TARGET
        NEXT,   J/SETIR512E1                         !
 (6577)  DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,010,111]

6327:  !(FREE)
SETIR512E1:
        P0,     BUMP-VERIFY,                         !COUNT
        P3,     CSPD[17]_EMIT, EMIT/150626,          !SETUP IR:  FLTPT/SM0/SR6/DM0/DR6
        NEXT,   J/SETPSFLAG512E1                     !
 (6327)  DCS[0,00,0,0,0,1]  BM[1101,,10,00,,01,10,,010,,110,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,011,011,000]

6330:  !(FREE)
SETPSFLAG512E1:
        P3,     CSPD[16]_EMIT, EMIT/103001,          !BIT<15,13> -> PS<15,13>,
                                                     !BIT<10:9>  -> FLAGS<2:1>
        NEXT,   J/GOTEST512E1                        !BIT<00> IS REGISTER KEY (SEE SUBR)
 (6330)  DCS[0,00,0,0,0,0]  BM[1000,,10,01,,10,00,,000,,001,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,011,011,001]

6331:  !(FREE)
GOTEST512E1:
        SETUP,  RETURN/TEST512E2,                    !GO EXEC KT SRC/DST TEST SUBR AT
        NEXT,   CALL[KTSRCDST]                       !  INITIALIZATION POINT
 (6331)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,001,100]



!* TEST 512E2 NOW READS THE COMPLEMENTARY REGISTER TO THAT USED IN TEST512E1, INTO THE SR
6535:
TEST512E2:
        P0,     LOAD-ENUA(ZTARGET412),               !BIT<3:0> = (12) = SP-ADDRESS(06)
                LOAD-ERROR(TEST512E2),               !ERROR DIRECTORY KEY
                DCS-CTR(C4,),                        !COMPARE AT TARGET
        NEXT,   J/GOTEST512E2                        !
 (6535)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,001,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,011,010]

6332:  !(FREE)
GOTEST512E2:
        SETUP,  RETURN/SCOPE512E,                    !READ REGISTER BSPHI[SF] TO SR,
        NEXT,   CALL[KTSRCBSP]                       !  THEN DO BUT(SR3=0)
 (6332)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,10,11,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,010,111]
```



```
6333:  !(FREE)
SCOPE512E:
        P0,     BUSDIN_EMIT-[I],                     !RESET PROC UCON
                EN-CLK-IR[15-00],                    !
        NEXT,   BUTD[SCOPE],                         !NO ERROR:  "TEST520A"  (+1, WORDS)
                J/TEST520A                           !   ERROR:  "SETIR512D1"  (-11, WORDS)
 (6333)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,110,010,111]





!.PAGE=================================================================================================


.TOC    *   TEST520A-520E:  TESTING THE "INSTR BRANCH" ROM

!*******************************************************************************
!*
!*      TESTS:  520A - 520E                          UWORDS: 020 + 031
!*
!*      FUNCTIONS:
!*
!*      THE FOLLOWING FIVE TESTS VERIFY THE VALIDITY OF THE INSTRUCTION BRANCH ROM
!*      INPUTS AND OUTPUTS, IN REGARD TO NO STUCK ONE/ZERO CONDITIONS.
!*
!*******************************************************************************


!       SUMMARY OF INSTR BRANCH ROM TESTS:
!
!       TEST    IR<15,10:08>H   B-- ?   ON:                     PS<3:0>H        INSTR BRANCH L
!       NUMB                                                    N Z V C
!
!       520A    1 0 1 0         BHI     C,IOR,Z=0               0 1 0 0         1, NEGATED
!       520B    0 1 1 0         BGT     Z,IOR,(N,XOR,V)=0       0 0 0 0         0, ASSERTED
!       520C    0 1 0 1         BLT     N,XOR,V=1               1 1 1 0         1, NEGATED
!       520D    1 0 1 1         BLOS    C,IOR,Z=1               0 0 0 1         0, ASSERTED
!       520E    1 1 1 1         BLO     C=1                     0 1 1 0         1, NEGATED
!




! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 520A ***
!TEST-520-A SETS UP IR<15,10:08>H="1010", PS<3:0>H="0100",
!  AND THEN BUTS ON "INSTR BRANCH L"
6627:
TEST520A:
        P0,     LOAD-ENUA(ZTARGET403),               !NOT ASSERTED
```

```
13324                   LOAD-ERROR(TEST520A),                   !ERROR DIRECTORY KEY
13325                   DCS-CTR(C0,),                           !COMPARE ENUA;TNUA AT TARGET
13326           NEXT,   J/UCON520A                              !
     (6627)  DCS[1,00,1,0,0,0]  BM[0111..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...110.010.100]
13327
13328    6624:
13329    UCON520A:
13330           SELECT, UCON=PROC,                              !PROCESSOR UCON:
13331           ENABLE, BUSDIN_EMIT[15-00],                     !  EMIT ON BUSDIN
13332                   EN-CLK-IR[15-00],                       !  AND CLOCKING IR
13333           P0,     BUMP=VERIFY,                            !COUNT
13334                   SET-UCON=CONTROL,                       !WRITE CONTROLS
13335           NEXT,   J/SETUP520A                             !
     (6624)  DCS[0,00,0,0,0,1]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...011.011.100]
13336
13337    6334:  !(FREE)
13338    SETUP520A:
13339           P0,     BUMP=VERIFY,                            !COUNT
13340           EMITC,  EMIT/101004,                            !PS<3:0>M="0100"
13341           P2=U,   IR_EMIT,                                !
13342           P3,     CSPD[05]_EMIT,                          !IR<15,10:08>M="1010"
13343           NEXT,   J/GOTEST520A                            !
     (6334)  DCS[0,00,0,0,0,1]  BM[1000..10.00..10.00..000..100...0.0.0..0..0...1.1010...1..0000.0...11.000...011.011.101]
13344
13345    6335:  !(FREE)
13346    GOTEST520A:
13347           SETUP,  RETURN/TEST520B,                        !RETURN TO START OF NEXT SUBTEST
13348           NEXT,   GOTO=PAGE(7),                           !GO TO CODE THAT LOADS PS[CC], AND
13349                   J/SUCBRTEST01                           !  THEN BUTS ON THE "INSTR BRANCH" ROM OUTPUT
     (6335)  DCS[0,00,0,0,0,0]  BM[0110..00.11..11.10..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.010.010]
13350
13351
13352
13353
13354    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13355
13356    !*** TEST 520B ***
13357    !TEST-520-B SETS UP IR<15,10:08>M="0110", PS<3:0>M="0000",
13358    !  AND THEN BUTS ON "INSTR BRANCH L"
13359    6764:
13360    TEST520B:
13361           P0,     LOAD-ENUA(ZTARGET402),                   !ASSERTED
13362                   LOAD-ERROR(TEST520B),                   !ERROR DIRECTORY KEY
13363                   DCS-CTR(C7,),                           !COMPARE ENUA;TNUA AT TARGET
13364           NEXT,   J/SETUP520B                             !
     (6764)  DCS[1,00,1,0,0,0]  BM[1000..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.110]
13365
13366    6336:  !(FREE)
13367    SETUP520B:
13368           EMITC,  EMIT/003000,                            !PS<3:0>M="0000"
13369           P2=U,   IR_EMIT,                                !
13370           P3,     CSPD[05]_EMIT,                          !IR<15,10:08>M="0110"
13371           NEXT,   J/GOTEST520B                            !
```



```
     (6336)  DCS[0,00,0,0,0,0]  BM[0000..10.01..10.00..000..000...0.0.0..0..0...1.1010...1..0000.0...11.000...011.011.111]
13372
13373    6337:  !(FREE)
13374    GOTEST520B:
13375           SETUP,  RETURN/TEST520C,                        !RETURN TO START OF NEXT SUBTEST
13376           NEXT,   GOTO=PAGE(7),                           !GO TO CODE THAT LOADS PS[CC], AND
13377                   J/SUCBRTEST01                           !  THEN BUTS ON THE "INSTR BRANCH" ROM OUTPUT
     (6337)  DCS[0,00,0,0,0,0]  BM[0110..00.11..11.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.010.010]
13378
13379
13380
13381
13382    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13383
13384    !*** TEST 520C ***
13385    !TEST-520-C SETS UP IR<15,10:08>M="0101", PS<3:0>M="1110",
13386    !  AND THEN BUTS ON "INSTR BRANCH L"
13387    6772:
13388    TEST520C:
13389           P0,     LOAD-ENUA(ZTARGET403),                   !NEGATED
13390                   LOAD-ERROR(TEST520C),                   !ERROR DIRECTORY KEY
13391                   DCS-CTR(C7,),                           !COMPARE ENUA;TNUA AT TARGET
13392                   BUMP=VERIFY,                            !COUNT
13393           NEXT,   J/SETUP520C                             !
     (6772)  DCS[1,00,1,0,0,1]  BM[1000..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...011.100.000]
13394
13395    6340:  !(FREE)
13396    SETUP520C:
13397           EMITC,  EMIT/002416,                            !PS<3:0>M="1110"
13398           P2=U,   IR_EMIT,                                !
13399           P3,     CSPD[05]_EMIT,                          !IR<15,10:08>M="0101"
13400           NEXT,   J/GOTEST520C                            !
     (6340)  DCS[0,00,0,0,0,0]  BM[0000..10.01..01.00..001..110...0.0.0..0..0...1.1010...1..0000.0...11.000...011.100.001]
13401
13402    6341:  !(FREE)
13403    GOTEST520C:
13404           SETUP,  RETURN/TEST520D,                        !RETURN TO START OF NEXT SUBTEST
13405           NEXT,   GOTO=PAGE(7),                           !GO TO CODE THAT LOADS PS[CC], AND
13406                   J/SUCBRTEST01                           !  THEN BUTS ON THE "INSTR BRANCH" ROM OUTPUT
     (6341)  DCS[0,00,0,0,0,0]  BM[0110..00.11..11.10..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.010.010]
13407
13408
13409
13410
13411    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13412

13413    !*** TEST 520D ***
13414    !TEST-520-D SETS UP IR<15,10:08>M="1011", PS<3:0>M="0001",
13415    !  AND THEN BUTS ON "INSTR BRANCH L"
13416    6762:
13417    TEST520D:
13418           P0,     LOAD-ENUA(ZTARGET402),                   !ASSERTED
```

```
                LOAD-ERROR(TEST520D),               !ERROR DIRECTORY KEY
                DCS-CTR(C7,),                       !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/SETUP520D                         !
    (6762) DCS[1,00,1,0,0,0] BM[1000,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,100,010]

    6342: !(FREE)
    SETUP520D:
        EMITC,  EMIT/101401,                        !PS<3:0>H="0001"
        P2-U,   IR_EMIT,                            !
        P3,     CSPD[05]_EMIT,                      !IR<15,10:08>H="1011"
        NEXT,   J/GOTEST520D                        !
    (6342) DCS[0,00,0,0,0,0] BM[1000,,10,00,,11,00,,000,,001,,,0,0,0,,0,,0,,,1,1010,,,1,,0000,0,,,11,000,,,011,100,011]

    6343: !(FREE)
    GOTEST520D:
        SETUP,  RETURN/TEST520E,                    !RETURN TO START OF NEXT SUBTEST
        NEXT,   GOTO-PAGE(7),                       !GO TO CODE THAT LOADS PS[CC], AND
                J/SUCBRTEST01                       !  THEN BUTS ON THE "INSTR BRANCH" ROM OUTPUT
    (6343) DCS[0,00,0,0,0,0] BM[0110,,00,11,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,010,010]




    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 520E ***
    !TEST-520-F SETS UP IR<15,10:08>H="1111", PS<3:0>H="0110",
    !  AND THEN BUTS ON "INSTR BRANCH L"
    6775:
    TEST520E:
        P0,     LOAD-ENUA(ZTARGET403),              !NEGATED
                LOAD-ERROR(TEST520E),               !ERROR DIRECTORY KEY
                DCS-CTR(C7,),                       !COMPARE ENUA:TNUA AT TARGET
        NEXT,   J/SETUP520E                         !
    (6775) DCS[1,00,1,0,0,0] BM[1000,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,100,100]

    6344: !(FREE)
    SETUP520E:
        P0,     BUMP-VERIFY,                        !COUNT
        EMITC,  EMIT/103406,                        !PS<3:0>H="0110"
        P2-U,   IR_EMIT,                            !
        P3,     CSPD[05]_EMIT,                      !IR<15,10:08>H="1111"
        NEXT,   J/GOTEST520F                        !
    (6344) DCS[0,00,0,0,0,1] BM[1000,,10,01,,11,00,,000,,110,,,0,0,0,,0,,0,,,1,1010,,,1,,0000,0,,,11,000,,,011,100,101]

    6345: !(FREE)
    GOTEST520E:
        SETUP,  RETURN/SCOPE520,                    !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                       !GO TO CODE THAT LOADS PS[CC], AND
                J/SUCBRTEST01                       !  THEN BUTS ON THE "INSTR BRANCH" ROM OUTPUT
    (6345) DCS[0,00,0,0,0,0] BM[0110,,00,01,,11,00,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,010,010]
```



```
    6346: !(FREE)
    SCOPE520:
        P0,     BUSDIN_EMIT-[I],                    !RESET PROC UCONS
                EN-CLK-IR[15-00],                   !
        NEXT,   BUTO[SCOPE],                        !NO ERROR:  "TEST533A"  [+4, WORDS]
                J/TEST533A                          !   ERROR:  "UCON520A"  [-15, WORDS]
    (6346) DCS[0,00,0,1,0,0] BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,110,010,101]



    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !       TESTING SUBR (COMMON CODE) FOR ABOVE TESTS

    7122: !(FREE)
    SUCBRTEST01:
        P2-T,   D_CSPD(D05), D[C]_0,                !GET PATTERN
        NEXT,   J/SUCBRTEST02                       !
    (7122) DCS[0,00,0,0,0,0] BM[1010,,10,00,,00,00,,000,,000,,,0,1,0,,0,,0,,,0,1010,,,0,,0000,0,,,11,000,,,001,011,010]

    7132: !(FREE)
    SUCBRTEST02:
        P2-T,   PS[3-0]_D[3-0]-[I],                 !INTO PS[CC]
        NEXT,   J/SUCBRTEST03                       !
    (7132) DCS[0,00,0,0,0,0] BM[1000,,00,00,,00,01,,000,,000,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,001,011,011]

    7133: !(FREE)
    SUCBRTEST03:
        SELECT, UCON-PROC,                          !LEAVE WITH EMIT ON BUSDIN,
        ENABLE, BUSDIN_EMIT[15-00],                 !  CLOCK IR ENABLED
                EN-CLK-IR[15-00],                   !
        P0,     SET-UCON-CONTROL,                   !WRITE CONTROLS
        NEXT,   J/BUTINSTRBRANCH                    !
    (7133) DCS[0,00,0,0,0,0] BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,011,101,110]





    !.PAGE==========================================================================================


    .TOC    *   TEST533-537:  SHIFT TREE

    !***************************************************************************
    !*

    !*      TESTS:  533A - 537A                         UWORDS: 170 + 044
    !*
    !*      FUNCTIONS:      TESTS 533A - 537A VERIFY THE DATA AND CONTROL PATHS
    !*                      OF THE 3 LEVEL BARREL SHIFTER (SHIFT TREE).
    !*
```

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13515    !*****************************************************************************
13516
13517
13518
13519
13520
13521
13522    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13523
13524    !*** TEST 533A ***
13525    !READ D DIRECTLY THRU "D[HI]#D[LO]" PORT OF AMUX[HI#LO], BMUX=CMUX/DIRECT
13526    !IN(0)(052652), OUT(052652)
13527    6625:
13528    TEST533A:
13529            P0,     LOAD-ENUA(ETARGET402),                  !SETUP FOR D = ZERO TEST
13530                    LOAD-ERROR(TEST533A),                   !ERROR DIRECTORY KEY
13531                    DCS-CTR(C6,),                           !COMPARE AT TARGET
13532            NEXT,   J/INIT533A                              !
     (6625)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,110]
13533
13534    6666:
13535    INIT533A:
13536            P0,     BUMP-VERIFY,                            !COUNT
13537            P3,     CSPD[17]_EMIT,                          !GET INITIAL PATTERN FOR D
13538                    EMIT/052652,                            !"0101 0101 1010 1010"
13539            NEXT,   J/INITD533A                             !
     (6666)  DCS[0,00,0,0,0,1]  BM[0101,,10,01,,01,10,,101,,010...0,0,0,,0,,0...0,0000...1,,0000,0,,,11,000,,,011,100,111]
13540
13541    6347:  !(FREE)
13542    INITD533A:
13543            P2-T,   D_CSPD(D17),                            !INITIAL D =(052652)
13544                    D[C]_ALU15,                             !SETUP D[C] FOR SHIFT = "0"
13545            NEXT,   J/COMP533A                              !
     (6347)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,100...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,101,000]
13546
13547    6350:  !(FREE)
13548    COMP533A:
13549            P0,     BUMP-VERIFY,                            !COUNT
13550            SETUP,  D=DIRECT,                               !AMUX=BMUX=CMUX ALL DIRECT
13551            P2-T,   D_D=SHIFTED-XOR-CSPB(B17),              !COMPARE D=SHIFTED;EXPECTED, BITWISE
13552            NEXT,   J/GOBUT533A                             !EXPECTED #(052652)
     (6350)  DCS[0,00,0,0,0,1]  BM[0110,,11,00,,01,01,,000,,000...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,101,001]
13553
13554    6351:  !(FREE)
13555    GOBUT533A:
13556            SETUP,  RETURN/TEST533B,                        !RETURN TO START OF NEXT SUBTEST
13557            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
13558                    J/BUTD-IS-ZERO                          !GO TEST D IS ALL ZERO
     (6351)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,00,11,,011,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13559
13560
13561
13562
```



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13563    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13564
13565    !*** TEST 533B ***
13566    !READ D DIRECTLY THRU "D[HI]#D[LO]" PORT OF AMUX[HI#LO], BMUX=CMUX/DIRECT
13567    !IN(0)(125125), OUT(125125)
13568    6633:
13569    TEST533B:
13570            P0,     LOAD-ENUA(ETARGET402),                  !SETUP FOR D=ZERO TEST
13571                    LOAD-ERROR(TEST533B),                   !ERROR DIRECTORY KEY
13572                    DCS-CTR(C6,),                           !COMPARE AT TARGET
13573            NEXT,   J/INIT533B                              !
     (6633)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,101,010]
13574
13575    6352:  !(FREE)
13576    INIT533B:
13577            P3,     CSPD[16]_EMIT,                          !GET INITIAL PATTERN FOR D
13578                    EMIT/125125,                            !"1010 1010 0101 0101"
13579            NEXT,   J/INITD533B                             !
     (6352)  DCS[0,00,0,0,0,0]  BM[1010,,10,10,,10,01,,010,,101...0,0,0,,0,,0...0,0001...1,,0000,0,,,11,000,,,011,101,011]
13580
13581    6353:  !(FREE)
13582    INITD533B:
13583            P0,     BUMP-VERIFY,                            !COUNT
13584            P2-T,   D_CSPD(D16),                            !INITIAL D=(125125)
13585                    D[C]_ALU07,                             !SETUP D[C] FOR SHIFT = "0"
13586            NEXT,   J/COMP533B                              !
     (6353)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,011...0,1,0,,0,,0...0,0001...0,,0000,0,,,11,000,,,011,101,100]
13587
13588    6354:  !(FREE)
13589    COMP533B:
13590            SETUP,  D=DIRECT,                               !AMUX=BMUX=CMUX ALL DIRECT
13591            P2-T,   D_D=SHIFTED-XOR-CSPB(B16),              !COMPARE D=SHIFTED;EXPECTED, BITWISE
13592            NEXT,   J/GOBUT533B                             !EXPECTED=(125125)
     (6354)  DCS[0,00,0,0,0,0]  BM[0110,,11,01,,01,01,,000,,000...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,101,101]
13593
13594    6355:  !(FREE)
13595    GOBUT533B:
13596            SETUP,  RETURN/SCOPE533B,                       !RETURN TO SCOPE LOOP TEST WORD
13597            NEXT,   GOTO-PAGE(7),                           !BUT TABLE IS ON PAGE 7
13598                    J/BUTD-IS-ZERO                          !GO TEST D IS ALL ZERO
     (6355)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,11,01,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13599
13600    6356:  !(FREE)
13601    SCOPE533B:
13602            P3,     CSPD[14]_EMIT, EMIT/000377,             !CONSTANT FOR USE BELOW
13603            NEXT,   BUTD[SCOPE],                            !NO ERROR: "TEST534A" (+1,WORDS)

13604                    J/TEST534A                              !   ERROR: "INIT533A" (-9,WORDS)
     (6356)  DCS[0,00,0,1,0,0]  BM[0000,,10,00,,00,11,,111,,111...0,0,0,,0,,0...0,0011...1,,0000,0,,,11,000,,,110,110,111]
13605
13606
13607
13608
13609    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
13610
13611     ;*** TEST 534A ***
13612     ;READ D THRU "D[LO]&D[HI]" PORT OF AMUX[HI,LO], BMUX=CMUX/DIRECT
13613     ;IN(0)(052652), OUT(125125)
13614     6667:
13615     TEST534A:
13616             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
13617                     LOAD-ERROR(TEST534A),                  ;ERROR DIRECTORY KEY
13618                     DCS-CTR(C5,),                          ;COMPARE AT TARGET
13619             P3,     BUTA(CLR-FLAG-RES-UCON),               ;EMIT ON BUSDIN
13620             NEXT,   J/INITD534A                            ;
    (6667)  DCS[1,00,1,0,0,0]  BM[1010,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,010,,,110,110,100]
13621
13622     6664:
13623     INITD534A:
13624             P0,     BUMP-VERIFY,                           ;COUNT
13625             P7-T,   D_CSPD(D17),                           ;INITIAL D=(052652)
13626                     D[C]_ALU15,                            ;SETUP D[C] FOR SHIFT = "0"
13627             NEXT,   J/COMP534A                             ;
    (6664)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,100...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,101,111]
13628
13629     6357:  ;(FREE)
13630     COMP534A:
13631             SETUP,  D-SWAB,                                ;AMUX/SWAB, BMUX=CMUX/DIRECT
13632             P2-T,   D_D-SHIFTED-XOR-CSPB(B16),             ;COMPARE D-SHIFTED;EXPECTED, BITWISE
13633             NEXT,   J/GOBUT534A                            ;EXPECTED=(125125)
    (6357)  DCS[0,00,0,0,0,0]  BM[0110,,11,01,,01,01,,000,,000...0,1,0,,0,,0...0,0101...0,,0000,0,,,11,000,,,011,110,000]
13634
13635     6360:  ;(FREE)
13636     GOBUT534A:
13637             SETUP,  RETURN/TEST534B,                        ;RETURN TO START OF NEXT SUBTEST
13638             NEXT,   GOTO-PAGE(7),                          ;BUT TABLE IS ON PAGE 7
13639                     J/BUTD-IS-ZERO                         ;GO TEST D IS ALL ZERO
    (6360)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,00,11,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13640
13641
13642
13643
13644     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13645
13646     ;*** TEST 534B ***
13647     ;READ D THRU "D[LO]&D[HI]" PORT OF AMUX[HI,LO], BMUX=CMUX/DIRECT
13648     ;IN(0)(125125), OUT(052652)
13649     6634:
13650     TEST534B:
13651             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
13652                     LOAD-ERROR(TEST534B),                  ;ERROR DIRECTORY KEY
13653                     DCS-CTR(C5,),                          ;COMPARE AT TARGET
13654                     BUMP-VERIFY,                           ;COUNT
13655             NEXT,   J/INITD534B                            ;
    (6634)  DCS[1,00,1,0,0,1]  BM[1010,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,110,001]
13656
13657     6361:  ;(FREE)
```



```
13658     INITD534B:
13659             P7-T,   D_CSPD(D16),                           ;INITIAL D=(125125)
13660                     D[C]_ALU07,                            ;SETUP D[C] FOR SHIFT = "0"
13661             NEXT,   J/COMP534B                             ;
    (6361)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,011...0,1,0,,0,,0...0,0001...0,,0000,0,,,11,000,,,011,110,010]
13662
13663     6362:  ;(FREE)
13664     COMP534B:
13665             P0,     BUMP-VERIFY,                           ;COUNT
13666             SETUP,  D-SWAB,                                ;AMUX/SWAB, BMUX=CMUX/DIRECT
13667             P2-T,   D_D-SHIFTED-XOR-CSPB(B17),             ;COMPARE D-SHIFTED;EXPECTED, BITWISE
13668             NEXT,   J/GOBUT534B                            ;EXPECTED=(052652)
    (6362)  DCS[0,00,0,0,0,1]  BM[0110,,11,00,,01,01,,000,,000...0,1,0,,0,,0...0,0101...0,,0000,0,,,11,000,,,011,110,011]
13669
13670     6363:  ;(FREE)
13671     GOBUT534B:
13672             SETUP,  RETURN/SCOPE534B,                      ;RETURN TO SCOPE LOOP TEST WORD
13673             NEXT,   GOTO-PAGE(7),                          ;BUT TABLE IS ON PAGE 7
13674                     J/BUTD-IS-ZERO                         ;GO TEST D IS ALL ZERO
    (6363)  DCS[0,00,0,0,0,0]  BM[0110,,00,01,,11,10,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13675
13676     6364:  ;(FREF)
13677     SCOPE534B:
13678             P3,     CSPD[15]_EMIT, EMIT/177400,            ;CONSTANT FOR USE BELOW
13679             NEXT,   BUTD[SCOPE],                           ;NO ERROR:  "TEST534C" (+1,WORD8)
13680                     J/TEST534C                             ;   ERROR:  "INITD534A" (-7,WORD8)
    (6364)  DCS[0,00,0,1,0,0]  BM[1111,,10,11,,11,00,,000,,000...0,0,0,,0,,0...0,0010...1,,0000,0,,,11,000,,,110,110,101]
13681
13682
13683
13684
13685     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13686
13687     ;*** TEST 534C ***
13688     ;READ D THRU "8*D[C]&D[HI]" PORT OF AMUX[HI&LO], BMUX=CMUX/DIRECT
13689     ;IN(1)(000000), OUT(177400)
13690     6665:
13691     TEST534C:
13692             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
13693                     LOAD-ERROR(TEST534C),                  ;ERROR DIRECTORY KEY
13694                     DCS-CTR(C5,),                          ;COMPARE AT TARGET
13695             NEXT,   J/INITD534C                            ;
    (6665)  DCS[1,00,1,0,0,0]  BM[1010,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,010]
13696
13697     6662:
13698     INITD534C:

13699             P2-T,   D_ASPHI(C000000),                      ;INITIAL D=(000000)
13700                     D[C]_1,                                ;SETUP D[C] FOR SHIFT = "1"
13701             NEXT,   J/COMP534C                             ;
    (6662)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,11,01,,100,,000...0,1,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,110,101]
13702
13703     6365:  ;(FREF)
13704     COMP534C:
```

```
13705                                                   ;CSP(15)=(177400)="1111 1111 0000 0000"
13706           SETUP,  D=RIGHT=8,                      ;AMUX/@=D[C]:D<HI>, BMUX=CMUX/DIRECT
13707           P2=T,   D_D=SHIFTED=XOR=CSPB(B15),      ;COMPARE D=SHIFTED:EXPECTED, BITWISE
13708           NEXT,   J/GOBUT534C                     ;EXPECTED=(177400)
     (6365)  DCS[0,00,0,0,0,0]  BM[0110..11,10..01,01..000..000...0,1,0...0...0...0,0110...0..0000,0...11,000...011,110,110]
13709
13710    6366:  ;(FREE)
13711    GOBUT534C:
13712           SETUP,  RETURN/TEST534D,                 ;RETURN TO START OF  NEXT SUBTEST
13713           NEXT,   GOTO=PAGE(7),                   ;BUT TABLE IS ON PAGE 7
13714                   J/BUTD=IS=ZERO                  ;GO TEST  D IS ALL ZERO
     (6366)  DCS[0,00,0,0,0,0]  BM[0110..00,11..00,11..101..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,100,001]
13715
13716
13717
13718
13719    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13720
13721    ;*** TEST 534D ***
13722    ;READ D THRU "@=D[C]:D[LO]" PORT OF AMUX[HI:LO], BMUX=CMUX/DIRECT
13723    ;IN(0)(177777), OUT(000377)
13724    6635:
13725    TEST534D:
13726           P0,     LOAD=ENUA(ZTARGET402),           ;SETUP FOR D=ZERO TEST
13727                   LOAD=ERROR(TEST534D),            ;ERROR DIRECTORY KEY
13728                   DCS=CTR(C5.),                    ;COMPARE AT TARGET
13729           NEXT,   J/INITD534D                      ;
     (6635)  DCS[1,00,1,0,0,0]  BM[1010..00,11..11,00..000..010...0,0,0...0...0...0,0000...0..0000,0...11,000...011,110,111]
13730
13731    6367:  ;(FREE)
13732    INITD534D:
13733           P2=T,   D_BSPHI(C177777),                ;INITIAL D=(177777)
13734                   D[C]_0,                          ;SETUP D[C] FOR SHIFT = "0"
13735           NEXT,   J/COMP534D                       ;
     (6367)  DCS[0,00,0,0,0,0]  BM[1010..01,11..00,00..101..000...0,1,0...0...0...0,0000...0..0000,0...11,000...011,111,000]
13736
13737    6370:  ;(FREE)
13738    COMP534D:
13739                                                   ;CSP(14)=(000377)="0000 0000 1111 1111"
13740           SETUP,  D=SIGNEXT,                       ;AMUX/@=D[C]:D<LO>, BMUX=CMUX/DIRECT
13741           P2=T,   D_D=SHIFTED=XOR=CSPB(B14),       ;COMPARE D=SHIFTED:EXPECTED, BITWISE
13742           NEXT,   J/GOBUT534D                      ;EXPECTED=(000377)
     (6370)  DCS[0,00,0,0,0,0]  BM[0110..11,11..01,01..000..000...0,1,0...0...0...0,0010...0..0000,0...11,000...011,111,001]
13743
13744    6371:  ;(FREE)
13745    GOBUT534D:
13746           P0,     BUMP=VERIFY,                     ;COUNT
13747           SETUP,  RETURN/SCOPE534D,                ;RETURN TO SCOPE LOOP TEST WORD
13748           NEXT,   GOTO=PAGE(7),                    ;BUT TABLE IS ON PAGE 7
13749                   J/BUTD=IS=ZERO                   ;GO TEST D IS ALL ZERO
     (6371)  DCS[0,00,0,0,0,1]  BM[0110..00,01..11,11..010..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,100,001]
13750
```



```
13751    6372:  ;(FREE)
13752    SCOPE534D:
13753           NEXT,   BUTD[SCOPE],                     ;NO ERROR:  "TEST534E" (+1,WORD8)
13754                   J/TEST534E                       ;   ERROR:  "EXPEC534C" (-9,WORD8)
     (6372)  DCS[0,00,0,1,0,0]  BM[0000..00,00,00..00,00..000..000...0,0,0...0...0...0,0000...0..0000,0...11,000...110,110,011]
13755
13756
13757
13758
13759    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13760
13761    ;*** TEST 534E ***
13762    ;READ D THRU "COUNTER:D[LO]" PORT OF AMUX[HI:LO], BMUX=CMUX/DIRECT
13763    ;IN(0)(000125), OUT(125125), CTR(252)
13764    6663:
13765    TEST534E:
13766           P0,     LOAD=ENUA(ZTARGET402),           ;SETUP FOR D =ZERO TEST
13767                   LOAD=ERROR(TEST534E),            ;ERROR DIRECTORY KEY
13768                   DCS=CTR(C6.),                    ;COMPARE AT TARGET
13769           NEXT,   J/LODCNTR534E                    ;
     (6663)  DCS[1,00,1,0,0,0]  BM[1001..00,11..11,00..000..010...0,0,0...0...0...0,0000...0..0000,0...11,000...110,110,000]
13770
13771    6660:
13772    LODCNTR534E:
13773           P0,     BUMP=VERIFY,                     ;COUNT
13774           P2,     COUNTER_BSPHI(C125252),          ;PUT A (252) IN BM COUNTER
13775           NEXT,   J/INITD534E                      ;(GETS B=BUS[7:0])
     (6660)  DCS[0,00,0,0,0,1]  BM[0000..01,11..00,00..110..000...0,0,0...0...0...0,0000...0..0010,1...11,000...011,111,011]
13776
13777    6373:  ;(FREE)
13778    INITD534E:
13779           P0,     BUMP=VERIFY,                     ;COUNT
13780           P2=T,   D_CSPD[14]=AND=ASPHI(C052525),    ;INITIAL D=(000125), CSP(14)=(000377)
13781                   D[C]_ALU15,                      ;SETUP D[C] FOR SHIFT = "0"
13782           NEXT,   J/COMP534E                       ;
     (6373)  DCS[0,00,0,0,0,1]  BM[1011..10,00..11,01..111..100...0,1,0...0...0...0,0011...0..0000,0...11,000...011,111,100]
13783
13784    6374:  ;(FREE)
13785    COMP534E:
13786           SETUP,  COUNT:D[LO],                     ;ANUX/COUNTER:D<LO> BMUX=CMUX/DIRECT
13787           P2=T,   D_D=SHIFTED=XOR=CSPB(B16),       ;COMPARE D=SHIFTED:EXPECTED, BITWISE
13788           NEXT,   J/GOBUT534E                      ;EXPECTED=(125125)
     (6374)  DCS[0,00,0,0,0,0]  BM[0110..11,01..01,01..000..000...0,1,0...0...0...0,0011...0..0000,0...11,000...011,111,101]
13789
13790    6375:  ;(FREE)
13791    GOBUT534E:

13792           SETUP,  RETURN/TEST534F,                 ;RETURN TO START OF NEXT SUBTEST
13793           NEXT,   GOTO=PAGE(7),                    ;BUT TABLE IS ON PAGE 7
13794                   J/BUTD=IS=ZERO                   ;GO TEST D IS ALL ZERO
     (6375)  DCS[0,00,0,0,0,0]  BM[0110..00,11..00,11..110..111...0,0,0...0...0...0,0000...0..0000,0...11,100...011,100,001]
13795
13796
13797
```

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13798
13799    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13800
13801    !*** TEST 534F ***
13802    !READ D THRU "COUNTER#D[HI]" PORT OF AMUX[HI#LO], BMUX=CMUX/DIRECT
13803    !IN(0)(125000), OUT(052652), CTR(125)
13804    6636!
13805    TEST534F!
13806            P0,     LOAD=ENUA(ZTARGET402),                  !SETUP FOR D=ZERO TEST
13807                    LOAD=ERROR(TEST534F),                   !ERROR DIRECTORY KEY
13808                    DC8=CTR(C6,),                           !COMPARE AT TARGET
13809            NEXT,   J/LODCNTR534F                           !
     (6636)  DC8[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,,,0,0000...0,,0000,0,,,11,000,,,100,000,000]
13810
13811    6400!  !(FREE)
13812    LODCNTR534F!
13813            P2,     COUNTER_BSPHI(C052525),                 !PUT A (125) IN BM COUNTER
13814            NEXT,   J/INITD534F                             !(GETS D=BUS(7-0))
     (6400)  DC8[0,00,0,0,0,0]  BM[0000,,01,11,,00,00,,111,,000...0,0,0,,0,,0...0,,,0,0000...0,,0010,1,,,11,000,,,100,000,001]
13815
13816    6401!  !(FREE)
13817    INITD534F!
13818            P0,     BUMP=VERIFY,                            !COUNT
13819            P2=T,   D_CSPD[15]=AND-ASPHI(C125252),           !INITIAL D=(125000), CSP(15)=(177400)
13820                    D[C]_ALU00,                             !SETUP D[C] FOR SHIFT = "0"
13821            NEXT,   J/COMP534F                              !
     (6401)  DC8[0,00,0,0,0,1]  BM[1011,,10,00,,11,01,,110,,010...0,1,0,,0,,0...0,0010...0,,0000,0,,,11,000,,,100,000,010]
13822
13823    6402!  !(FPEE)
13824    COMP534F!
13825            SETUP,  COUNT#D[HI],                            !AMUX/COUNTER#D<HI>, BMUX=CMUX/DIRECT
13826            P2=T,   D_D-SHIFTED-XOR-CSPB(B17),               !COMPARE D=SHIFTED!EXPECTED, BITWISE
13827            P3,     BUTA(LAST),                             !CLEAR CTR TO (000) DURING P3
13828            NEXT,   J/GOBUT534F                             !EXPECTED=(052652)
     (6402)  DC8[0,00,0,0,0,0]  BM[0110,,11,00,,01,01,,000,,000...0,1,0,,0,,0...0,0111...0,,0000,0,,,10,000,,,100,000,011]
13829
13830    6403!  !(FREE)
13831    GOBUT534F!
13832            SETUP,  RETURN/TEST534G,                        !RETURN TO START OF NEXT SUBTEST
13833            NEXT,   GOTO=PAGE(7),                           !BUT TABLE IS ON PAGE 7
13834                    J/BUTD-T8=ZERO                          !GO TEST D IS ALL ZERO
     (6403)  DC8[0,00,0,0,0,0]  BM[0110,,00,11,,11,01,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13835
13836
13837
13838    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13839
13840    !*** TEST 534G ***
13841    !READ D THRU "COUNTER#D[LO]" PORT OF AMUX[HI#LO], BMUX=CMUX/DIRECT
13842    !COUNTER AND D SHOULD READ ALL ZERO, AFTER BEING ZAPPED IN TEST-534-F
13843    6752!
13844    TEST534G!
13845            P0,     LOAD=ENUA(ZTARGET402),                  !SETUP FOR D=ZERO TEST
```



```
13846                    LOAD=ERROR(TEST534G),                   !ERROR DIRECTORY KEY
13847                    DC8=CTR(C4,),                           !COMPARE AT TARGET
13848            NEXT,   J/COUNTER534G                           !
     (6752)  DC8[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,100,000,100]
13849
13850    6404!  !(FREE)
13851    COUNTER534G!
13852            P2=T,   D_COUNT#D[LO],                          !READ THE MUX INTO D
13853            NEXT,   J/GOBUT534G                             !
     (6404)  DC8[0,00,0,0,0,0]  BM[1111,,00,00,,01,01,,000,,000...0,1,0,,0,,0...0,0011...0,,0000,0,,,11,000,,,100,000,101]
13854
13855    6405!  !(FREE)
13856    GOBUT534G!
13857            P0,     BUMP=VERIFY,                            !COUNT
13858            SETUP,  RETURN/SCOPE534G,                       !RETURN TO SCOPE LOOP TEST WORD
13859            NEXT,   GOTO=PAGE(7),                           !BUT TABLE
13860                    J/BUTD-T8=ZERO                          !GO TEST D IS ALL ZERO
     (6405)  DC8[0,00,0,0,0,1]  BM[0110,,00,10,,00,00,,110,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
13861
13862
13863
13864
13865    6406!  !(FREE)
13866    SCOPE534G!
13867            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST535A" (+1,WORD8)
13868                    J/TEST535A                              !   ERROR:  "LODCNTR534E"(-11,WORD8)
     (6406)  DC8[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,110,001]
13869
13870
13871
13872
13873    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
13874
13875    !*** TEST 535A ***
13876    !READ D THRU "4*D[C]#AMUX<15:04>" PORT OF BMUX, AMUX=CMUX/DIRECT
13877    !IN(1)(122645), OUT(175132)
13878    6661!
13879    TEST535A!
13880            P0,     LOAD=ENUA(ZTARGET402),                  !SETUP FOR D=ZERO TEST
13881                    LOAD=ERROR(TEST535A),                   !ERROR DIRECTORY KEY
13882                    DC8=CTR(C7,),                           !COMPARE AT TARGET
13883                    BUMP=VERIFY,                            !COUNT
13884            NEXT,   J/INIT535A                              !
     (6661)  DC8[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,101,110]
13885
13886    6656!

13887    INIT535A!
13888            P3,     CSPD[15]_EMIT,                          !GET INITIAL PATTERN FOR D
13889                    EMIT/122645,                            !"1010 0101 1010 0101"
13890            NEXT,   J/EXPEC535A                             !
     (6656)  DC8[0,00,0,0,0,0]  BM[1010,,10,01,,01,10,,100,,101...0,0,0,,0,,0...0,0010...1,,0000,0,,,11,000,,,100,000,111]
13891
13892    6407!  !(FREE)
```

```
    EXPEC535A:
            P3,     CSPD[14]_EMIT,                                  !GET EXPECTED PATTERN AFTER SHIFT
                    EMIT/175132,                                    !"1111 1010 0101 1010"
            NEXT,   J/INITD535A                                     !
  (6407)  DCS[0,00,0,0,0,0]  BM[1111,,10,10,,10,01,,011,,010,,,0,0,0,,0,,0,,,0,0011,,,1,,0000,0,,,11,000,,,100,001,000]

    6410: !(FREE)
    INITD535A:
            P0,     BUMP-VERIFY,                                    !COUNT
            P2-T,   D_CSPD(D15),                                    !INITIAL D=(122645)
                    D[C]_ALU15,                                     !SETUP D[C] FOR SHIFT = "1"
            NEXT,   J/COMP535A                                      !
  (6410)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,100,,,0,1,0,,0,,0,,,0,0010,,,0,,0000,0,,,11,000,,,100,001,001]

    6411: !(FREE)
    COMP535A:
            SETUP,  D-RIGHT-4,                                      !AMUX/DIRECT, BMUX/RIGHT-4, CMUX/DIRECT
            P2-T,   D_D-SHIFTED-XOR-CSPB(B14),                      !COMPARE D-SHIFTED:EXPECTED, BITWISE
            NEXT,   J/GOBUT535A                                     !EXPECTED=(175132)
  (6411)  DCS[0,00,0,0,0,0]  BM[0110,,11,11,,01,01,,000,,000,,,0,1,0,,0,,0,,,0,1000,,,0,,0000,0,,,11,000,,,100,001,010]

    6412: !(FREE)
    GOBUT535A:
            SETUP,  RETURN/TEST535B,                                !RETURN TO START OF NEXT SUBTEEST
            NEXT,   GOTO-PAGE(7),                                   !BUT TABLE IS ON PAGE 7
                    J/BUTD-IS-ZERO                                  !GO TEST D IS ALL ZERO
  (6412)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,00,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]




    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 535B ***
    !READ D THRU "4*D[C]#AMUX<15:04>" PORT OF BMUX, AMUX-CMUX/DIRECT
    !IN(0)(055132), OUT (002645)
    6637:
    TEST535B:
            P0,     LOAD-ENUA(ZTARGET402),                          !SETUP FOR D=ZERO TEST
                    LOAD-ERROR(TEST535B),                           !ERROR DIRECTORY KEY
                    DCS-CTR(C6,),                                   !COMPARE AT TARGET
                    BUMP-VERIFY,                                    !COUNT
            NEXT,   J/EXPEC535B                                     !
  (6637)  DCS[1,00,1,0,0,1]  BM[1001,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,011]

    6413: !(FREE)
    EXPEC535B:
            P3,     CSPD[14]_EMIT,                                  !GET EXPECTED PATTERN AFTER SHIFT
                    EMIT/002645,                                    !"0000 0101 1010 0101"
            NEXT,   J/INITD535B                                     !
  (6413)  DCS[0,00,0,0,0,0]  BM[0000,,10,01,,01,10,,100,,101,,,0,0,0,,0,,0,,,0,0011,,,1,,0000,0,,,11,000,,,100,001,100]

    6414: !(FREE)
```



```
    INITD535B:
            P2-T,   D_NOT-CSPB(B15),                                !INITIAL D=(055132)
                    D[C]_ALU15,                                     !SETUP D[C] FOR SHIFT = "0"
            NEXT,   J/COMP535B                                      !
  (6414)  DCS[0,00,0,0,0,0]  BM[0111,,11,10,,11,01,,101,,100,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,101]

    6415: !(FREE)
    COMP535B:
            SETUP,  D-RIGHT-4,                                      !AMUX/DIRECT, BMUX/RIGHT-4, CMUX/DIRECT
            P2-T,   D_D-SHIFTED-XOR-CSPB(B14),                      !COMPARE D-SHIFTED:EXPECTED, BITWISE
            NEXT,   J/GOBUT535B                                     !EXPECTED=(002645)
  (6415)  DCS[0,00,0,0,0,0]  BM[0110,,11,11,,01,01,,000,,000,,,0,1,0,,0,,0,,,0,1000,,,0,,0000,0,,,11,000,,,100,001,110]

    6416: !(FREE)
    GOBUT535B:
            P0,     BUMP-VERIFY,                                    !COUNT
            SETUP,  RETURN/SCOPE535B,                               !RETURN TO SCOPE LOOP TEST WORD
            NEXT,   GOTO-PAGE(7),                                   !BUT TABLE IS ON PAGE 7
                    J/BUTD-IS-ZERO                                  !GO TEST D IS ALL ZERO
  (6416)  DCS[0,00,0,0,0,1]  BM[0110,,00,10,,00,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]

    6417: !(FREE)
    SCOPE535B:
            P3,     CSPD[16]_EMIT, EMIT/114631,                     !CONSTANT FOR USE BELOW
            NEXT,   BUTD[SCOPE],                                    !NO ERROR:  "TEST536A" (+1,WORDS)
                    J/TEST536A                                      !   ERROR:  "INIT535A" (-10,WORDS)
  (6417)  DCS[0,00,0,1,0,0]  BM[1001,,10,10,,01,10,,011,,001,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,110,101,111]




    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 536A ***
    !READ D THRU "2*D[C]#BMUX<15:02>" PORT OF CMUX, AMUX-BMUX/DIRECT
    !IN(1)(016161), OUT(143434)
    6657:
    TEST536A:
            P0,     LOAD-ENUA(ZTARGET402),                          !SETUP FOR DD=ZERO TEST
                    LOAD-ERROR(TESP536A),                           !ERROR DIRECTORY KEY
                    DCS-CTR(C7,),                                   !COMPARE AT TARGET
            NEXT,   J/INIT536A                                      !
  (6657)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,101,100]

    6654:
    INIT536A:

            P3,     CSPD[15]_EMIT,                                  !GET INITIAL PATTTERN FOR D
                    EMIT/016161,                                    !"0001 1100 0111 0001"
            NEXT,   J/EXPEC536A                                     !

  (6654)  DCS[0,00,0,0,0,0]  BM[0001,,10,11,,00,01,,110,,001,,,0,0,0,,0,,0,,,0,0010,,,1,,0000,0,,,11,000,,,100,010,000]

    6420: !(FREE)
    EXPEC536A:
```

```
                P0,     BUMP-VERIFY,                            ;COUNT
                P3,     CSPD[14]_EMIT,                          ;GET EXPECTED PATTERN AFTER SHIFT
                        EMIT/143434,                            ;"1100 0111 0001 1100"
                NEXT,   J/INITD536A                             ;
      (6420)  DCS[0,00,0,0,0,1]  BM[1100,,10,01,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0011,,,1,,0000,0,,,11,000,,,100,010,001]

        6421:  ;(FREE)
        INITD536A:
                P2-T,   D_CSPD(D15),                            ;INITIAL D=(016161)
                        D[C]_ALU00,                             ;SETUP D[C] FOR SHIFT = "1"
                NEXT,   J/COMP536A                              ;
      (6421)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,010,,,0,1,0,,0,,0,,,0,0010,,,0,,0000,0,,,11,000,,,100,010,010]

        6422:  ;(FREE)
        COMP536A:
                SETUP,  D-RIGHT-2,                              ;AMUX=BMUX/DIRECT, CMUX/RIGHT-2
                P2-T,   D_D-SHIFTED-XOR-CSPB(B14),              ;COMPARE D-SHIFTED:EXPECTED, BITWISE
                NEXT,   J/GOBUT536A                             ;EXPECTED =(143434)
      (6422)  DCS[0,00,0,0,0,0]  BM[0110,,11,11,,01,11,,000,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,010,011]

        6423:  ;(FREE)
        GOBUT536A:
                SETUP,  RETURN/TEST536B,                        ;RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
                        J/BUTD-IS-ZERO                          ;GO TEST D IS ALL ZERO
      (6423)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,01,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]




        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 536B ***
        ;READ D THRU "2*D[C]#BMUX<15:02>" PORT OF CMUX, AMUX=BMUX/DIRECT
        ;IN(0)(161616), OUT(034343)
        6640:
        TEST536B:
                P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
                        LOAD-ERROR(TEST536B),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C6,),                           ;COMPARE AT TARGET
                NEXT,   J/EXPEC536B                             ;
      (6640)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,010,100]

        6424:  ;(FREE)
        EXPEC536B:
                P0,     BUMP-VERIFY,                            ;COUNT
                P3,     CSPD[14]_EMIT,                          ;GET EXPECTED PATTERN AFTER SHIFT
                        EMIT/034343,                            ;"1110 0011 1000 1110"
                NEXT,   J/INITD536B                             ;
      (6424)  DCS[0,00,0,0,0,1]  BM[0011,,10,10,,00,11,,100,,011,,,0,0,0,,0,,0,,,0,0011,,,1,,0000,0,,,11,000,,,100,010,101]

        6425:  ;(FREE)
        INITD536B:
```



```
                P2-T,   D_NOT-CSPB(B15),                        ;INITIAL D=(161616)
                        D[C]_ALU00,                             ;SETUP D[C] FOR SHIFT = "0"
                NEXT,   J/COMP536B                              ;
      (6425)  DCS[0,00,0,0,0,0]  BM[0111,,11,10,,11,01,,101,,010,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,010,110]

        6426:  ;(FREE)
        COMP536B:
                P0,     BUMP-VERIFY,                            ;COUNT
                SETUP,  D-RIGHT-2,                              ;AMUX=BMUX/DIRECT, CMUX/RIGHT-2
                P2-T,   D_D-SHIFTED-XOR-CSPB(B14),              ;COMPARE D-SHIFTED:EXPECTED, BITWISE
                NEXT,   J/GOBUT536B                             ;EXPECTED=(034343)
      (6426)  DCS[0,00,0,0,0,1]  BM[0110,,11,11,,01,11,,000,,000,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,010,111]

        6427:  ;(FREE)
        GOBUT536B:
                SETUP,  RETURN/SCOPE536B,                       ;RETURN TO SCOPE LOOP TEST WORD
                NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
                        J/BUTD-IS-ZERO                          ;GO TEST D IS ALL ZERO
      (6427)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,00,11,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]

        6430:  ;(FREE)
        SCOPE536B:
                P0,     BUMP-VERIFY,                            ;COUNT
                P3,     CSPD[17]_EMIT, EMIT/031463,             ;CONSTANT FOR USE BELOW
                NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST536C" (+1,WORDS)
                        J/TEST536C                              ;   ERROR:  "INIT536A"(-10,WORDS)
      (6430)  DCS[0,00,0,1,0,1]  BM[0011,,10,00,,11,00,,110,,011,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,110,101,101]




        ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        ;*** TEST 536C ***
        ;READ D THRU "D[C]#BMUX<15:01>" PORT OF CMUX, AMUX=BMUX/DIRECT
        ;IN(1)(031463), OUT(114631)
        6655:
        TEST536C:
                P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
                        LOAD-ERROR(TEST536C),                   ;ERROR DIRECTORY KEY
                        DCS-CTR(C5,),                           ;COMPARE AT TARGET
                        BUMP-VERIFY,                            ;COUNT
                NEXT,   J/INITD536C                             ;
      (6655)  DCS[1,00,1,0,0,1]  BM[1010,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,110,101,010]

        6652:

        INITD536C:
                P0,     BUMP-VERIFY,                            ;COUNT
                P2-T,   D_CSPD(D17),                            ;INITIAL D=(031463)
                        D[C]_ALU00,                             ;SETUP D[C] FOR SHIFT = "1"
                NEXT,   J/COMP536C                              ;"0011 0011 0011 0011"
      (6652)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,010,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,011,001]
```

```
14081    6431:  !(FREE)
14082    COMP536C:
14083           SETUP,   D-RIGHT-1,                          !AMUX-BMUX/DIRECT, CMUX/RIGHT-1
14084           P2-T,    D_D-SHIFTED-XOR-CSPB(B16),          !COMPARE D-SHIFTED;EXPECTED, BITWISE
14085           NEXT,    J/GOBUT536C                         !EXPECTED=(114631)
     (6431)  DCS[0,00,0,0,0,0]  BM[0110,,11,01,,01,10,,000,,000...0,1,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,100,011,010]
14086                                                        !"1001 1001 1001 1001"
14087
14088    6432:  !(FREE)
14089    GOBUT536C:
14090           SETUP,   RETURN/TEST536D,                    !RETURN TO START OF NEXT SUBTEST
14091           NEXT,    GOTO-PAGE(7),                       !BUT TABLE IS ON PAGE 7
14092                    J/BUTD-IS-ZERO                      !GO TEST D IS ALL ZERO
     (6432)  DCS[0,00,0,0,0,0]  BM[0110,,00,11,,01,00,,001,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
14093
14094
14095
14096
14097    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
14098
14099    !*** TEST 536D ***
14100    !READ D THRU "D[C]=BMUX<15:01>" PORT OF CMUX, AMUX-BMUX/DIRECT
14101    !IN(0)(146314), OUT(063146)
14102    6641:
14103    TEST536D:
14104           P0,      LOAD-ENUA(ZTARGET402),               !SETUP FOR D=ZERO TEST
14105                    LOAD-ERROR(TEST536D),                !ERROR DIRECTORY KEY
14106                    DCS-CTR(C7,),                        !COMPARE AT TARGET
14107           NEXT,    J/INIT536D                           !
     (6641)  DCS[1,00,1,0,0,0]  BM[1000,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,100,011,011]
14108
14109    6433:  !(FREE)
14110    INIT536D:
14111           P3,      CSPD[15]_EMIT,                       !GET INITIAL PATTERN FOR D
14112                    EMIT/146314,                         !"1100 1100 1100 1100"
14113           NEXT,    J/EXPEC536D                          !
     (6433)  DCS[0,00,0,0,0,0]  BM[1100,,10,11,,00,11,,001,,100...0,0,0,,0,,0,,0...0,0010...1,,0000,0,,,11,000,,,100,011,100]
14114
14115    6434:  !(FREE)
14116    EXPEC536D:
14117           P3,      CSPD[14]_EMIT,                       !GET EXPECTED PATTERN AFTER SHIFT
14118                    EMIT/063146,                         !"0110 0110 0110 0110"
14119           NEXT,    J/INITD536D                          !
     (6434)  DCS[0,00,0,0,0,0]  BM[0110,,10,01,,10,01,,100,,110...0,0,0,,0,,0,,0...0,0011...1,,0000,0,,,11,000,,,100,011,101]
14120
14121    6435:  !(FREE)
14122    INITD536D:
14123           P0,      BUMP-VERIFY,                         !COUNT
14124           P7-T,    D_CSPD(D15),                         !INITIAL D=(146314)
14125                    D[C]_0,                              !SETUP D[C] FOR SHIFT = "0"
14126           NEXT,    J/COMP536D                           !
     (6435)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,000...0,1,0,,0,,0,,0...0,0010...0,,0000,0,,,11,000,,,100,011,110]
14127
```



```
14128    6436:  !(FREE)
14129    COMP536D:
14130           SETUP,   D-RIGHT-1,                          !AMUX-BMUX/DIRECT, CMUX/RIGHT-1
14131           P2-T,    D_D-SHIFTED-XOR-CSPB(B14),          !COMPARE D-SHIFTED;EXPECTED, BITWISE
14132           NEXT,    J/GOBUT536D                         !EXPECTED=(063146)
     (6436)  DCS[0,00,0,0,0,0]  BM[0110,,11,11,,01,10,,000,,000...0,1,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,100,011,111]
14133
14134    6437:  !(FREE)
14135    GOBUT536D:
14136           SETUP,   RETURN/SCOPE536D,                   !RETURN TO SCOPE LOOP TEST WORD
14137           NEXT,    GOTO-PAGE(7),                       !BUT TABLE IS ON PAGE 7
14138                    J/BUTD-IS-ZERO                      !GO TEST D IS ALL ZERO
     (6437)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,01,00,,000,,111...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,011,100,001]
14139
14140    6440:  !(FREE)
14141    SCOPE536D:
14142           NEXT,    BUTD[SCOPE],                        !NO ERROR:  "TEST536E" (+1,WORD8)
14143                    J/TEST536E                          !   ERROR:  "INIT536C" (-11,WORD8)
     (6440)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,110,101,011]
14144
14145
14146
14147
14148    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
14149
14150    !*** TEST 536E ***
14151    !READ D THRU BMUX<14:00>=SENDMUX(=SR15) PORT OF CMUX, AMUX-BMUX/DIRECT
14152    !IN(0)(146314), OUT(114631), SR=(100000)
14153    6653:
14154    TEST536E:
14155           P0,      LOAD-ENUA(ZTARGET402),               !SETUP FOR D=ZERO TEST
14156                    LOAD-ERROR(TEST536E),                !ERROR DIRECTORY KEY
14157                    DCS-CTR(C6,),                        !COMPARE AT TARGET
14158           P3,      BUTA(CLR-FLAG-RES-UCON),             !SELECT SR-LOAD, SENDMUX PORTS 0123, BUSDIN_EMIT
14159           NEXT,    J/LOADSR536E                         !
     (6653)  DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,0...0,0000...0,,0000,0,,,11,010,,,110,101,000]
14160
14161    6650:
14162    LOADSR536E:
14163           P0,      BUMP-VERIFY,                         !COUNT
14164           P2-T,    SR_BSPHI(C100000),                   !(100000) IN SR<15:00>
14165           NEXT,    J/INITD536E                          !
     (6650)  DCS[0,00,0,0,0,1]  BM[1010,,01,11,,00,00,,001,,000...0,0,1,,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,100,100,001]
14166
14167    6441:  !(FREE)
14168    INITD536E:

14169           P0,      BUMP-VERIFY,                         !COUNT
14170           P2-T,    D_CSPD(D15),                         !INITIAL D=(146314)
14171                    D[C]_0,                              !SETUP D[C] FOR SHIFT = "0"
14172           NEXT,    J/COMP536E                           !
     (6441)  DCS[0,00,0,0,0,1]  BM[1010,,10,00,,00,00,,000,,000...0,1,0,,0,,0,,0...0,0010...0,,0000,0,,,11,000,,,100,100,010]
14173
14174    6442:  !(FREE)
```

```
14175    COMP536E:
14176            SETUP,  D=LEFT-1,                               ;AMUX=BMUX/DIRECT, CMUX/LEFT-1
14177                                                            ;BIT<00> = SR<15> = SENDMUX PORT 0 = (1)
14178            P2=T,   D_D=SHIFTED-XOR-CSPB(B16),              ;COMPARE D=SHIFTED;EXPECTED, BITWISE
14179            NEXT,   J/GOBUT536E                             ;EXPECTED=(114631)
      (6442)  DCS[0,00,0,0,0,0]  BM[0110..11,01..01,00..000..000...0,1,0..0..0...0,0000...0..0000,0...11,000...100,100,011]
14180
14181    6443:  ;(FREE)
14182    GOBUT536E:
14183            SETUP,  RETURN/TEST536F,                        ;RETURN TO START OF NEXT SUBTEST
14184            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
14185                    J/BUTD-IS-ZERO                          ;GO TEST D IS ALL ZERO
      (6443)  DCS[0,00,0,0,0,0]  BM[0110..00,11..01,00..010..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,001]
14186
14187
14188
14189
14190    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
14191
14192    ;*** TEST 536F ***
14193    ;READ D THRU BMUX<14:00>=SENDMUX(=SR15) PORT OF CMUX, AMUX=BMUX/DIRECT
14194    ;IN(0)(031463), (063146), SR=(077777)
14195    6642:
14196    TEST536F:
14197            P0,     LOAD=ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO TEST
14198                    LOAD=ERROR(TEST536F),                   ;ERROR DIRECTORY KEY
14199                    DCS-CTR(C6,),                           ;COMPARE AT TARGET
14200            NEXT,   J/LOADSR536F                            ;
      (6642)  DCS[1,00,1,0,0,0]  BM[1001..00,11..11,00..000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...100,100,100]
14201
14202    6644:  ;(FREF)
14203    LOADSR536F:
14204            P0,     BUMP=VERIFY,                            ;COUNT
14205            P2=T,   SR_NOT-ASPHI(C100000),                  ;(077777) IN SR <15:00>
14206            NEXT,   J/INITD536F                             ;
      (6644)  DCS[0,00,0,0,0,1]  BM[0000..00,00..11,01..001..000...0,0,1..0..0...0,0000...0..0000,0...11,000...100,100,101]
14207
14208    6645:  ;(FREF)
14209    INITD536F:
14210            P2=T,   D_CSPD(D17),                            ;INITIAL D=(031463)
14211                    D[C]_0,                                 ;SETUP D[C] FOR SHIFT = "0"
14212            NEXT,   J/COMP536F                              ;
      (6645)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,1,0..0..0...0,0000...0..0000,0...11,000...100,100,110]
14213
14214    6646:  ;(FREF)
14215    COMP536F:
14216            SETUP,  D=LEFT-1,                               ;AMUX=BMUX/DIRECT, CMUX/LEFT-1
14217                                                            ;BIT<00> = SR<15> = SENDMUX PORT 0 = (0)
14218            P2=T,   D_D=SHIFTED-XOR-CSPB(B14),              ;COMPARE D=SHIFTED;EXPECTED, BITWISE
14219            NEXT,   J/GOBUT536F                             ;EXPECTED =(063146)
      (6646)  DCS[0,00,0,0,0,0]  BM[0110..11,11..01,00..000..000...0,1,0..0..0...0,0000...0..0000,0...11,000...100,100,111]
14220
14221    6647:  ;(FREE)
```



```
14222    GOBUT536F:
14223            SETUP,  RETURN/SCOPE536F,                       ;RETURN TO SCOPE LOOP TEST WORD
14224            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
14225                    J/BUTD-IS-ZERO                          ;GO TEST D IS ALL ZERO
      (6647)  DCS[0,00,0,0,0,0]  BM[0110..00,10..01,01..000..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,001]
14226
14227    6650:  ;(FREE)
14228    SCOPE536F:
14229            P0,     BUMP=VERIFY,                            ;COUNT
14230            P3,     CSPD[02]_EMIT,                          ;REG-CON #1:   (FOR USE BELOW)
14231            EMITC,  SENDMUX=0123-SEL,                       ;  SELECT SENDMUX PORTS 0-3
14232                    SR-LEFT, GUARD=DIS,                     ;  SR GOES LEFT, SR<00>_D[C]
14233            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "SETEMIT537A" (+1,WORDS)
14234                    J/SETEMIT537A                           ;   ERROR:  "LOADSR536E" (-9,WORDS)
      (6650)  DCS[0,00,0,1,0,1]  BM[0101..10,00..00,00..000..000...0,0,0..0..0...0,1101...1..0000,0...11,000...110,101,001]
14235
14236
14237
14238
14239    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
14240
14241    ;*** TEST 537A ***
14242    ;THIS TEST VALIDATES THE "SENDMUX" INPUTS TO THE SHIFT-TREE,
14243    ;EACH 'SENDMUX' OUTPUT IS SET TO 1/0 VALUES, AND THEN READ OUT INTO THE 'SR' WHERE THEY
14244    ;ARE ALL SAVED TO CHECK AT ONCE.
14245    6651:
14246    SETEMIT537A:
14247            P0,     DCS-CTR(C15,),                          ;HOLD UP FOR NOW
14248            NEXT,   GOTO-PAGE(4),                           ;XFER
14249                    J/LOAD16537A                            ;
      (6651)  DCS[0,00,1,0,0,0]  BM[0000..00,00..00,00..000..100...0,0,0..0..0...0,0000...0..0000,0...11,100...101,111,100]
14250
14251    4574:
14252    LOAD16537A:
14253            P3,     CSPD[16]_EMIT,                          ;BIT03 ONLY SET
14254                    EMIT/000010,                            ;
14255                    BUTA(CLR-FLAG-RES-UCON),                ;BUSDIN <- EMIT, SR LOAD
14256            NEXT,   J/LOAD14537A                            ;
      (4574)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..001..000...0,0,0..0..0...0,0001...1..0000,0...11,010...010,111,110]
14257
14258    4276:  ;(FREE)
14259    LOAD14537A:
14260
14261            P3,     CSPD[14]_EMIT,                          ;BIT11 ONLY SET
14262                    EMIT/004000,                            ;
14263            NEXT,   J/LOAD03537A                            ;

      (4276)  DCS[0,00,0,0,0,0]  BM[0000..10,10..00,00..000..000...0,0,0..0..0...0,0011...1..0000,0...11,000...010,111,111]
14264
14265    4277:  ;(FREE)
14266    LOAD03537A:
14267            P3,     CSPD[03]_EMIT,                          ;WHAT THE 'SR' SHOULD BE
14268                    EMIT/177252,                            ;AFTER THIS TEST
```

```
14269           NEXT,   J/LOAD01537A                            !
     (4277)  DCS[0,00,0,0,0,0]  BM[1111..10,11..10,10..101..010...0,0,0..0..0...0,1100...1..0000,0...11,000...011,000,000]
14270
14271     4300:  !(FREE)
14272     LOAD01537A:
14273           P3,     CSPD[01]_EMIT,                          !RES-CON #2:
14274           EMITC,  SENDMUX-4567-SEL,                       !  SELECT SENDMUX PORTS 4-7
14275                   SR-LEFT, GUARD-DIS,                     !  SR GOES LEFT, SR<00>_D[C]
14276           NEXT,   GOTO-PAGE(7),                           !XFER
14277                   J/INITSR537A                            !
     (4300)  DCS[0,00,0,0,0,0]  BM[0001..10,00..00,00..000..111...0,0,0..0..0...0,1110...1..0000,0...11,100...001,011,001]
14278
14279     7131:  !(FREE)
14280     INITSR537A:
14281           P2-T,   SR_ALL-ONES,                            !START 'SR' WITH ALL ONES
14282           NEXT,   J/SETRES8537A                           !
     (7131)  DCS[0,00,0,0,0,0]  BM[1111..00,00..11,01..101..000...0,0,1..0..0...0,0000...0..0000,0...11,000...001,011,101]
14283
14284     7135:  !(FREE)
14285     SETRES8537A:
14286           P2,     RES_CSPD(D02),                          !LOAD RES W/ RES-CON#1 (SENDMUX=0123)
14287           NEXT,   GOTO-PAGE(6),                           !XFER
14288                   J/NEWCTR537A                            !
     (7135)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..110...0,0,0..0..0...0,1101...0..1000,1...11,100...110,100,011]
14289
14290     6643:
14291     NEWCTR537A:
14292           P0,     LOAD-ENUA(SETRES8537A),                 !COMPARE POINT #2
14293                   LOAD-ERROR(NEWCTR537A),                 !ERROR DIRECTORY KEY
14294                   DCS-CTR(C14.),                          !COMPARE BELOW
14295           NEXT,   J/AR3-537A                              !
     (6643)  DCS[1,00,1,0,0,0]  BM[0001..00,11..10,11..111..000...0,0,0..0..0...0,0000...0..0000,0...11,000...100,101,001]
14296
14297     6451:  !(FREE)
14298     AR3-537A:
14299           P0,     BUMP-VERIFY,                            !COUNT
14300           P2-T,   D_NOT-CSPD(D16),                        !D=(177767), BIT03="0"
14301           NEXT,   GOTO-PAGE(7),                           !XFER
14302                   J/BR3-537A                              !
     (6451)  DCS[0,00,0,0,0,1]  BM[0111..10,00..11,01..101..111...0,1,0..0..0...0,0001...0..0000,0...11,100...001,011,100]
14303
14304     7134:  !(FREE)
14305     BR3-537A:
14306           P2-T,   D_D=RIGHT-3,                            !USE SENDMUX PORT 1 = AMUX03 = "0"
14307                   D[C]_ALU00,                             !INTO D[C] FOR SR
14308           NEXT,   J/CR3-537A                              !
     (7134)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0,1000...0..0000,0...11,000...001,011,111]
14309
14310     7137:  !(FREE)
14311     CR3-537A:
14312           P2-T,   SR_SR-LEFT-1,                           !SENDMUX OUTPUT INTO SR<00>
```



```
14313                   D_CSPB(B16), SAVE-D[C],                 !D=(000010), BIT03="1"
14314           NEXT,   J/DR3-537A                              !
     (7137)  DCS[0,00,0,0,0,0]  BM[1010..11,01..00,00..000..111...0,1,1..0..0...0,0000...0..0000,0...11,000...001,100,000]
14315
14316     7140:  !(FREE)
14317     DR3-537A:
14318           P2-T,   D_D=RIGHT-3,                            !USE SENDMUX PORT 1 = AMUX03 = "1"
14319                   D[C]_ALU00,                             !INTO D[C] FOR SR
14320           NEXT,   J/AR7-537A                              !
     (7140)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0,1000...0..0000,0...11,000...001,100,001]
14321
14322     7141:  !(FREE)
14323     AR7-537A:
14324           P2-T,   SR_SR-LEFT-1,                           !SENDMUX OUTPUT INTO SR<00>
14325                   D_NOT-ASPHI(C000200), SAVE-D[C],        !D=(177577), BIT07="0"
14326           NEXT,   J/BR7-537A                              !
     (7141)  DCS[0,00,0,0,0,0]  BM[0000..00,00..11,01..010..111...0,1,1..0..0...0,0000...0..0000,0...11,000...001,100,010]
14327
14328     7142:  !(FREE)
14329     BR7-537A:
14330           P2-T,   D_D=RIGHT-7,                            !USE SENDMUX PORT 2 = D07 = "0"
14331                   D[C]_ALU00,                             !INTO D[C] FOR SR
14332           NEXT,   J/CR7-537A                              !
     (7142)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0,0110...0..0000,0...11,000...001,100,011]
14333
14334     7143:  !(FREE)
14335     CR7-537A:
14336           P2-T,   SR_SR-LEFT-1,                           !SENDMUX OUTPUT INTO SR<00>
14337                   D_ASPHI(C000200), SAVE-D[C],            !D=(000200), BIT07="1"
14338           NEXT,   J/DR7-537A                              !
     (7143)  DCS[0,00,0,0,0,0]  BM[1111..00,00..11,01..010..111...0,1,1..0..0...0,0000...0..0000,0...11,000...001,100,100]
14339
14340     7144:  !(FREE)
14341     DR7-537A:
14342           P2-T,   D_D=RIGHT-7,                            !USE SENDMUX PORT 2 = D07 = "1"
14343                   D[C]_ALU00,                             !INTO D[C] FOR SR
14344           NEXT,   J/AR11-537A                             !
     (7144)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0,0110...0..0000,0...11,000...001,100,101]
14345
14346     7145:  !(FREE)
14347     AR11-537A:
14348           P2-T,   SR_SR-LEFT-1,                           !SENDMUX OUTPUT INTO SR<00>
14349                   D_NOT-CSPB(B14), SAVE-D[C],             !D=(173777), BIT11="0"
14350           NEXT,   J/BR11-537A                             !
     (7145)  DCS[0,00,0,0,0,0]  BM[0111..11,11..11,01..101..111...0,1,1..0..0...0,0000...0..0000,0...11,000...001,100,110]
14351

14352     7146:  !(FREE)
14353     BR11-537A:
14354           P2-T,   D_D=RIGHT-11,                           !USE SENDMUX PORT 3 = AMUX03 = "0"
14355                   D[C]_ALU00,                             !INTO D[C] FOR SR
14356           NEXT,   J/CR11-537A                             !
     (7146)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0,1110...0..0000,0...11,000...001,100,111]
14357
14358     7147:  !(FREE)
```

```
14359    CR11-537A:
14360            P2-T,   SR_SR-LEFT-1,                           ;SENDMUX OUTPUT INTO SR<00>
14361                    D_CSPB(B14), SAVE-D[C],                 ;D=(004000), BIT11="1"
14362            NEXT,   J/DR11-537A                             !
      (7147)  DCS[0,00,0,0,0,0]  BM[1010..11,11..00,00..000..111...0,1,1..0..0...0.0000...0..0000,0...11,000...001,101,000]
14363
14364    7150:  !(FREE)
14365    DR11-537A:
14366            P2-T,   D_D-RIGHT-11,                           ;USE SENDMUX PORT 3 = AMUX03 = "1"
14367                    D[C]_ALU00,                             ;INTO D[C] FOR SR
14368            NEXT,   J/ER3-537A                              !
      (7150)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0.1110...0..0000,0...11,000...001,101,001]
14369
14370    7151:  !(FREE)
14371    ER3-537A:
14372            P2-T,   SR_SR-LEFT-1,                           ;SENDMUX OUTPUT INTO SR<00>
14373                    D_NOT-CSPB(B16), SAVE-D[C],             ;D=(177767), BIT03="0"
14374            NEXT,   J/SETRESB537A                           !
      (7151)  DCS[0,00,0,0,0,0]  BM[0111..11,01..11,01..101..111...0,1,1..0..0...0.0000...0..0000,0...11,000...011,111,000]
14375
14376    7370:
14377    SETRESB537A:
14378            P2,     RES_CSPD(D01),                          ;LOAD RES W/RES-CON=2 (SENDMUX=4567)
14379            NEXT,   J/FR3-537A                              !
      (7370)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..000...0,0,0..0..0...0.1110...0..1000,1...11,000...001,101,010]
14380
14381    7152:  !(FREE)
14382    FR3-537A:
14383            P2-T,   D_D-RIGHT-3,                            ;USE SENDMUX PORT 5 = AMUX03 = "0"
14384                    D[C]_ALU00,                             ;INTO D[C] FOR SR
14385            NEXT,   J/GR3-537A                              !
      (7152)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0.1000...0..0000,0...11,000...001,101,011]
14386
14387    7153:  !(FREE)
14388    GR3-537A:
14389            P2-T,   SR_SR-LEFT-1,                           ;SENDMUX OUTPUT INTO SR<00>
14390                    D_CSPB(B16), SAVE-D[C],                 ;D=(000010), BIT03="1"
14391            NEXT,   J/HR3-537A                              !
      (7153)  DCS[0,00,0,0,0,0]  BM[1010..11,01..00,00..000..111...0,1,1..0..0...0.0000...0..0000,0...11,000...001,101,100]
14392
14393    7154:  !(FREE)
14394    HR3-537A:
14395            P2-T,   D_D-RIGHT-3,                            ;USE SENDMUX PORT 5 = AMUX03 = "1"
14396                    D[C]_ALU00,                             ;INTO D[C] FOR SR
14397            NEXT,   J/AL1-537A                              !
      (7154)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0.1000...0..0000,0...11,000...001,101,101]
14398
14399    7155:  !(FREE)
14400    AL1-537A:
14401            P2-T,   SR_SR-LEFT-1,                           ;SENDMUX OUTPUT INTO SR<00>
14402                    D_ALL-ONES,                             ;D=(177777)
14403            NEXT,   GOTO-PAGE(4),                           ;XFER
14404                    J/BL1-537A                              !
```



```
      (7155)  DCS[0,00,0,0,0,0]  BM[1111..00,00..11,01..101..100...0,1,1..0..0...0.0000...0..0000,0...11,100...010,100,010]
14405
14406    4242:  !(FREE)
14407    BL1-537A:
14408            P2-T,   D_D-LEFT-1,                             ;USE SENDMUX PORT 4 = HARD "0"
14409                    D[C]_ALU00,                             ;INTO D[C] FOR SR
14410            NEXT,   J/TEST537A                              !
      (4242)  DCS[0,00,0,0,0,0]  BM[1111..00,00..01,00..000..010...0,1,0..0..0...0.0000...0..0000,0...11,000...101,111,010]
14411
14412    4572:
14413    TEST537A:
14414            P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D-IS-ZERO COMPARE
14415                    LOAD-ERROR(TEST537A),                   ;ERROR DIRECTORY KEY
14416                    DCS-CTR(C4.),                           ;COMPARE AT TARGET
14417                    BUMP-VERIFY,                            ;COUNT
14418            P2-T,   SR_SR-LEFT-1,                           ;SENDMUX OUTPUT INTO SR<00>
14419            NEXT,   J/COMP537A                              !
      (4572)  DCS[1,00,1,0,0,1]  BM[1011..00,11..11,00..000..010...0,0,1..0..0...0.0000...0..0000,0...11,000...011,000,010]
14420
14421    4302:  !(FREE)
14422    COMP537A:
14423            P2-T,   D_SR-XOR-CSPD(D03),                     ;COMPARE RECEIVED:EXPECTED BITWISE
14424            P3,     BUTA(CLR-FLAG-RES-UCON),                ;RESET SR TO LOAD/GUARD=DIS
14425            NEXT,   J/GOBUT537A                             !
      (4302)  DCS[0,00,0,0,0,0]  BM[0110..10,00..00,00..000..000...0,1,0..0..0...0.1100...0..0000,0...11,010...011,000,011]
14426
14427    4303:  !(FREE)
14428    GOBUT537A:
14429            SETUP,  RETURN/SCOPE537A,                       ;RETURN TO SCOPE LOOP TEST WORD
14430            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
14431                    J/BUTD-IS-ZERO                          ;GO TEST D IS ALL ZERO
      (4303)  DCS[0,00,0,0,0,0]  BM[0100..00,01..10,00..100..111...0,0,0..0..0...0.0000...0..0000,0...11,100...011,100,001]
14432
14433    4304:  !(FREE)
14434    SCOPE537A:
14435            P0,     BUMP-VERIFY,                            ;COUNT
14436                    BUSDIN_EMIT-[I],                        ;RESET PROC UCON
14437                    EN-CLK-IR[15-00],                       !
14438            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST551A" (+1,WORD)
14439                    J/TEST551A                              !   ERROR:  "LOAD16537A" (-30,WORD8)
      (4304)  DCS[0,00,0,1,0,1]  BM[0000..00,00..00,01..000..100...0,0,0..0..0...1.1001...0..0000,0...11,000...101,111,101]
14440
14441
14442
14443
14444

14445    !,PAGE=========================================================================================================
14446
14447

14448    .TOC   *   TEST551:  BASE MACHINE DATAPATH COUNTER CAN COUNT
14449
14450
14451    !*************************************************************************************
```

```
        !*
        !*      TESTS:  551 A - C                                         UWORDS:  015 + 035
        !*
        !*      FUNCTIONS:
        !*
        !*      THE FOLLOWING THREE TESTS USE A COMMON SUBROUTINE TO TEST THE COUNTING
        !*      ABILITY OF THE BASE MACHINE DATAPATH COUNTER;   USING THE THREE ACTIVE
        !*      BUTS THAT ENABLE COUNTING.   ADMITTEDLY THIS SEEMS LIKE OVERKILL,  BUT
        !*      THIS METHOD WAS  THE LEAST EXPENSIVE IN  TERMS OF NUMBER OF MICROWORDS
        !*      USED FOR THE TESTING.
        !*
        !*************************************************************************************



        !THE FIRST TEST USES THE ACTIVE BUT(#13) "SR<1:0>#COUNT-IS-377" TO CHECK THE COUNTER
        4575:
        TEST551A:
                P0,     LOAD-ERROR(TEST551A),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C15.),                          !HOLD UP FOR NOW
                        BUMP-VERIFY,                            !BUMP DCS COUNTER
                NEXT,   J/LOADIN551A                            !
    (4575)  DCS[1,00,1,0,0,1]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,000,101]

        4305:  !(FREE)
        LOADIN551A:
                P3,     CSPD[17]_EMIT, EMIT/400,                !INCREMENT FOR D, TO MATCH COUNTER
                NEXT,   J/SETSR551A                             !
    (4305)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,01,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,1,,0000,0,,,11,000,,,011,000,110]

        4306:  !(FREE)
        SETSR551A:
                P0,     BUMP-VERIFY,                            !COUNT
                P2-T,   SR_ZERO,                                !KEY IN SR<1:0>=(00) FOR SELECT THIS BUT
                NEXT,   J/GOTEST551A                            !
    (4306)  DCS[0,00,0,0,0,1]  BM[0011,,00,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,110,100]

        4564:
        GOTEST551A:
                SETUP,  RETURN/TEST551B,                        !GO TO TEST SUBROUTINE
                NEXT,   CALL[COUNT-TEST]                        !  (SEE DESCRIP, FOLLOWING)
    (4564)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,11,,110,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,001]




        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !THE SECOND TEST USES THE ACTIVE BUT(#25) "COUNT-IS-377" TO CHECK THE COUNTER
        4576:
        TEST551B:
                P0,     LOAD-ENUA(ZTARGET400),                  !BIT<1:0> CLEAR
                        LOAD-ERROR(TEST551B),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C4.),                           !COMPARE AT TARGET
```



```
                NEXT,   BUTD[SCOPE],                            !NO ERROR;  "SETSR551B" (+1, WORDS)
                        J/SETSR551B                             !  ERROR:  "GOTEST551A" (-1, WORDS) REPEAT PREV TEST
    (4576)  DCS[1,00,1,1,0,0]  BM[1011,,00,11,,11,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,110,101]

        4565:
        SETSR551B:
                P2-T,   SR_SR-PLUS-1,                           !KEY IN SR<1:0>=(01) FOR SELECT THIS BUT
                NEXT,   J/GOTEST551B                            !
    (4565)  DCS[0,00,0,0,0,0]  BM[1001,,01,11,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,110,000]

        4560:
        GOTEST551B:
                SETUP,  RETURN/GOTEST551B1,                     !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                        J/BUTCOUNT-IS-377                       !FAKE A TEST
    (4560)  DCS[0,00,0,0,0,0]  BM[0111,,00,00,,11,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,011,110]

        7136:  !(FREE)
        BUTCOUNT-IS-377:
                NEXT,   BUT(COUNT-IS-377),                      !SHOULD TARGET INTO *** *** *00
                        J/ZTARGET400                            !BIT<1:0> BOTH CLEAR
    (7136)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,10,101,,,100,000,000]


        !     -     -     -     -     -     -     -     -     -     -     -     -     -     -


        !   AND NOW TEST THAT THE ACTUAL BUT/COUNTER WORKS

        7157:  !(FREE)
        GOTEST551B1:
                SETUP,  RETURN/TEST551C,                        !GO TO TEST SUBROUTINE
                NEXT,   CALL[COUNT-TEST]                        !  (SEE DESCRIP, FOLLOWING)
    (7157)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,11,10,,110,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,000,001]




        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !THE THIRD TEST USES THE ACTIVE BUT(#17) "COUNT-IS-377#D[C]" TO CHECK THE COUNTER
        4566:
        TEST551C:
                P0,     LOAD-ERROR(TEST551C),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C15.),                          !HOLD UP FOR NOW
                NEXT,   BUTD[SCOPE],                            !NO ERROR:  "SETSR551C" (+1, WORDS)

                        J/SETSR551C                             !  ERROR:  "GOTEST551B" (-3, WORDS) REPEAT PREV TEST
    (4566)  DCS[1,00,1,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,110,001]

        4561:
        SETSR551C:
                P2-T,   SR_SR-PLUS-1,                           !KEY IN SR<1:0>=(10) FOR SELECT THIS BUT
```

```
                NEXT,   GOTO-PAGE(5),                            !XFER
                        J/GOTEST551C                             !
    (4561)  DCS[0.00.0.0.0.0]  BM[1001..01.11..00.00..000..101...0.0.1..0..0...0.0000...0..0000.0...11.100...110.010.110]


        5626:
        GOTEST551C:
                SETUP,  RETURN/SCOPE551,                         !GO TO TEST SUBROUTINE
                NEXT,   CALL[COUNT-TEST]                         !  (SEE DESCRIP, FOLLOWING)
    (5626)  DCS[0.00.0.0.0.0]  BM[0101..00.01..10.00..101..100...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.001]



        5305:  !(FREE)
        SCOPE551:
                P0,     BUSDIN_EMIT-[I],                         !RESET PROC UCON
                        EN-CLK-IR[15-00],                        !
                NEXT,   BUTD[SCOPE],                             !NO ERROR:  "TEST610A1"  (NEXT SECTION)
                        J/TEST610A1                              !   ERROR:  "GOTEST551C" (-1. WORDS) REPEAT PREV TEST
    (5305)  DCS[0.00.0.1.0.0]  BM[0000..00.00..00.01..000..100...0.0.0..0..0...1.1001...0..0000.0...11.000...110.010.111]



        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !***    B.M. COUNTER TESTING ROUTINE   ***

        !       THIS ROUTINE USES THE B.M. COUNTER TO COUNT FROM 000-377, WAITING FOR IT
        !       TO OVERFLOW AT THE RIGHT MOMENT.  AT THE SAME TIME THE D REGISTER HAS BEEN
        !       TRACKING THE PROGRESS OF THE COUNTER, WAITING FOR IT TO OVERFLOW, COMPARING
        !       COUNT FOR COUNT THE INCREMENTED VALUES, AND GUARANTEEING WE WILL EXIT THE
        !       LOOP IF THE COUNTER SOMEHOW NEVER OVERFLOWS.


        4301:  !(FREE)
        COUNTER01:
                P2,     COUNTER_BSPHI(C000000),                  !LOAD COUNTER WITH (000) TO START
                NEXT,   J/COUNTER02                              !
    (4301)  DCS[0.00.0.0.0.0]  BM[0000..01.11..00.00..100..000...0.0.0..0..0...0.0000...0..0010.1...11.000...011.001.000]

        4310:  !(FREE)
        COUNTER02:
                P2-T,   D_ZERO, D[C]_ALU15,                      !ZERO D, D[C]
                P3,     A#BSPHI[17]_D,                           !ASPHI[17] WILL TRACK THE COUNTER
                NEXT,   J/COUNTER03                              !
    (4310)  DCS[0.00.0.0.0.0]  BM[0011..00.11..00.01..011..100...0.1.0..0..0...0.0000...0..1011.0...11.000...101.010.110]


        !***    THE LOOP FOR THE COUNTER TEST ENTERS HERE   ***
        4526:
        COUNTER03:
                P2-T,   D_A-XOR-B, SAVE-D[C],                    !COMPARE COUNTER:TRACKER
                        BUS-A, COUNT#D[LO],                      !=(COUNTER)#(000)
```



```
                        BUS-B_BSPHI(R17),                        !=(TRACKER)#(000)
                NEXT,   BUTR(D[C]-B),                            !D[C] HOLDS THE CARRYOUT FROM THE TRACKING REGISTER
                                                                 !IF (0), GOTO(COUNTER04), CONTINUE TESTING
                        J/COUNTER04                              !IF (1), GOTO(COUNTER11), ERROR, D OVERFLOW BEFORE COUNTER
    (4526)  DCS[0.00.0.0.0.0]  BM[0110..01.11..01.01..011..111...0.1.0..0..0...0.0011...0..0000.0...10.011...101.100.101]


        !ENTER HERE FOR CONTINUE TEST
        4545:
        COUNTER04:
                P0,     DCS-CTR(C5.),                            !HOLD UP ON DCS COMPARE
                NEXT,   BUTR(D14-00-EQ-0),                       !COMPARE COUNTER:TRACKER, GENERATED ABOVE
                                                                 !IF  EQUAL, GOTO(COUNTER05), CONTINUE TEST
                        J/COUNTER12                              !IF NOT EQUAL, GOTO(COUNTER12), COUNTER#TRACKER ERROR
    (4545)  DCS[0.00.1.0.0.0]  BM[1010..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...01.101...101.101.101]


        !ENTER HERE FOR CONTINUE TEST
        4557:
        COUNTER05:
                P2-T,   D_ZERO, D[C]_ALU15,                      !TRY TO FORCE EXIT
                NEXT,   BUTR(CASE),                              !DETERMINE WHO TO TEST:
                                                                 !SR=0 -> COUNTER06
                                                                 !SR=1 -> COUNTER07
                        J/COUNTER06                              !SR=2 -> COUNTER08    (SR=3 NOT USED)
    (4557)  DCS[0.00.0.0.0.0]  BM[0011..00.00..00.00..000..100...0.1.0..0..0...0.0000...0..0000.0...00.000...101.011.100]

        !ENTER HERE FOR SR=0
        4534:
        COUNTER06:
                P2-T,   D_A-PLUS-B, D[C]_COUT15,                 !INCREMENT TRACKING REGISTER
                        BUS-A_ASPHI(R17),                        !
                        BUS-B_CSPD(D17),                         !CONSTANT (400)
                P3,     A#BSPHI[17]_D,                           !SAVE NEW
                NEXT,   BUTA(SR1-0#COUNT-IS-377),                !IF SET, GOTO(COUNTER10), B.M. COUNTER OVERFLOWED
                        J/COUNTER03                              !IF CLEAR, GOTO(COUNTER03), NEXT PASS THRU TEST
    (4534)  DCS[0.00.0.0.0.0]  BM[1001..10.11..11.01..011..110...0.1.0..0..0...0.0000...0..1011.0...01.011...101.010.110]

        !ENTER HERE FOR SR=1
        4535:
        COUNTER07:
                P2-T,   D_A-PLUS-B, D[C]_COUT15,                 !INCREMENT TRACKING REGISTER
                        BUS-A_ASPHI(R17),                        !
                        BUS-B_CSPD(D17),                         !CONSTANT (400)
                P3,     A#BSPHI[17]_D,                           !SAVE NEW
                NEXT,   BUTA(COUNT-IS-377),                      !IF SET, GOTO(COUNTER10), B.M. COUNTER OVERFLOWED

                        J/COUNTER03                              !IF CLEAR, GOTO(COUNTER03), NEXT PASS THRU TEST
    (4535)  DCS[0.00.0.0.0.0]  BM[1001..10.11..11.01..011..110...0.1.0..0..0...0.0000...0..1011.0...10.101...101.010.110]

        !ENTER HERE FOR SR=2
        4536:
        COUNTER08:
                P2-T,   D_A-PLUS-B, D[C]_COUT15,                 !INCREMENT TRACKING REGISTER
                        BUS-A_ASPHI(R17),                        !
```

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14644                   BUS-B_CSPD(D17),                        ;CONSTANT (400)
14645            P3,    A#BSPHI[17]_D,                          ;SAVE NEW
14646            NEXT,  BUTA(COUNT-IS-377#D[C]),                ;IF SET, GOTO(COUNTER10), B.M. COUNTER OVERFLOWED
14647                   J/COUNTER09                             ;IF CLEAR, GOTO(COUNTER09), NEXT PASS THRU TEST
     (4536)  DCS[0,00,0,0,0,0]  BM[1001..10,11..11,01..011..110...0,1,0..0..0...0,0000...0..1011,0...01,111...101,010,101]
14648
14649
14650    ;INTERMEDIATE WORD FOR NEXT PASS
14651    4525:
14652    COUNTER09:
14653            NEXT,  J/COUNTER03                             ;NEXT PASS
     (4525)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...11,000...101,010,110]
14654
14655
14656
14657    ;      -      -      -      -      -      -      -      -      -      -      -      -
14658
14659    ;ENTER THIS SECTION WHEN HIT AN END CONDITION:
14660
14661    ;ENTER HERE WHEN COUNTER SIGNALS IT HAS OVERFLOWN:
14662    4527:
14663    COUNTER10:
14664            P0,    DCS-CTR(C15.),                          ;HOLD UP
14665            NEXT,  BUTR(D[C]-B),                           ;NOW TEST THAT D HAS ALSO OVERFLOWED, AT THE SAME TIME
14666                                                           ;IF TRUE, GOTO(COUNTER10A),  ALL IS OK, END THE TEST
14667                   J/COUNTER10B                            ;IF FALSE, GOTO(COUNTER10B), ERROR, COUNTER OVERFLOWED TOO SOON
     (4527)  DCS[0,00,1,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...10,011...101,011,001]
14668
14669    4533:
14670    COUNTER10A:
14671            P0,    DCS-CTR(C15.),                          ;ALL, END THE TEST WITH NO ERRORS
14672            NEXT,  BUTA(RETURN),                           ;
14673                   J/BUTERROR4                             ;
     (4533)  DCS[0,00,1,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...11,111...011,111,110]
14674
14675    4531:
14676    COUNTER10B:
14677            P0,    DCS-CTR(C0.),                           ;FORCE ERROR NOW,
14678            NEXT,  BUTA(RETURN),                           ;  B.M. COUNTER OVERFLOWED TOO SOON
14679                   J/BUTERROR4                             ;
     (4531)  DCS[0,00,1,0,0,0]  BM[1111..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...11,111...011,111,110]
14680
14681    ;ENTER HERE WHEN WE GET A "D OVERFLOWED BEFORE COUNTER" CONDITION
14682    4547:
14683    COUNTER11:
14684            P0,    DCS-CTR(C0.),                           ;FORCE ERROR NOW,
14685            NEXT,  BUTA(RETURN),                           ;  B.M. COUNTER DIDN'T OVERFLOW ON TIME
14686                   J/BUTERROR4                             ;
     (4547)  DCS[0,00,1,0,0,0]  BM[1111..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...11,111...011,111,110]
14687
14688    ;ENTER HERE WHEN WE GET A "TRACKER : COUNTER" MISCOMPARE
14689    4555:
14690    COUNTER12:
14691            P0,    DCS-CTR(C0.),                           ;FORCE ERROR NOW,
```



```
14692            NEXT,  BUTA(RETURN),                           ;  B.M. COUNTER DIDN'T INCREMENT IN STEP WITH TRACKER
14693                   J/BUTERROR4                             ;
     (4555)  DCS[0,00,1,0,0,0]  BM[1111..00,00..00,00..000..000...0,0,0..0..0...0,0000...0..0000,0...11,111...011,111,110]
14694
14695
14696
14697
14698
14699    ;.PAGE=============================================================================================================
14700
14701
14702    .TOC   *   TEST610:  CONDITION CODE LOGIC
14703
14704
14705
14706    ;*****************************************************************************************
14707    ;*
14708    ;*     TESTS:  610 A - D                                  UWORDS:  074 + 070
14709    ;*
14710    ;*     FUNCTIONS:
14711    ;*
14712    ;*     THE FOLLOWING EIGHT TESTS EXERCISE THE PSW CC LOGIC (THE NZVC BITS)
14713    ;*     AND THE ASSOCIATED ROMS/MUXES ETC. TO VERIFY THE ABSCENCE OF STUCK
14714    ;*     ONE/ZERO CONDITIONS ON ALL LOGIC LINES.
14715    ;*
14716    ;*****************************************************************************************
14717    ;
14718    ;      SUMMARY OF CC-LOGIC TESTS:
14719    ;
14720    ;      TEST  ROM      IR    CC                                    MODIFY  PREV  GENERATED
14721    ;      NUMB  ADR      DATA  CLASS BYTE-H  D[C]/D-REG A-SIDE B-SIDE VBIT-H NZVC  NZVC
14722    ;      ----  ---    ------ ----- ------  ---------- ------ ------ ------ ----  ----
14723    ;
14724    ;       A1   665   105200  010     1     1=100000  177700 100100     1    1010  0101
14725    ;       A2   145   105200  010     1     0=100000  077600 000200     0    1001  0110
14726    ;
14727    ;       B1   132   105300  101     1     1=000200  100000 000200     0    0100  1011
14728    ;       B2   253   005300  101     0     0=000000  100200 000200     1    1001  0110
14729    ;
14730    ;       C1   437   072000  111     0     1=000000  000200 000200     0    1010  0111
14731    ;       C2   037   072000  111     0     1=077776  037777 037777     0    1100  0001
14732    ;
14733    ;       D1   216   072000  111     0     0=177400  077600 077600     1    0101  1000
14734    ;       D2   116   072000  111     0     0=100000  000200 100200     0    0101  1000
14735    ;
14736    ;
14737
14738
14739    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
14740
14741    ;*** TEST 610A1 ***
14742
14743    5627:
14744    TEST610A1:
```

```
            P0,     LOAD-ENUA(ZTARGET405),                  !NZVC AFTER = "0101"
                    LOAD-ERROR(TEST610A1),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C15.),                          !COMPARE AT TARGET
                    BUMP-VERIFY,                            !COUNT
            NEXT,   J/LOADIR610A1                           !
    (5627)  DCS[1.00.1.0.0.1]  BM[0000..00.11..11.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...101.011.010]

    5532:
    LOADIR610A1:
            P0,     BUMP-VERIFY,                            !COUNT
            P2-U,   IR_EMIT, EMIT/105200,                   !(105200)=INCB, CC-CLASS="010", BYTE-H
            NEXT,   J/LOAD01-610A1                          !
    (5532)  DCS[0.00.0.0.0.1]  BM[1000..00.10..10.10..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...011.000.110]

    5306:  !(FREE)
    LOAD01-610A1:
            P0,     BUMP-VERIFY,                            !COUNT
            P3,     CSPD[01]_EMIT, EMIT/100012,             !FOR D[C]=(1), PS[NZVC]="1010" PREVIOUSLY
            NEXT,   J/LOAD05-610A1                          !
    (5306)  DCS[0.00.0.0.0.1]  BM[1000..10.00..00.00..001..010...0.0.0..0..0...0.1110...1..0000.0...11.000...011.000.111]

    5307:  !(FREE)
    LOAD05-610A1:
            P3,     CSPD[05]_EMIT, EMIT/177700,             !A-SIDE DATA
            NEXT,   J/LOAD06-610A1                          !
    (5307)  DCS[0.00.0.0.0.0]  BM[1111..10.11..11.11..000..000...0.0.0..0..0...0.1010...1..0000.0...11.000...011.001.000]

    5310:  !(FREE)
    LOAD06-610A1:
            P3,     CSPD[06]_EMIT, EMIT/100100,             !B-SIDE DATA
            NEXT,   J/PSCC-DC610A1                          !
    (5310)  DCS[0.00.0.0.0.0]  BM[1000..10.00..00.01..000..000...0.0.0..0..0...0.1001...1..0000.0...11.000...011.001.001]

    5311:  !(FREE)
    PSCC-DC610A1:
            SETUP,  RETURN/SETBUSA610A1,                    !EXEC SUBR WHICH:
                                                            !(1) CSP(10)<3:0> -> PS[NZVC]
            NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> -> D[C]
    (5311)  DCS[0.00.0.0.0.0]  BM[0101..00.01..10.01..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.101.110]

    5312:  !(FREE)
    SETBUSA610A1:
            P2-T,   SR_CSPD(D05),                           !GET CONSTANT FOR A-SIDE WHEN CC SET
            NEXT,   J/DOIT610A1                             !
    (5312)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.1010...0..0000.0...11.000...011.001.011]

    5313:  !(FREE)
    DOIT610A1:
            SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                    MODIFY-VBIT,                            !EXTRA CC ROM INPUT
            P2-T,   D_A-PLUS-B, SAVE-D[C],                  !D=(100000), D[C]=(1)
                    BUS-A_SR,                               !A=(177700)
                    BUS-B_CSPD(D06),                        !B=(100100)
```



```
            NEXT,   J/GETIT610A1                            !
    (5313)  DCS[0.00.0.0.0.0]  BM[1001..10.00..00.10..000..111...0.1.0..0..1...0.1001...0..0000.0...11.000...011.001.100]

    5314:  !(FREE)
    GETIT610A1:
            P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
            SETUP,  RETURN/TEST610A2,                       !EXEC SUBR WHICH:
            NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> -> SR<3:0>, J/BUT(SR3=0)
    (5314)  DCS[0.00.0.0.0.0]  BM[0101..00.11..00.10..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.110.010]



    !  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 610A2 ***

    5622:
    TEST610A2:
            P0,     LOAD-ENUA(ZTARGET406),                  !NZVC AFTER = "0110"
                    LOAD-ERROR(TEST610A2),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C13.),                          !COMPARE AT TARGET
            NEXT,   J/LOAD06-610A2                          !
    (5622)  DCS[1.00.1.0.0.0]  BM[0010..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...011.001.101]

    5315:  !(FREE)
    LOAD06-610A2:
            P0,     BUMP-VERIFY,                            !COUNT
            P3,     CSPD[06]_EMIT, EMIT/077600,             !A-SIDE DATA
            NEXT,   J/LOAD01-610A2                          !
    (5315)  DCS[0.00.0.0.0.1]  BM[0111..10.11..11.10..000..000...0.0.0..0..0...0.1001...1..0000.0...11.000...011.001.110]

    5316:  !(FREE)
    LOAD01-610A2:
            P3,     CSPD[01]_EMIT, EMIT/000011,             !FOR D[C]=(0), PS[NZVC]="1001" PREVIOUSLY
            NEXT,   J/PSCC-DC610A2                          !
    (5316)  DCS[0.00.0.0.0.0]  BM[0000..10.00..00.00..001..001...0.0.0..0..0...0.1110...1..0000.0...11.000...011.001.111]

    5317:  !(FREE)
    PSCC-DC610A2:
            SETUP,  RETURN/SETBUSA610A2,                    !EXEC SUBR WHICH:
                                                            !(1) CSP(10)<3:0> -> PS[NZVC]
            NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> -> D[C]
    (5317)  DCS[0.00.0.0.0.0]  BM[0101..00.01..10.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.101.110]

    5320:  !(FREE)
    SETBUSA610A2:

            P2-T,   SR_CSPD(D06),                           !GET CONSTANT FOR A-SIDE WHEN CC SET
            NEXT,   J/DOIT610A2                             !
    (5320)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.1001...0..0000.0...11.000...011.010.001]

    5321:  !(FREE)
    DOIT610A2:
```

```
        SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                NOT-MODIFY-VBIT,                        !EXTRA CC ROM INPUT
        P2-T,   D_A-PLUS-B, SAVE-D[C],                  !D=(100000), D[C]=(0)
                BUS-A_SR,                               !A=(077600)
                BUS-B_BSPHI(C000200),                   !B=(000200)
        NEXT,   J/GETIT610A2                            !
 (5321) DCS[0.00.0.0.0.0]  BM[1001..01.11..00.00..010..111...0.1.0..0..1...0.0000...0..0000.0...11.000...011.010.010]

    5322: !(FREE)
    GETIT610A2:
        P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
        SETUP,  RETURN/SCOPE610A,                       !EXEC SUBR WHICH:
        NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> => SR<3:0>, J/BUT(SR3-0)
 (5322) DCS[0.00.0.0.0.0]  BM[0101..00.01..10.10..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.110.010]

    5323: !(FREE)
    SCOPE610A:
        P0,     BUMP-VERIFY,                            !COUNT
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST610B1" (+1, WORDS)
                J/TEST610B1                             !   ERROR:  "LOADIR610A1" (-15, WORDS)
 (5323) DCS[0.00.0.1.0.1]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000...101.011.011]

    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 610B1 ***

    5533:
    TEST610B1:
        P0,     LOAD-ENUA(ZTARGET413),                  !NZVC AFTER = "1011"
                LOAD-ERROR(TEST610B1),                  !ERROR DIRECTORY KEY
                DCS-CTR(C13.),                          !COMPARE AT TARGET
        NEXT,   J/LOADIR610B1                           !
 (5533) DCS[1.00.1.0.0.0]  BM[0010..00.11..11.00..001..011...0.0.0..0..0...0.0000...0..0000.0...11.000...101.011.100]

    5534:
    LOADIR610B1:
        P0,     BUMP-VERIFY,                            !COUNT
        P2-U,   IR_EMIT, EMIT/105300,                   !(105300)=DECB, CC-CLASS="101", BYTE-H
        NEXT,   J/LOAD01-610B1                          !
 (5534) DCS[0.00.0.0.0.1]  BM[1000..00.10..10.11..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...011.010.100]

    5324: !(FREE)
    LOAD01-610B1:
        P3,     CSPD[01]_EMIT, EMIT/100004,             !FOR D[C]=(1), PS[NZVC]="0100" PREVIOUSLY
```



```
        NEXT,   J/PSCC-DC610B1                          !
 (5324) DCS[0.00.0.0.0.0]  BM[1000..10.00..00.00..000..100...0.0.0..0..0...0.1110...1..0000.0...11.000...011.010.101]

    5325: !(FREE)
    PSCC-DC610B1:
        SETUP,  RETURN/SETBUSA610B1,                    !EXEC SUBR WHICH:
                                                        !(1) CSP(10)<3:0> => PS[NZVC]
        NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> => D[C]
 (5325) DCS[0.00.0.0.0.0]  BM[0101..00.01..10.10..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.101.110]

    5326: !(FREE)
    SETBUSA610B1:
        P2-T,   SR_BSPHI(C100000),                      !GET CONSTANT FOR A-SIDE WHEN CC SET
        NEXT,   J/DOIT610B1                             !
 (5326) DCS[0.00.0.0.0.0]  BM[1010..01.11..00.00..001..000...0.0.1..0..0...0.0000...0..0000.0...11.000...011.010.111]

    5327: !(FREE)
    DOIT610B1:
        SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                NOT-MODIFY-VBIT,                        !EXTRA CC ROM INPUT
        P2-T,   D_NOT-A-AND-B, SAVE-D[C],               !D=(000200), D[C]=(1)
                BUS-A_SR,                               !A=(100000)
                BUS-B_BSPHI(C000200),                   !B=(000200)
        NEXT,   J/GETIT610B1                            !
 (5327) DCS[0.00.0.0.0.0]  BM[0010..01.11..00.00..010..111...0.1.0..0..1...0.0000...0..0000.0...11.000...011.011.000]

    5330: !(FREE)
    GETIT610B1:
        P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
        SETUP,  RETURN/TEST610B2,                       !EXEC SUBR WHICH:
        NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> => SR<3:0>, J/BUT(SR3-0)
 (5330) DCS[0.00.0.0.0.0]  BM[0101..00.11..00.01..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.110.010]

    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 610B2 ***

    5612:
    TEST610B2:
        P0,     LOAD-ENUA(ZTARGET406),                  !NZVC AFTER = "0110"
                LOAD-ERROR(TEST610B2),                  !ERROR DIRECTORY KEY
                DCS-CTR(C14.),                          !COMPARE AT TARGET
        NEXT,   J/LOADIR610B2                           !
 (5612) DCS[1.00.1.0.0.0]  BM[0001..00.11..11.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.001]

    5331: !(FREE)
    LOADIR610B2:

        P0,     BUMP-VERIFY,                            !COUNT
        P2-U,   IR_EMIT, EMIT/005300,                   !(005300)=DEC, CC-CLASS="101", NOT-BYTE-H
        NEXT,   J/LOAD07-610B2                          !
```

```
(5331) DCS[0,00,0,0,0,1] BM[0000,,00,10,,10,11,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,011,011,010]

    5332: !(FREE)
    LOAD07-610B2:
            P3,     CSPD[07]_EMIT, EMIT/100200,             !A-SIDE DATA
            NEXT,   J/LOAD01-610B2                          !
(5332) DCS[0,00,0,0,0,0] BM[1000,,10,00,,00,10,,000,,000,,,0,0,0,,0,,0,,,0,1000,,,1,,0000,0,,,11,000,,,011,011,011]

    5333: !(FREE)
    LOAD01-610B2:
            P3,     CSPD[01]_EMIT, EMIT/000011,             !FOR D[C]=(0), PS[NZVC]="1001" PREVIOUSLY
            NEXT,   J/PSCC-DC610B2                          !
(5333) DCS[0,00,0,0,0,0] BM[0000,,10,00,,00,00,,001,,001,,,0,0,0,,0,,0,,,0,1110,,,1,,0000,0,,,11,000,,,011,011,100]

    5334: !(FREE)
    PSCC-DC610B2:
            SETUP,  RETURN/SETBUSA610B2,                    !EXEC SUBR WHICH:
                                                            !(1) CSP(10)<3:0> -> PS[NZVC]
            NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> -> D[C]
(5334) DCS[0,00,0,0,0,0] BM[0101,,00,01,,10,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,101,110]

    5335: !(FREE)
    SETBUSA610B2:
            P2-T,   SP_CSPD(D07),                           !GET CONSTANT FOR A-SIDE WHEN CC SET
            NEXT,   J/DOIT610B2                             !
(5335) DCS[0,00,0,0,0,0] BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,1000,,,0,,0000,0,,,11,000,,,011,011,110]

    5336: !(FREE)
    DOIT610B2:
            SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                    MODIFY-VBIT,                            !EXTRA CC ROM INPUT
            P2-T,   D_NOT-A-AND-B, SAVE-D[C],               !D=(000000), D[C]=(0)
                    BUS-A_SR,                               !A=(100200)
                    BUS-B_BSPHI(C000200),                   !B=(000200)
            NEXT,   J/GETIT610B2                            !
(5336) DCS[0,00,0,0,0,0] BM[0010,,01,11,,00,10,,010,,111,,,0,1,0,,0,,1,,,0,0000,,,0,,0000,0,,,11,000,,,011,011,111]

    5337: !(FREE)
    GETIT610B2:
            P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
            SETUP,  RETURN/SCOPE610B,                       !EXEC SUBR WHICH:
            NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> -> SR<3:0>, J/BUT(SR3-0)
(5337) DCS[0,00,0,0,0,0] BM[0101,,00,01,,11,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,110,010]



    5340: !(FREE)
    SCOPE610B:
            P0,     BUMP-VERIFY,                            !COUNT
            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST610C1" (+1, WORDS)
                    J/TEST610C1                             !   ERROR:  "LOADIR610B1" (-14, WORDS)
(5340) DCS[0,00,0,1,0,1] BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,011,101]
```



```









    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !*** TEST 610C1 ***

    5535:
    TEST610C1:
            P0,     LOAD-ENUA(ZTARGET407),                  !NZVC AFTER = "0111"
                    LOAD-ERROR(TEST610C1),                  !ERROR DIRECTORY KEY
                    DCS-CTR(C13,),                          !COMPARE AT TARGET
            NEXT,   J/LOADIR610C1                           !
(5535) DCS[1,00,1,0,0,0] BM[0010,,00,11,,11,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,101,100,100]

    5544:
    LOADIR610C1:
            P0,     BUMP-VERIFY,                            !COUNT
            P2-U,   IR_EMIT, EMIT/072000,                   !(072000)=ASH, CC-CLASS="111", NOT-BYTE-H
            NEXT,   J/LOAD01-610C1                          !
(5544) DCS[0,00,0,0,0,1] BM[0111,,00,01,,00,00,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,011,100,001]

    5341: !(FREE)
    LOAD01-610C1:
            P3,     CSPD[01]_EMIT, EMIT/100012,             !FOR D[C]=(1), PS[NZVC]="1010" PREVIOUSLY
            NEXT,   J/PSCC-DC610C1                          !
(5341) DCS[0,00,0,0,0,0] BM[1000,,10,00,,00,00,,001,,010,,,0,0,0,,0,,0,,,0,1110,,,1,,0000,0,,,11,000,,,011,100,010]

    5342: !(FREE)
    PSCC-DC610C1:
            SETUP,  RETURN/SETBUSA610C1,                    !EXEC SUBR WHICH:
                                                            !(1) CSP(10)<3:0> -> PS[NZVC]
            NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> -> D[C]
(5342) DCS[0,00,0,0,0,0] BM[0101,,00,01,,11,00,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,101,110]

    5343: !(FREE)
    SETBUSA610C1:
            P2-T,   SP_BSPHI(C000200),                      !GET CONSTANT FOR A-SIDE WHEN CC SET
            NEXT,   J/DOIT610C1                             !
(5343) DCS[0,00,0,0,0,0] BM[1010,,01,11,,00,00,,010,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,100,100]

    5344: !(FREE)
    DOIT610C1:
            SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                    NOT-MODIFY-VBIT,                        !EXTRA CC ROM INPUT
            P2-T,   D_A-XOR-B, SAVE-D[C],                   !D=(000000), D[C]=(1)
                    BUS-A_SR,                               !A=(000200)
                    BUS-B_BSPHI(C000200),                   !B=(000200)
```

```
15022            NEXT,   J/GETIT610C1                            !
     (5344)  DCS[0,00,0,0,0,0]  BM[0110,,01,11,,00,00,,010,,111...0,1,0,,0,,1...0,0000...0,,0000,0,,,11,000,,,011,100,101]
15023
15024     5345:  !(FREE)
15025     GETIT610C1:
15026            P2=T,   CLK=CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
15027            SETUP,  RETURN/TEST610C2,                       !EXEC SUBR WHICH:
15028            NEXT,   CALL[PSCCTOSR3=0]                       !  PS<3:0> -> SR<3:0>, J/BUT(SR3=0)
     (5345)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,00,,010,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,110,010]
15029
15030
15031
15032
15033     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15034
15035     !*** TEST 610C2 ***
15036
15037     5602:
15038     TEST610C2:
15039            P0,     LOAD=ENUA(ZTARGET401),                  !NZVC AFTER = "0001"
15040                    LOAD=ERROR(TEST610C2),                  !ERROR DIRECTORY KEY
15041                    DCS=CTR(C13,),                          !COMPARE AT TARGET
15042            NEXT,   J/LOAD05=610C2                          !
     (5602)  DCS[1,00,1,0,0,0]  BM[0010,,00,11,,11,00,,000,,001...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,011,100,110]
15043
15044     5346:  !(FREE)
15045     LOAD05=610C2:
15046            P0,     BUMP=VERIFY,                            !COUNT
15047            P3,     CSPD[05]_EMIT, EMIT/037777,             !A AND B SIDE DATA
15048            NEXT,   J/LOAD01=610C2                          !
     (5346)  DCS[0,00,0,0,0,1]  BM[0011,,10,11,,11,11,,111,,111...0,0,0,,0,,0...0,1010...1,,0000,0,,,11,000,,,011,100,111]
15049
15050     5347:  !(FREE)
15051     LOAD01=610C2:
15052            P3,     CSPD[01]_EMIT, EMIT/100014,             !FOR D[C]=(1), PS[NZVC]="1100" PREVIOUSLY
15053            NEXT,   J/PSCC=DC610C2                          !
     (5347)  DCS[0,00,0,0,0,0]  BM[1000,,10,00,,00,00,,001,,100...0,0,0,,0,,0...0,1110...1,,0000,0,,,11,000,,,011,101,000]
15054
15055     5350:  !(FREE)
15056     PSCC=DC610C2:
15057            SETUP,  RETURN/SETBUSA610C2,                    !EXEC SUBR WHICH:
15058                                                            !(1) CSPD[10]<3:0> -> PS[NZVC]
15059            NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP[10]<15> -> D[C]
     (5350)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,11,01,,001,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,101,110]
15060
15061     5351:  !(FREE)
15062     SETBUSA610C2:
15063            P2=T,   SR_CSPD(D05),                           !GET CONSTANT FOR A-SIDE WHEN CC SET
15064            NEXT,   J/DOIT610C2                             !
     (5351)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,0,1,,0,,0...0,1010...0,,0000,0,,,11,000,,,011,101,010]
15065
15066     5352:  !(FREE)
```



```
15067     DOIT610C2:
15068            SETUP,  SET=CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
15069                    NOT-MODIFY-VBIT,                        !EXTRA CD ROM INPUT
15070            P2=T,   D_A-PLUS-R, SAVE-D[C],                  !D=(077776), D[C]=(1)
15071                    BUS-A_SR,                               !A=(037777)
15072                    BUS-B_CSPD(D05),                        !B=(037777)
15073            NEXT,   J/GETIT610C2                            !
     (5352)  DCS[0,00,0,0,0,0]  BM[1001,,10,00,,00,00,,000,,111...0,1,0,,0,,1...0,1010...0,,0000,0,,,11,000,,,011,101,011]
15074
15075     5353:  !(FREE)
15076     GETIT610C2:
15077            P2=T,   CLK=CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
15078            SETUP,  RETURN/SCOPE610C,                       !EXEC SUBR WHICH:
15079            NEXT,   CALL[PSCCTOSR3=0]                       !  PS<3:0> -> SR<3:0>, J/BUT(SR3=0)
     (5353)  DCS[0,00,0,0,0,0]  BM[0101,,00,01,,11,01,,100,,111...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,100,,,001,110,010]
15080
15081
15082
15083     5354:  !(FREE)
15084     SCOPE610C:
15085            P0,     BUMP=VERIFY,                            !COUNT
15086            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST610D1" (+1, WORDS)
15087                    J/TEST610D1                             !   ERROR:  "LOADIR610C1" (-13, WORDS)
     (5354)  DCS[0,00,0,1,0,1]  BM[0000,,00,00,,00,00,,000,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,100,101]
15088
15089
15090
15091
15092
15093
15094
15095
15096     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15097
15098     !*** TEST 610D1 ***
15099
15100     5545:
15101     TEST610D1:
15102            P0,     LOAD=ENUA(ZTARGET410),                  !NZVC AFTER = "1000"
15103                    LOAD=ERROR(TEST610D1),                  !ERROR DIRECTORY KEY
15104                    DCS=CTR(C12,),                          !COMPARE AT TARGET
15105            NEXT,   J/LOAD01=610D1                          !
     (5545)  DCS[1,00,1,0,0,0]  BM[0011,,00,11,,11,00,,001,,000...0,0,0,,0,,0...0,0000...0,,0000,0,,,11,000,,,101,001,000]
15106
15107     5510:
15108     LOAD01=610D1:
15109            P3,     CSPD[01]_EMIT, EMIT/000005,             !FOR D[C]=(0), PS[NZVC]="0101" PREVIOUSLY
15110            NEXT,   J/PSCC=DC610D1                          !
     (5510)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,00,00,,000,,101...0,0,0,,0,,0...0,1110...1,,0000,0,,,11,000,,,011,101,101]
15111
15112     5355:  !(FREE)
15113     PSCC=DC610D1:
15114            SETUP,  RETURN/SETBUSA610D1,                    !EXEC SUBR WHICH:
```

```
                                                        !(1) CSP(10)<3:0> => PS[NZVC]
        NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> => D[C]
  (5355) DCS[0,00,0,0,0,0]  BM[0101,,00,01,,11,01,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,101,110]

   5356:  !(FREE)
   SETBUSA610D1:
        P2-T,   SR_CSPD(D06),                           !GET CONSTANT FOR A-SIDE WHEN CC SET
        NEXT,   J/DOIT610D1                             !
  (5356) DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,1001,,,0,,0000,0,,,11,000,,,011,101,111]

   5357:  !(FREE)
   DOIT610D1:
        SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                MODIFY-VBIT,                            !EXTRA CC ROM INPUT
        P2-T,   D_A-PLUS-B, SAVE-D[C],                  !D=(177400), D[C]=(0)
                BUS-A_SR,                               !A=(077600)
                BUS-B_CSPD(D06),                        !B=(077600)
        NEXT,   J/GETIT610D1                            !
  (5357) DCS[0,00,0,0,0,0]  BM[1001,,10,00,,00,10,,000,,111,,,0,1,0,,0,,1,,,0,1001,,,0,,0000,0,,,11,000,,,011,110,000]

   5360:  !(FREE)
   GETIT610D1:
        P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
        SETUP,  RETURN/TEST610D2,                       !EXEC SUBR WHICH:
        NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> => SR<3:0>, J/BUT(SR3-0)
  (5360) DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,10,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,110,010]



   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !*** TEST 610D2 ***

   5624:
   TEST610D2:
        P0,     LOAD-ENUA(ZTARGET410),                  !NZVC AFTER = "1000"
                LOAD-ERROR(TEST610D2),                  !ERROR DIRECTORY KEY
                DCS-CTR(C11.),                          !COMPARE AT TARGET
        NEXT,   J/PSCC-DC610D2                          !
  (5624) DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,00,,001,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,110,001]

   5361:  !(FREE)
   PSCC-DC610D2:
        SETUP,  RETURN/SETBUSA610D2,                    !EXEC SUBR WHICH:
                                                        !(1) CSP(10)<3:0> => PS[NZVC]
        NEXT,   CALL[SETUPPSCC#DC]                      !(2) CSP(10)<15> => D[C]
  (5361) DCS[0,00,0,0,0,0]  BM[0101,,00,01,,11,10,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,101,110]

   5362:  !(FREE)
   SETBUSA610D2:
        P2-T,   SR_BSPHI(C000200),                      !GET CONSTANT FOR A-SIDE WHEN CC SET
```



```
        NEXT,   J/DOIT610D2                             !
  (5362) DCS[0,00,0,0,0,0]  BM[1010,,01,11,,00,00,,010,,000,,,0,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,110,011]

   5363:  !(FREE)
   DOIT610D2:
        SETUP,  SET-CC,                                 !FOR CLOCKING CC-S IN NEXT UWORD
                NOT-MODIFY-VBIT,                        !EXTRA CC ROM INPUT
        P2-T,   D_NOT-A-AND-B, SAVE-D[C],               !D=(100000), D[C]=(0)
                BUS-A_SR,                               !A=(000200)
                BUS-B_CSPD(D07),                        !B=(100200)
        NEXT,   J/GETIT610D2                            !
  (5363) DCS[0,00,0,0,0,0]  BM[0010,,10,00,,00,00,,000,,111,,,0,1,0,,0,,1,,,0,1000,,,0,,0000,0,,,11,000,,,011,110,100]

   5364:  !(FREE)
   GETIT610D2:
        P2-T,   CLK-CC,                                 !PS[NZVC] GENERATED ABOVE LATCHED HERE
        SETUP,  RETURN/SCOPE610D,                       !EXEC SUBR WHICH:
        NEXT,   CALL[PSCCTOSR3-0]                       !  PS<3:0> => SR<3:0>, J/BUT(SR3-0)
  (5364) DCS[0,00,0,0,0,0]  BM[0101,,00,01,,11,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,001,110,010]



   5365:  !(FREE)
   SCOPE610D:
        P0,     BUSDIN_EMIT-[I],                        !RESET PROC UCONS
                EN-CLK-IR[15-00],                       !
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST620A" (+6. WORDS)
                J/TEST620A                              !   ERROR:  "LOAD01-610D1" (-10. WORDS)
  (5365) DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,101,001,001]







   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !        THESE TWO SUBROUTINES ARE USED IN THE ABOVE CC-LOGIC TESTS:

   7156:  !(FREE)
   SETUPPSCC#DC:
        P2-T,   D_CSPD(D01), D[C]_ALU15,                !SET D[C] FROM BIT<15>
        NEXT,   J/SETUPPSCC#DC02                        !
  (7156) DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,100,,,0,1,0,,0,,0,,,0,1110,,,0,,0000,0,,,11,000,,,001,110,001]

   7161:  !(FREE)
   SETUPPSCC#DC02:
        P2,     PS[3-0]_D[3-0]-[I],                     !SET PS[CC] FROM BIT<03:00>
                BUSDIN_PS-[I],                          !SETUP BUSDIN TO READ PS
        NEXT,   BUTA(RETURN),                           !AND RETURN
                J/BUTERROR7                             !ERROR IF HERE
  (7161) DCS[0,00,0,0,0,0]  BM[1000,,00,00,,10,01,,000,,000,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,111,,,011,111,110]
```

```
15207
15208
15209
15210
15211    7162:  ;(FREE)
15212    PSCCTOSR3=0:
15213            P3,     CSPD[03]_BUSDIN,                        ;GET ENABLED PS INTO CSP
15214            NEXT,   J/PSCCTOSR3=0AA                         ;
     (7162)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..000...0,0,0..0..0...0,1100...1..0000,0...11,000...001,110,011]
15215
15216    7163:  ;(FREE)
15217    PSCCTOSR3=0AA:
15218            P2=7,   SR_CSPD(D03),                           ;MOVE PS[CC] TO SR<3:0>
15219            NEXT,   J/PSCCTOSR3=0BB                         ;
     (7163)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,00..000..000...0,0,1..0..0...0,1100...0..0000,0...11,000...001,110,100]
15220
15221    7164:  ;(FREE)
15222    PSCCTOSR3=0BB:
15223            P0,     BUSDIN_EMIT=[I],                        ;RESET EMIT FOR CONSTANTS
15224                    EN-CLK-IR[15=00],                       ;AND IR LOADING
15225            NEXT,   J/BUTSR3=0                              ;AND GO TEST THE BITS
     (7164)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,01..000..100...0,0,0..0..0...1,1001...0..0000,0...11,000...010,111,110]
15226
15227
15228
15229
15230
15231    ;.PAGE==========================================================================================================
15232
15233
15234    .TOC    *    TEST620-624:  TESTING UBREAK AND JAMUPP
15235
15236    ;*****************************************************************************
15237    ;*
15238    ;*      TESTS:  620 - 624                               UWORDS: 101 + 133
15239    ;*
15240    ;*      FUNCTIONS:
15241    ;*
15242    ;*      THE FOLLOWING GROUP OF TEST FORCES A JAMUPP CONDITION VIA THE UBREAK FACILITY.
15243    ;*      TESTS ARE THEN PERFORMED ON JAMUPP RELATED SIDE EFFECTS:
15244    ;*
15245    ;*      ALL JAM CONDITION BITS CAN BE RESET; ACTIVE BUT RON, CSP WRITE BIT ARE CLEARED
15246    ;*      IN WORD WHICH JAM OCCURS; NON-INTERNAL-JAM IS SET; CUA IS LOCKED, UNLOCKED BY
15247    ;*      BUTA(TRACK); PREFETCH*JAM SET/CLEARED.
15248    ;*
15249    ;*****************************************************************************
15250
15251
15252
15253    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15254
15255    ;*** TEST 620 ***
15256
15257    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```



```
15258
15259    ;* PART A ***
15260    ;TEST-620-A DOES A 'CLR-JAM-ERRORS' UCON-I=0 FUNCTION, THEN CHECKS 'INIT JAM'=0
15261    5511:
15262    TEST620A:
15263            P0,     LOAD-ENUA(ZTARGET406),                  ;EXPECTED ADDRESS AFTER 'BUT'
15264                    LOAD-ERROR(TEST620A),                   ;ERROR DIRECTORY KEY
15265                    DCS-CTR(C5,),                           ;COMPARE AT TARGET
15266            NEXT,   J/BCERC620A                             ;
     (5511)  DCS[1,00,1,0,0,0]  BM[1010..00,11..11,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,000...101,111,000]
15267
15268    5570:
15269    BCERC620A:
15270            P0,     BUMP-VERIFY,                            ;COUNT
15271            P2,     CLR-JAM-ERRORS=[I],                     ;CLEAR OUT ERROR REGISTERS
15272            NEXT,   J/GOBUT620A                             ;
     (5570)  DCS[0,00,0,0,0,1]  BM[0100..00,00..10,00..000..000...0,0,0..0..0...1,1011...0..0000,0...11,000...011,110,110]
15273
15274    5366:  ;(FREE)
15275    GOBUT620A:
15276            SETUP,  RETURN/TEST620B,                        ;RETURN TO START OF NEXT SUBTEST
15277            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7,
15278                    J/BUTMINITJAM                           ;GO DO MULTIPLE 'BUT' ON INIT JAM
     (5366)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,10..011..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,011,110]
15279
15280
15281    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15282
15283    ;* PART B *
15284    ;TEST-620-B CHECKS THAT 'OTHER-JAM-H'=0 ALSO
15285    5623:
15286    TEST620B:
15287            P0,     LOAD-ENUA(ZTARGET401),                  ;BIT<01> CLEAR
15288                    LOAD-ERROR(TEST620B),                   ;ERROR DIRECTORY KEY
15289                    DCS-CTR(C3,),                           ;COMPARE AT TARGET
15290            NEXT,   J/GOBUT620B                             ;
     (5623)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..001...0,0,0..0..0...0,0000...0..0000,0...11,000...011,110,111]
15291
15292    5367:  ;(FREE)
15293    GOBUT620B:
15294            SETUP,  RETURN/TEST620C,                        ;RETURN TO START OF NEXT SUBTEST
15295            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE IS ON PAGE 7
15296                    J/BUTOTHERJAM                           ;GO DO BUT ON OTHER-JAM-H SIGNAL
     (5367)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,10..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,101,010]
15297
15298
15299    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15300
15301    ;* PART C *
15302    ;TEST-620-C CHECKS THAT STATUS MUX PORT 7 (JAM REG) READS (001000) WHEN RESET
15303    ;       "CLEAR-JAM-ERRORS" FUNCTION CLEARS BITS<15,13,11,8-2,0> OF JAM-REG
15304    ;       "CLR-YELLOW-ZONE" FUNCTION CLEARS BIT<12> OF JAM-REG
```

```
!       BIT<9> IS ACTIVE LOW, READS AS "1"H
!       BITS<10,1> READ "0" SINCE NO WCS PRESENT
!       BIT<14> IS "0" ALWAYS
5621:
TEST620C:
        P0,     LOAD-ENUA(ZTARGET402),              !SETUP FOR D<15:00>=0 TEST RESULT
                LOAD-ERROR(TEST620C),               !ERROR DIRECTORY KEY
                DCS-CTR(C11,),                      !COMPARE AT TARGET
        P3,     BUTA(CLR-FLAG-RES-UCON),            !PUT EMIT ONTO BUSDIN, CLEAR OUT I-O UCON
        NEXT,   J/MASK620C                          !
   (5621) DCS[1,00,1,0,0,0] BM[0100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,010,,,011,111,000]

5370: !(FREE)
MASK620C:
        P0,     BUMP-VERIFY,                        !COUNT
        P3,     CSPD[04]_EMIT,                      !DON'T NEED TO MASK ANYTHING
        EMITC,  EMIT/177777,                        !
        NEXT,   J/GETJAM620C                        !
   (5370) DCS[0,00,0,0,0,1] BM[1111,,10,11,,11,11,,111,,111,,,0,0,0,,0,,0,,,0,1011,,,1,,0000,0,,,11,000,,,011,111,001]

5371: !(FREE)
GETJAM620C:
        SETUP,  RETURN/TEST621A,                    !GO EXECUTE SUBR WHICH:
        P0,     BUMP-VERIFY,                        !COUNT
        NEXT,   CALL[CLRJAMTOD]                     !  (JAMREG)-XOR-CSP(02)/(001000) => D, BUT(D=ZERO)
   (5371) DCS[0,00,0,0,0,1] BM[0101,,00,11,,00,01,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,101]





! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

!*** TEST 621 ***
!CAUSE A MICROBREAK JAM, AND CHECK ALL THE APPROPRIATE SIGNALS ARE SET

!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!* PART A *
!TEST-621-A CAUSES A MICROBREAK JAM AT A SPECIFIC MICROADDRESS, AND CHECKS
!THAT THE MICROCODE JAMS TO LOCATION (4777) IMMEDIATELY
5617:
TEST621A:
        P0,     LOAD-ENUA(4777),                    !SETUP JAMUPP ADDRESS
                LOAD-ERROR(TEST621A),               !ERROR DIRECTORY KEY
                DCS-CTR(C9,),                       !COMPARE AT JAMUPP WORD
        P3,     BUTA(CUA-TRACK),                    !RESET CUA TRACKING IF HASN'T BEEN
        NEXT,   J/CSP1L621A                         !
   (5617) DCS[1,00,1,0,0,0] BM[0110,,00,10,,01,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,001,,,011,111,010]

5372: !(FREE)
CSP1L621A:
        P0,     BUMP-VERIFY,                        !COUNT
```



```
        EMITC,  EMIT/100377,                        !
        P2-U,   IR_EMIT,                            !A BRANCH INSTR, SO 'PREFETCH H' = "0"
        P3,     CSPD[05]_EMIT,                      !FLAG<8>="1", FOR UBREAK EN; EXFLAG<2:1>="11", FOR ACTIVE BUT TEST
        NEXT,   J/SETBRK621A                        !BIT00="1", FOR JAMUPP ROUTINE
   (5372) DCS[0,00,0,0,0,1] BM[1000,,10,00,,00,11,,111,,111,,,0,0,0,,0,,0,,,1,1010,,,1,,0000,0,,,11,000,,,011,111,011]
                                                    !NOTE CSPADDR(05)/UCON-OPERATION BIT OVERLAP

5373: !(FREE)
SETBRK621A:
        SELECT, UCON-PROC,                          !PROCESSOR UCON:
        ENABLE, EN-CLK-UBREAK[11-00],               !  FOR UBREAK REG LOAD
                BUSDIN_EMIT[15-00],                 !  AND KEEP EMIT ON BUSDIN
        P0,     SET-UCON-CONTROL,                   !WRITE UCON REGISTER
        NEXT,   J/LODBRK621A                        !
   (5373) DCS[0,00,0,0,0,0] BM[0000,,01,00,,00,01,,000,,000,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,011,111,100]

5374: !(FREE)
LODBRK621A:
        P2-T,   SR_ZERO,                            !ZERO SR<00>, TO PREVENT SPURIOUS UBREAKS FROM GETTING THRU
                UBREAK_BUSDIN[11-00],               !LOAD MICROBREAK REGISTER
                EMITNL/5522,                        !  WITH SELECTED ADDRESS FROM EMIT
        NEXT,   J/SETRET621A                        !
   (5374) DCS[0,00,0,0,0,0] BM[0011,,00,10,,11,01,,010,,010,,,0,0,1,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,011,111,101]

5375: !(FREE)
SETPFT621A:
        P0,     BUMP-VERIFY,                        !COUNT
        P3,     CSPD[00]_EMIT, RETURN/TEST621B,     !RETURN ADDRESS FOR AFTER JAMUPP
        NEXT,   J/SETFLG621A                        !
   (5375) DCS[0,00,0,0,0,1] BM[0101,,10,11,,00,01,,011,,000,,,0,0,0,,0,,0,,,0,1111,,,1,,0000,0,,,11,000,,,011,111,111]

5377: !(FREE)
SETFLG621A:
        P2-T,   D_CSPD(D05), D[C]_0,                !GET VALUES TO LOAD INTO FLAGS
        P3,     ASPHI[16]_D,                        !  AND SAVE IN ASP FOR COMPARE LATER
        NEXT,   J/LODFLG621A                        !
   (5377) DCS[0,00,0,0,0,0] BM[1010,,10,00,,00,00,,011,,000,,,0,1,0,,0,,0,,,0,1010,,,0,,1001,0,,,11,000,,,100,000,000]

5400: !(FREE)
LODFLG621A:
        P0,     BUSDIN_EMIT-[I],                    !KEEP IT ON
                BUMP-VERIFY,                        !COUNT
        P3,     FLAG[8-0]_D[15-8]-[I],              !ENABLE U-BREAK, FLAG 8; SET EXFLAGS FOR LATER
        NEXT,   J/SETSR621A                         !
   (5400) DCS[0,00,0,0,0,1] BM[0000,,00,00,,00,01,,000,,001,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,100,000,001]


5401: !(FREE)
SETSR621A:
        P2-T,   SR_CSPD(D05),                       !MAKE SR<00>=1, FOR JAMUPP EXPECTED
        NEXT,   J/UBRK621A                          !(FOR UBREAK JAM EXPECTED)
   (5401) DCS[0,00,0,0,0,0] BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,1010,,,0,,0000,0,,,11,000,,,101,010,010]

5522:
UBRK621A:                                           !*** MICROBREAK HERE ***
```

```
15401           P3-T,   D_ZERO, D[C]_ALU;5,                     !UWORD LATCH FOR CLK-D NOT CLEARED, CLK-D SHOULD HAPPEN
15402                   BUTA(CLR-FLAG-RES-UCON),                !JAMUPP CLEAR SHOULD ZAP ACTIVE BUT LATCH, BUTA(CLR-,..) SHOULDN'T H
15403                                                           !CUA GETS LOCKED WITH UADDR OF THIS UWORD (5522) ON JAMUPP
15404                                                           !PREFETCH=JAM(1)H GETS PREFETCH=H (="0") AT JAMUPP
15405           P3,     CSPD[05]_EMIT, EMIT/030004,             !LATCH HOLDING "WRCSP" BIT SHOULD GET ZAPPED ON JAMUPP,
15406                                                           !  THIS WRITE SHOULDN'T HAPPEN
15407           NEXT,   J/ERROR621A                             !THIS UPF SHOULD NOT BE USED
     (5522)  DCS[0,00,0,0,0,0]  BM[0011..10,00,.00,00,.000..100...1,1,0..0..0...0,1010...1..0000,0...11,010...110,001,101]
15408
15409
15410   !(4777)  JAMUPP001:  ***COMPARE ENABLED ABOVE DONE HERE***
15411   !               THIS WORD TESTS SR<00>, WHICH SHOULD BE SET
15412   !               IF SR<00>=1, GOTO(JAMUPP002B), IF SR<00>=0, GOTO(JAMUPP003) (ERROR)
15413   !               P3-T,   SR_D    SAVE OLD D IN SR, FOR NOW
15414   !
15415   !(4757)  JAMUPP002B:  P2-T,  D_CSPD(00)         GET RETURN ADDRESS INTO D
15416   !
15417   !(4XXX)  JAMUPP002C:  P0,    RETURN_D  LOAD RETURN ADDRESS
15418   !                     P2-T,  D_SR      RESTORE OLD D FROM SR
15419   !
15420   !(7XXX)  JAMUPP002D:  P2-T,  SR_ZERO,  ZERO OUT SR, JAMUPPS NOW ILLEGAL
15421   !                     NEXT,  BUTA(RETURN)       AND NOW RETURN
15422   !
15423
15424   !EXECUTE THE FOLLOWING WORD ONLY IF NO JAMUPP OCCURRED:
15425   5615:
15426   ERROR621A:
15427           P0,     LOAD=ENUA(0000),                        !FORCE ERROR
15428                   LOAD=ERROR(ERROR621A),                  !ERROR DIRECTORY KEY
15429                   DCS=CTR(C0,),                           !FORCE COMPARE AT P3-T
15430                   BUMP=VERIFY,                            !COUNT
15431           NEXT,   J/TEST621B                              !
     (5615)  DCS[1,00,1,0,0,1]  BM[1111..00,00,.00,00,.000..000...0,0,0..0..0...0,0000...0..0000,0...11,000...110,001,011]
15432
15433
15434   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15435
15436   !* PART B *
15437   !TEST-621-B CHECKS THAT D WAS ZEROED; IE, P3 PULSE WAS SUPPRESSED IN JAM WORD,
15438   !  BUT UWORD LATCH FOR CLK-D BIT NOT ZAPPED, SO BIT WAS SAVED FOR EXECUTE LATER
15439   5613:
15440   TEST621B:
15441           P0,     LOAD=ENUA(ZTARGET402),                  !SETUP FOR D = ZERO TEST
15442                   LOAD=ERROR(TEST621B),                   !ERROR DIRECTORY KEY
15443                   DCS=CTR(C3,),                           !COMPARE AT TARGET
15444           NEXT,   J/GOBUT621B                             !
     (5613)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...100,000,010]
15445
15446   5402:  !(FREE)
15447   GOBUT621B:
15448           SETUP,  RETURN/TEST621C,                        !RETURN TO START OF NEXT SUBTEST
15449           NEXT,   GOTO=PAGE(7),                           !BUT TABLE ON PAGE 7
15450                   J/BUTD=IS=ZERO                          !BUT ON D CONTENTS
```



```
     (5402)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,01..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,100,001]
15451
15452
15453   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15454
15455   !* PART C *
15456   !TEST-621-C CHECKS THAT 'INIT JAM' STILL OFF
15457   5611:
15458   TEST621C:
15459           P0,     LOAD=ENUA(ZTARGET406),                  !BIT<00> CLEAR
15460                   LOAD=ERROR(TEST621C),                   !ERROR DIRECTORY KEY
15461                   DCS=CTR(C4,),                           !COMPARE AT TARGET
15462           NEXT,   J/GOBUT621C                             !
     (5611)  DCS[1,00,1,0,0,0]  BM[1011..00,11..11,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,000...100,000,011]
15463
15464   5403:  !(FREE)
15465   GOBUT621C:
15466           SETUP,  RETURN/TEST621D,                        !RETURN TO START OF NEXT SUBTEST
15467           NEXT,   GOTO=PAGE(7),                           !BUT TABLE ON PAGE 7
15468                   J/BUTMINITJAM                           !GO TEST INIT JAM
     (5403)  DCS[0,00,0,0,0,0]  BM[0101..00,11..00,00..111..111...0,0,0..0...0,0000...0..0000,0...11,100...011,011,110]
15469
15470
15471   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15472
15473   !* PART D *
15474   !TEST-621-D CHECKS THAT 'OTHER-JAM-H'=1, WAS SET FOR UBREAK
15475   5607:
15476   TEST621D:
15477           P0,     LOAD=ENUA(ZTARGET403),                  !BIT<01> SET
15478                   LOAD=ERROR(TEST621D),                   !ERROR DIRECTORY KEY
15479                   DCS=CTR(C3,),                           !COMPARE AT TARGET
15480           NEXT,   J/GOBUT621D                             !
     (5607)  DCS[1,00,1,0,0,0]  BM[1100..00,11..11,00..000..011...0,0,0..0..0...0,0000...0..0000,0...11,000...100,000,100]
15481
15482   5404:  !(FREE)
15483   GOBUT621D:
15484           SETUP,  RETURN/TEST621E,                        !RETURN TO START OF NEXT SUBTEST
15485           P0,     BUMP=VERIFY,                            !COUNT
15486           NEXT,   GOTO=PAGE(7),                           !BUT TABLE ON PAGE 7
15487                   J/BUTOTHERJAM                           !GO TEST 'OTHER-JAM-H' IS SET
     (5404)  DCS[0,00,0,0,0,1]  BM[0101..00,11..00,00..101..111...0,0,0..0...0,0000...0..0000,0...11,100...011,101,010]
15488
15489
15490   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15491

15492   !* PART E *
15493   !TEST-621-E CHECKS UBREAK ONLY BIT SET FROM UBREAK JAMUPP IN STATUS MUX PORT 2 (JAM REG)
15494   5605:
15495   TEST621E:
15496           P0,     LOAD=ENUA(ZTARGET402),                  !SETUP FOR D = ZERO COMPARE
15497                   LOAD=ERROR(TEST621E),                   !ERROR DIRECTORY KEY
```

```
15498                   DCS-CTR(C10.),                          ;COMPARE AT TARGET
15499           NEXT,   J/EXPEC621E                             !
      (5604)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,,0,,0000,,,0,,0000,0,,,11,000,,,100,000,101]
15500
15501     5405:  1(FREE)
15502     EXPEC621E:
15503           P3,     CSPD[02]_EMIT,                          ;WHAT WE EXPECT TO SEE IN JAM IS:
15504           EMITC,  EMIT/001001,                            ;  (001001),  UBREAK H IN BIT00
15505           NEXT,   J/GETJAM621E                            !
      (5405)  DCS[0,00,0,0,0,0]  BM[0000,,10,00,,10,00,,000,,001...0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,000,110]
15506
15507     5406:  1(FREE)
15508     GETJAM621E:
15509           SETUP,  RETURN/TEST621F,                        ;GO TO SUBR WHICH:
15510           NEXT,   CALL[JAMTOD]                            ;  (JAMREG)-XOR-CSP(02) => D, BUT(D=ZERO)
      (5406)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,00,,011,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,110]
15511
15512
15513
15514     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15515
15516     !* PART F *
15517     !TEST-621-F CHECKS THAT THE RIGHT CUA WAS LOCKED, AND SHORT TERM FLAGS NOT CLEARED (IE,
15518     !  BUTA(CLR-FLAG-...) IN UBREAK WORD DIDN'T CLEAR EXFLAG1), INDICATING JAMUPP CLEAR L
15519     !  DID IN FACT ZAP THE ACTIVE BUT ROM LATCH.  ALSO PREFETCH*JAM(1)H GETS PREFETCH-H="0".
15520     5603:
15521     TEST621F:
15522           P0,     LOAD-ENUA(ZTARGET402),                   ;SETUP FOR D = ZERO COMPARE
15523                   LOAD-ERROR(TEST621F),                   ;ERROR DIRECTORY KEY
15524                   DCS-CTR(C10.),                          ;COMPARE AT TARGET
15525           NEXT,   J/EXPEC621F                             !
      (5603)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,000,111]
15526
15527     5407:  1(FREE)
15528     EXPEC621F:
15529           P0,     BUMP-VERIFY,                            ;COUNT
15530           P3,     CSPD[02]_EMIT,                          ;(USE MASK OF ALL 1'S FROM BEFORE)
15531           EMITC,  EMIT/055226,                            ;WHAT THE CUA-EXFLAG-FOVP PORT OF HBMUX SHOULD BE
15532           NEXT,   J/GETCUA621F                            ;CUA=(55221), EXFLAG<2:1>="11", PREFETCH*JAM(1)H="0"
      (5407)  DCS[0,00,0,0,0,1]  BM[0101,,10,10,,10,10,,010,,110...0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,001,000]
15533
15534     5410:  1(FREE)
15535     GETCUA621F:
15536           SETUP,  RETURN/TEST621G,                        ;GO TO SUBR WHICH:
15537           P0,     BUMP-VERIFY,                            ;COUNT
15538           NEXT,   CALL[CUATOD]                            ;  (CUA)-XOR-CSP(02) -> D, BUT(D=ZERO)
      (5410)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,11,10,,110,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,111]
15539
15540
15541
15542
15543
```



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15544
15545     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15546
15547     !* PART G *
15548     !TEST-621-G CHECKS THAT 'PREFETCH*JAM(1)H' GOT 'PREFETCH-H'="0" AFTER JAMUPP
15549     5766:
15550     TEST621G:
15551           P0,     LOAD-ENUA(ZTARGET401),                   ;BIT01 CLEAR
15552                   LOAD-ERROR(TEST621G),                   ;ERROR DIRECTORY KEY
15553                   DCS-CTR(C3,),                           ;COMPARE AT TARGET
15554           NEXT,   J/GOBUT621G                             !
      (5766)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,001...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,001]
15555
15556     5411:  1(FREE)
15557     GOBUT621G:
15558           SETUP,  RETURN/TEST621H,                        ;RETURN TO START OF NEXT SUBTEST
15559           P0,     BUMP-VERIFY,                            ;COUNT
15560           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE ON PAGE 7
15561                   J/BUTPREFETCHJAM                        ;PREFETCH*JAM(1)H IN BIT01
      (5411)  DCS[0,00,0,0,0,1]  BM[0101,,00,11,,11,01,,100,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,110,000]
15562
15563
15564
15565
15566     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15567
15568     !* PART H *
15569     !TEST-G21-H CHECKS THAT CSP(05) DID NOT GET WRITTEN IN THE JAMMED WORD ABOVE,
15570     !  AND IS IN FACT, EQUAL TO THE SAVED COPY OF ITS CONTENTS, IN ASPHI[16]
15571     5754:
15572     TEST621H:
15573           P0,     LOAD-ENUA(ZTARGET402),                   ;SETUP FOR D=ZERO COMPARE
15574                   LOAD-ERROR(TEST621H),                   ;ERROR DIRECTORY KEY
15575                   DCS-CTR(C4,),                           ;COMPARE AT TARGET
15576                   BUMP-VERIFY,                            ;COUNT
15577           NEXT,   J/COMP621H                              !
      (5754)  DCS[1,00,1,0,0,1]  BM[1011,,00,11,,11,00,,000,,010...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,010]
15578
15579     5412:  1(FREE)
15580     COMP621H:
15581           P2=T,   D_CSPD[05]-XOR-ASPHI(R16),               ;COMPARE CURRENT:SAVED, SHOUL BE SAME
15582           NEXT,   GOTO-PAGE(7),                           ;XFER
15583                   J/GOBUT621H                             !
      (5412)  DCS[0,00,0,0,0,0]  BM[0110,,10,00,,11,00,,011,,111...0,1,0,,0,,0,,,0,1010,,,0,,0000,0,,,11,100,,,001,110,000]
15584
15585     7160:  1(FREE)

15586     GOBUT621H:
15587           SETUP,  RETURN/TEST622A,                        ;RETURN TO START OF NEXT SUBTEST
15588           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE ON PAGE 7
15589                   J/BUTD-IS-ZERO                          ;TEST FOR EQUALITY
      (7160)  DCS[0,00,0,0,0,0]  BM[0101,,00,11,,00,00,,001,,111...0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]
15590
```

```


        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 622 ***
        !DO A 'CLR-JAM-ERRORS' FUNCTION TO CLEAR OUT SET BITS
        !MAKE SURE THAT 'START-DELAY', 'CLR-NPR-TIMEOUT' DON'T CLEAR THEM

        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !* PART A *
        !TEST-622-A CHECKS THAT 'START-DELAY', 'CLR-NPR-TIMEOUT' DON'T AFFECT
        !THE 'CLR-JAM-ERRORS' FUNCTION'
        5601:
        TEST622A:
                P0,     LOAD-ENUA(ZTARGET403),                          !SETUP FOR BUT ON 'OTHER-JAM-H'= (1)
                        LOAD-ERROR(TEST622A),                           !ERROR DIRECTORY KEY
                        DCS-CTR(C5,),                                   !COMPARE AT TARGET
                NEXT,   J/BC1FCN622A                                    !
     (5601)  DCS[1,00,1,0,0,0]  BM[1010,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,011]

        5413:  !(FREE)
        BC1FCN622A:
                P0,     BUMP-VERIFY,                                    !COUNT
                P2,     START-DELAY-[I],                                !DO A 'START-DELAY'
                NEXT,   J/CNST0622A                                     !
     (5413)  DCS[0,00,0,0,0,1]  BM[0100,,00,00,,01,00,,000,,000,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,100,001,100]

        5414:  !(FREE)
        CNST0622A:
                P2,     CLR-NPR-TIMEOUT-[I],                            !DO A 'CLR-NPR-TIMEOUT'
                NEXT,   J/GOBUT622A                                     !NEITHER OF THESE SHOULD ASSERT 'CLR-JAM-ERRORS'
     (5414)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,11,00,,000,,000,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,100,001,101]

        5415:  !(FREE)
        GOBUT622A:
                SETUP,  RETURN/TEST622B,                                !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                                   !BUT TABLE ON PAGE 7
                        J/BUTOTHERJAM                                   !TEST 'OTHER-JAM-H' STILL SET
     (5415)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,11,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,101,010]



        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !* PART B*
        !TEST-622-B NOW CHECKS THAT 'CLR-JAM-ERRORS' DOES JUST THAT
        5577:
        TEST622B:
                P0,     LOAD-ENUA(ZTARGET401),                          !SETUP FOR BUT ON 'OTHER-JAM-H'=(0)
                        LOAD-ERROR(TEST622B),                           !ERROR DIRECTORY KEY
                        DCS-CTR(C4,),                                   !COMPARE AT TARGET
                NEXT,   J/BCERC622B                                     !
     (5577)  DCS[1,00,1,0,0,0]  BM[1011,,00,11,,11,00,,000,,001,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,001,110]
```



```

        5416:  !(FREE)
        BCERC622B:
                P2,     CLR-JAM-ERRORS-[I],                             !DO IT
                NEXT,   J/GOBUT622B                                     !
     (5416)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,10,00,,000,,000,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,100,001,111]

        5417:  !(FREE)
        GOBUT622B:
                SETUP,  RETURN/TEST622C,                                !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                                   !BUT TABLE ON PAGE 7,
                        J/BUTOTHERJAM                                   !TEST 'OTHER-JAM-H' NOW CLEAR
     (5417)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,11,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,101,010]


        !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

        !* PART C *
        !TEST-622-C TESTS THAT STATUS MUX PORT 2 (JAM REG) READS (001000) WHEN RESET
        5575:
        TEST622C:
                P0,     LOAD-ENUA(ZTARGET402),                          !SETUP FOR D = ZERO TEST
                        LOAD-ERROR(TEST622C),                           !ERROR DIRECTORY KEY
                        DCS-CTR(C10,),                                  !COMPARE AT TARGET
                P3,     BUTA(CLR-FLAG-RES-UCON),                        !PUT EMIT ON BUSDIN, CLEAR SHORT TERM FLAGS
                NEXT,   J/GETJAM622C                                    !
     (5575)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,010,,,100,010,000]

        5420:  !(FREE)
        GETJAM622C:
                SETUP,  RETURN/TEST623,                                 !GO TO SUBR WHICH:
                NEXT,   CALL[CLRJAMTOD]                                 !  (JAMREG)-XOR-CSP(02)/(001000) -> D, BUT(D=ZERO)
     (5420)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,11,11,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,101]







        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !*** TEST 623 ***
        !TEST-623 CHECKS THAT BUTA(CUA-TRACK) RESTARTS CUA TRACKING
        5573:
        TEST623:

                P0,     LOAD-ENUA(ZTARGET402),                          !SETUP FOR D = ZERO TEST
                        LOAD-ERROR(TEST623),                            !ERROR DIRECTORY KEY
                        DCS-CTR(C10,),                                  !COMPARE AT TARGET
                P3,     BUTA(CUA-TRACK),                                !RESET TO TRACKING CUA MODE
                NEXT,   J/EXPEC623                                      !
     (5573)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,001,,,100,010,001]
```

```
15686
15687    5421:  ;(FREE)
15688    EXPEC623:
15689            P0,     BUMP-VERIFY,                            ;COUNT
15690            P3,     CSPD[02]_EMIT,                          ;(PREV MASK)
15691            EMITC,  EMIT/073734,                            ;CUA IS WORD WHICH LOADS CUA INTO CSP, ONLY
15692            NEXT,   J/GETCUA623                             ;  EXFLG<1> CLEARED FROM BUTA(CLR=FLAG=...), ABOVE
     (5421)  DCS[0,00,0,0,0,1]  BM[0111,,10,01,,11,11,,011,,100...0,0,0,,0,,0,,0...0,1101...1,,0000,0...11,000,,,100,010,010]
15693
15694    5422:  ;(FREE)
15695    GETCUA623:
15696            SETUP,  RETURN/SCOPE623,                        ;GO TO SUBR WHICH:
15697                                                            ;  CUA=(WORD WHICH READS CUA), SINCE TRACKING RESET
15698            NEXT,   CALL[CUATOD]                            ;  (CUA)=XOR-CSP(02) -> D, BUT(D=ZERO)
     (5422)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,00,10,,011,,111...0,0,0,,0,,0,,0...0,0000,,,0,,0000,0...11,100,,,010,101,111]
15699
15700
15701    5423:  ;(FREE)
15702    SCOPE623:
15703            P0,     BUSDIN_EMIT-[I],                        ;RESET PROC UCONS
15704                    EN-CLK-IR[15-00],                       ;IR GETS JUNK, BUT DON'T CARE
15705            P3,     FLAG[8-0]_D[15-8]-[I],                  ;RESET FLAGS TO ALL ZERO
15706            NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST624A" [+1, WORDS]
15707                    J/TEST624A                              ;   ERROR:  "BCERC620A" [-49, WORDS]
     (5423)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,01,,000,,101...0,0,0,,0,,0,,1,1011...0,,0000,0...11,000,,,101,111,001]
15708
15709
15710
15711
15712
15713    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15714
15715    ;*** TEST 624 ***
15716    ;DO ANOTHER UBREAK JAM, CHECK JAM OCCURS, AND THAT P2 IS SEEN IN JAM WORD
15717
15718    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15719
15720    ;* PART A *
15721    ;TEST-624-A CAUSES A UBREAK JAM, AND CHECKS TO SEE IT OCCURS
15722
15723    5571:
15724    TEST624A:
15725            P0,     LOAD-ENUA(4777),                        ;SETUP JAMUPP ADDRESS
15726                    LOAD-ERROR(TEST624A),                   ;ERROR DIRECTORY KEY
15727                    DCS-CTR(C9,),                           ;COMPARE AT JAMUPP WORD
15728            NEXT,   J/LODIR624A                             ;
     (5571)  DCS[1,00,1,0,0,0]  BM[0110,,00,10,,01,11,,111,,111...0,0,0,,0,,0,,0,0000...0,,0000,0...11,000,,,101,110,010]
15729
15730    5562:
15731    LODIR624A:
15732            P2-U,   IR_EMIT,                                ;IR PATTERN ASSERTS PREFETCH-H:
15733                    EMIT/030603,                            ;  PREFETCH-H=(DOPH*MOVBL*SMOH*SR7L*DMOH*DR7L)
15734            P3,     FLAG[8-0]_D[15-8],                      ;FLAGS OF D, WHICH IS ZERO
```



```
15735            NEXT,   J/SETBRK624A                            ;       + (SOPH*NEGL*SBCL*RORL*ASRL*DMOH*DR7L)
     (5562)  DCS[0,00,0,0,0,0]  BM[0011,,00,00,,01,10,,000,,011...0,0,0,,0,,0,,1,1010...0,,0000,0...11,000,,,100,010,100]
15736
15737    5424:  ;(FREE)
15738    SETBRK624A:
15739            SELECT, UCON-PROC,                              ;ENABLE PROCESSOR UCON:
15740            ENABLE, EN-CLK-UBREAK[11-00],                   ;  EN UBREAK LOAD,
15741                    BUSDIN_EMIT[15-00],                     ;  KEEP EMIT ON BUSDIN
15742            P0,     SET-UCON-CONTROL,                       ;WRITE CONTROLS
15743                    BUMP-VERIFY,                            ;COUNT
15744            NEXT,   J/LODBRK624A                            ;
     (5424)  DCS[0,00,0,0,0,1]  BM[0000,,01,00,,00,01,,000,,000...0,0,0,,0,,0,,1,1001...0,,0000,0...11,000,,,100,010,101]
15745
15746    5425:  ;(FREE)
15747    LODBRK624A:
15748            P0,     BUMP-VERIFY,                            ;COUNT
15749            P2-T,   UBREAK_BUSDIN[11-00],                   ;LOAD UBREAK REGISTER
15750                    EMITML/6255,                            ;  WITH SELECTED ADDRESS FROM EMIT
15751            NEXT,   J/SETRET624A                            ;
     (5425)  DCS[0,00,0,0,0,1]  BM[0000,,00,11,,00,10,,101,,101...0,0,0,,0,,0,,1,1010...0,,0000,0...11,000,,,100,010,110]
15752
15753    5426:  ;(FREE)
15754    SETRET624A:
15755            P3,     CSPD[00]_EMIT, RETURN/TEST624B,         ;RETURN ADDRESS FOR AFTER JAMUPP
15756            NEXT,   GOTO-PAGE(6),                           ;  RETURN TO START OF NEXT SUBTEST
15757                    J/SETD624A                              ;
     (5426)  DCS[0,00,0,0,0,0]  BM[0101,,10,10,,11,10,,101,,110...0,0,0,,0,,0,,0,1111...1,,0000,0...11,100,,,011,000,110]
15758
15759    6306:  ;(FREE)
15760    SETD624A:
15761            P2-T,   D_CSPD(D05), D[C]_ALU15,                ;SETUP D WITH VALUE TO GO INTO FLAGS<8:0>
15762            NEXT,   J/SETFLG624A                            ;
     (6306)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,100...0,1,0,,0,,0,,0,1010...0,,0000,0...11,000,,,100,101,011]
15763
15764    6453:  ;(FREE)
15765    SETFLG624A:
15766            P0,     BUSDIN_EMIT-[I],                        ;KEEP IT ON
15767            P3,     FLAG[8-0]_D[15-8]-[I],                  ;SET UBRK FLAG<8>
15768            NEXT,   J/SETSR624A                             ;
     (6453)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,001...0,0,0,,0,,0,,1,1011...0,,0000,0...11,000,,,100,101,100]
15769
15770    6454:  ;(FREE)
15771    SETSR624A:
15772            P2-T,   SR_CSPD(D05),                           ;SET SR<00>=1 FOR UBRK JAMUPP EXPECTED
15773            NEXT,   J/UBRK624A                              ;
     (6454)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,0,1,,0,,0,,0,1010...0,,0000,0...11,000,,,010,101,101]
15774
15775    6255:
15776    UBRK624A:                                               ;*** MICROBREAK HERE ***
15777            P2-T,   D_ZERO, D[C]_ALU15,                     ;P2 PULSE SHOULD OCCUR, SO D SHOULD BE ZEROED,
15778                                                            ;CUA GETS LOCKED WITH UADDR OF THIS UWORD (6255) ON JAMUPP
15779                                                            ;PREFETCH*JAM(1)H GETS PREFETCH-H (="1") AT JAMUPP
```

```
        P3,     FLAG[8-0]_D[15-8],                          !ZERO ALL THE FLAGS IN THIS UWORD, THE UBREAK SHOULD
                                                            !STILL OCCUR, HOWEVER, AS IT LOOKS AT THE 'NUA',
        NEXT,   J/ERROR624A                                 !UPF SHOULD NOT BE USED,
 (6255) DCS[0,00,0,0,0,0]  BM[0011,,00,00,,00,00,,000,,100,,,0,1,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,101,110,111]


   !(4777)  JAMUPP001:  ***COMPARE ENABLED ABOVE DONE HERE***
   !                THIS WORD TESTS SR<00>, WHICH SHOULD BE SET
   !                IF SR<00>=1, GOTO(JAMUPP002B), IF SR<00>=0, GOTO(JAMUPP003) (ERROR)
   !                P3-T,   SR_D    SAVE OLD D IN SR, FOR NOW
   !
   !(4757)  JAMUPP002B:  P2-T,  D_CSPD(00)        GET RETURN ADDRESS INTO D
   !
   !(4XXX)  JAMUPP002C:  P0,    RETURN_D  LOAD RETURN ADDRESS
   !                    P2-T,  D_SR      RESTORE OLD D FROM SR
   !
   !(7XXX)  JAMUPP002D:  P2-T,  SR_ZERO,  ZERO OUT SR, JAMUPPS NOW ILLEGAL
   !                    NEXT,  BUTA(RETURN)      AND NOW RETURN
   !



   !EXECUTE THE FOLLOWING WORD ONLY IF NO JAMUPP OCCURRED:
   6567:
   ERROR624A:
        P0,     LOAD-ENUA(0005),                            !FORCE ERROR
                LOAD-ERROR(ERROR624A),                      !ERROR DIRECTORY KEY
                DCS-CTR(C0,),                               !FORCE COMPARE AT P3-T
                BUMP-VERIFY,                                !COUNT
        NEXT,   GOTO-PAGE(5),                               !XFER TO 5
                J/TEST624B                                  !
 (6567) DCS[1,00,1,0,0,1]  BM[1111,,00,00,,00,00,,000,,101,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,101,110,101]


   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !* PART B *
   !TEST-624-B CHECKS THAT D WAS ZEROED, IE, P2 DID OCCUR IN JAM WORD
   5565:
   TEST624B:
        P0,     LOAD-ENUA(ZTARGET434),                      !SETUP FOR IR=ZERO TEST
                LOAD-ERROR(TEST624B),                       !ERROR DIRECTORY KEY
                DCS-CTR(C6,),                               !COMPARE AT TARGET
        NEXT,   J/ZEROIR624B                                !
 (5565) DCS[1,00,1,0,0,0]  BM[1001,,00,11,,11,00,,011,,100,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,010,111]

   5427:  !(FREE)
   ZEROIR624B:
        SETUP,  RETURN/TEST624C,                            !PUT THE ZEROES IN D INTO THE IR,
        NEXT,   CALL[DINTOIR-5]                             !  TO NEGATE PREFETCH-H  (000000)=HALT
 (5427) DCS[0,00,0,0,0,0]  BM[0101,,00,11,,11,11,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
```



```



   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !* PART C *
   !TEST-624-C CHECKS THAT THE RIGHT CUA WAS LOCKED,
   !THAT THE EXFLAGS<2:1>H READ AS "00", AND
   !THAT PREFETCH*JAM(1)H = "1", FROM TEST-624-A, EVEN THOUGH TEST-624-B
   !  RESET THE IR SO THAT PREFETCH-H="0"
   5776:
   TEST624C:
        P0,     LOAD-ENUA(ZTARGET402),                      !SETUP FOR D = ZERO COMPARE
                LOAD-ERROR(TEST624C),                       !ERROR DIRECTORY KEY
                DCS-CTR(C10,),                              !COMPARE AT TARGET
        NEXT,   J/EXPEC624C                                 !
 (5776) DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,011,000]

   5430:  !(FREE)
   EXPEC624C:
        P3,     CSPD[02]_EMIT,                              !(USE MASK OF ALL 1'S FROM BEFORE)
                EMIT/062551,                                !WHAT THE CUA-EXFLAG-FOVP PORT OF HBMUX SHOULD BE
        NEXT,   J/GETCUA624C                                !CUA=(6255), EXFLAG="00", PREFETCH*JAM(1)H="1"
 (5430) DCS[0,00,0,0,0,0]  BM[0110,,10,01,,01,01,,101,,001,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,011,001]

   5431:  !(FREE)
   GETCUA624C:
        SETUP,  RETURN/TEST624D,                            !GO TO SUBR WHICH:
        P0,     BUMP-VERIFY,                                !COUNT
        NEXT,   CALL[CUATOD]                                !  (CUA)-XOR-CSP(02) -> D, BUT(D=ZERO)
 (5431) DCS[0,00,0,0,0,1]  BM[0101,,00,11,,11,01,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,111]



   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !* PART D *
   !TEST-624-D CHECKS THAT 'PREFETCH*JAM(1)H' GOT 'PREFETCH-H'="1" AFTER JAMUPP
   5756:
   TEST624D:
        P0,     LOAD-ENUA(ZTARGET403),                      !BIT01 SET
                LOAD-ERROR(TEST624D),                       !ERROR DIRECTORY KEY
                DCS-CTR(C3,),                               !COMPARE AT TARGET
        NEXT,   J/GOBUT624D                                 !
 (5756) DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,000,,011,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,011,010]


   5432:  !(FREE)
   GOBUT624D:
        SETUP,  RETURN/CLEAR624,                            !RETURN TO SCOPE LOOP TEST WORD
        NEXT,   GOTO-PAGE(7),                               !BUT TABLE ON PAGE 7
                J/BUTPREFETCHJAM                            !PREFETCH*JAM(1)H IN BIT01
 (5432) DCS[0,00,0,0,0,0]  BM[0111,,00,00,,11,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,110,000]
```

```
15875
15876
15877    7165:  ;(FREE)
15878    CLEAR624:
15879            SETUP,  RETURN/SCOPE624,                    ;RETURN FOR SCOPE LOOP TEST
15880            NEXT,   CALL(CLEAR-I-O-B)                   ;CLEAR OUT WHAT I'VE DONE
      (7165)  DCS[0,00,0,0,0,0]  BM[0101..00.01..00.10..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.011.000]
15881
15882
15883    5224:  ;(FREE)
15884    SCOPE624:
15885            P0,     BUMP-VERIFY,                        ;COUNT
15886                    BUSDIN_EMIT-(I),                    ;RESET PROC UCON
15887                    EN-CLK-IR(15-00),                   ;
15888            P3,     BUTA(CUA-TRACK),                    ;AND START CUA TRACKING AGAIN
15889            NEXT,   BUTD(SCOPE),                        ;NO ERROR:  "TEST701A" (+1, WORDS)
15890                    J/TEST701A                          ;   ERROR:  "SETIR624A" (-18. WORDS)
      (5224)  DCS[0,00,0,1,0,1]  BM[0000..00.00..00.01..000..100...0.0.0..0...1.1001...0..0000.0...11.001...101.110.011]
15891
15892
15893
15894
15895
15896
15897
15898    ;.PAGE**********************************************************************************************************
15899
15900
15901    .TOC    *   TEST701-702:  LOAD/READ THE BA, FULL 16. BITS
15902
15903    ;*****************************************************************************
15904    ;*
15905    ;*      TESTS:  701A - 702B                         UWORDS:  033 + 042
15906    ;*
15907    ;*      FUNCTIONS:
15908    ;*
15909    ;*      THIS NEXT SET OF SIX TESTS CHECKS THE "BA" REGISTER RELATED FUNCTIONS:
15910    ;*              SPECIFICALLY,
15911    ;*              1) LOAD/READ OF BA<15:00>, FROM BUS-A -> BA -> STATUS-MUX/PBA-PORT
15912    ;*              2) BUT ON "BA<00>"
15913    ;*              3) LOAD READ OF BA<17:16>, FROM BUS-B -> BA -> STATUS-MUX/SERVICE-PORT
15914    ;*                      THE EFFECT OF PARTICULAR KT-UCON-FUNCTIONS/CONSOLE-18.-BIT-MODE
15915    ;*                      IN THIS SITUATION IS ALSO EXAMINED FOR FUNCTIONALITY.
15916    ;*
15917    ;*****************************************************************************
15918
15919
15920
15921    ;  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
15922
15923    ;TEST-701-A CHECKS THAT BA<15:00> CAN BE LOADED, AND READ BACK WITH (052525)
15924    5563:
15925    TEST701A:
15926            P0,     LOAD-ENUA(ZTARGET402),              ;SETUP FOR D=ZERO COMPARE
```



```
15927                    LOAD-ERROR(TEST701A),               ;ERROR DIRECTORY KEY
15928                    DCS-CTR(C12.),                      ;COMPARE AT TARGET
15929                    BUMP-VERIFY,                        ;COUNT
15930            NEXT,   J/MASK701A                          ;
      (5563)  DCS[1,00,1,0,0,1]  BM[0011..00.11..11.00..000..010...0.0.0..0...0.0000...0..0000.0...11.000...100.111.110]
15931
15932    5476:
15933    MASK701A:
15934            P3,     CSPD[04]_EMIT, EMIT/177777,         ;MASK TO READ ALL THE BITS
15935            NEXT,   GOTO-PAGE(7),                       ;XFER
15936                    J/EXPEC701A                         ;
      (5476)  DCS[0,00,0,0,0,0]  BM[1111..10.11..11.11..111..111...0.0.0..0...0...0.1011...1..0000.0...11.100...001.110.110]
15937
15938    7166:  ;(FREE)
15939    EXPEC701A:
15940            P3,     CSPD[02]_EMIT, EMIT/052525,         ;EXPECTED DATA TO BE READ OUT OF PBA AFTER LOAD:
15941            NEXT,   J/LOADBA701A                        ;"0101 0101 0101 0101"
      (7166)  DCS[0,00,0,0,0,0]  BM[0101..10.01..01.01..010..101...0.0.0..0...0...0.1101...1..0000.0...11.000...001.111.000]
15942
15943    7170:  ;(FREE)
15944    LOADBA701A:
15945            P1,     BA_ASPHI(C052525),                  ;LOAD BA<15:00> WITH PATTERN
15946            NEXT,   J/GOTEST701A                        ;
      (7170)  DCS[0,00,0,0,0,0]  BM[0000..00.00..11.01..111..000...0.0.0..1..0...0.0000...0..0000.0...11.000...001.111.001]
15947
15948    7171:  ;(FREE)
15949    GOTEST701A:
15950            SETUP,  RETURN/TEST701B,                    ;GO TO SUBR THAT:
15951            NEXT,   CALL(PBATOD)                        ;  (PBA)-XOR-CSP(02)->D, BUT(D=IS-ZERO)
      (7171)  DCS[0,00,0,0,0,0]  BM[0101..00.10..10.10..011..111...0.0.0..0...0...0.0000...0..0000.0...11.100...010.101.001]
15952
15953
15954
15955
15956
15957
15958    ;  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
15959
15960    ;TEST-701-B CHECKS THAT BA<00> WAS LOADED WITH A (1)
15961    5523:
15962    TEST701B:
15963            P0,     LOAD-ENUA(ZTARGET403),              ;BIT<00> SET
15964                    LOAD-ERROR(TEST701B),               ;ERROR DIRECTORY KEY
15965                    DCS-CTR(C3.),                       ;COMPARE AT TARGET
15966            NEXT,   J/GOBUT701B                         ;
      (5523)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..011...0.0.0..0...0...0.0000...0..0000.0...11.000...100.011.100]

15967
15968    5434:  ;(FREE)
15969    GOBUT701B:
15970            SETUP,  RETURN/TEST701C,                    ;RETURN TO START OF NEXT SUBTEST
15971            NEXT,   GOTO-PAGE(7),                       ;BUT TABLE
15972                    J/BUTBA00                           ;BA<00>=H IN BIT<00>
```

```
      (5434)  DCS[0,00,0,0,0,0]  BM[0110..00,11,..11,11,.000..111...0,0,0,..0,..0...0,0000...0..0000,0...11,100...011,101,001]
15973
15974
15975
15976
15977     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
15978
15979     !TEST-701-C CHECKS THAT BA<15:00> CAN BE LOADED, AND READ BACK WITH (125252)
15980     6770:
15981     TEST701C:
15982             P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
15983                     LOAD-ERROR(TEST701C),                   !ERROR DIRECTORY KEY
15984                     DCS-CTR(C11,),                          !COMPARE AT TARGET
15985             NEXT,   J/EXPEC701C                             !
      (6770)  DCS[1,00,1,0,0,0]  BM[0100..00,11,..11,00,.000..010...0,0,0...0,..0,..0,0000...0..0000,0...11,000...100,101,101]
15986
15987     6455:  !(FREE)
15988     EXPEC701C:
15989             P3,     CSPD[02]_EMIT, EMIT/125252,             !EXPECTED DATA TO BE READ OUT OF PBA AFTER LOAD:
15990             NEXT,   J/LOADBA701C                            !"1010 1010 1010 1010"
      (6455)  DCS[0,00,0,0,0,0]  BM[1010..10,10,..10,10,.101..010...0,0,0...0,..0...0,1101...1..0000,0...11,000...100,101,110]
15991
15992     6456:  !(FREE)
15993     LOADBA701C:
15994             P1,     BA_ASPHI(C125252),                      !LOAD BA<15:00> WITH PATTERN
15995             NEXT,   J/GOTEST701C                            !
      (6456)  DCS[0,00,0,0,0,0]  BM[0000..00,00,..11,01,.110..000...0,0,0..1..0...0,0000...0..0000,0...11,000...100,101,111]
15996
15997     6457:  !(FREE)
15998     GOTEST701C:
15999             SETUP,  RETURN/TEST701D,                        !GO TO $UBP THAT:
16000             NEXT,   CALL[PBATOD]                            !  (PBA)=XDR=CSP(02)=>D, BUT(D=IS=ZERO)
      (6457)  DCS[0,00,0,0,0,0]  BM[0101..00,10,..10,01,.010..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,101,001]
16001
16002
16003
16004
16005
16006
16007     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16008
16009     !TEST-701-D CHECKS THAT BA<00> WAS LOADED WITH A (0)
16010     5512:
16011     TEST701D:
16012             P0,     LOAD-ENUA(ZTARGET402),                  !BIT<00> CLEAR
16013                     LOAD-ERROR(TEST701D),                   !ERROR DIRECTORY KEY
16014                     DCS-CTR(C3,),                           !COMPARE AT TARGET
16015             NEXT,   J/GOBUT701D                             !
      (5512)  DCS[1,00,1,0,0,0]  BM[1100..00,11,..11,00,.000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...100,011,101]
16016
16017     5435:  !(FREE)
16018     GOBUT701D:
16019             SETUP,  RETURN/SCOPE701,                        !RETURN TO SCOPE LOOP TEST WORD
```



```
16020             NEXT,   GOTO-PAGE(7),                           !BUT TABLE
16021                     J/BUTBA00                               !BA<00>H IN BIT<00>
      (5435)  DCS[0,00,0,0,0,0]  BM[0101..00,10,..00,11,.110..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,101,001]
16022
16023
16024
16025
16026     5436:  !(FREE)
16027     SCOPE701:
16028             P0,     BUMP-VERIFY,                            !COUNT
16029             NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST702A" (+1, WORDS)
16030                     J/TEST702A                              !   ERROR:  "MASK701A"  (-12. WORDS)
      (5436)  DCS[0,00,0,1,0,1]  BM[0000..00,00,..00,00,.000..000...0,0,0..0..0...0,0000...0..0000,0...11,000...100,111,111]
16031
16032
16033
16034
16035     ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16036
16037     !TEST-702-A CHECKS THAT BA<17:16> CAN BE LOADED, AND READ BACK WITH "01"
16038     !  WHEN IN 18. BIT CONSOLE MODE AND KT-NO-RELOCATE MODE
16039     5477:
16040     TEST702A:
16041             P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
16042                     LOAD-ERROR(TEST702A),                   !ERROR DIRECTORY KEY
16043                     DCS-CTR(C13,),                          !COMPARE AT TARGET
16044             NEXT,   J/MASK702A                              !
      (5477)  DCS[1,00,1,0,0,0]  BM[0010..00,11,..11,00,.000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...100,111,100]
16045
16046     5474:
16047     MASK702A:
16048             P3,     CSPD[04]_EMIT, EMIT/001400,             !MASK TO READ ONLY BITS<9:8>
16049             NEXT,   J/EXPEC702A                             !
      (5474)  DCS[0,00,0,0,0,0]  BM[0000..10,00,..11,00,.000..000...0,0,0..0..0...0,1011...1..0000,0...11,000...100,011,111]
16050
16051     5437:  !(FREE)
16052     EXPEC702A:
16053             P3,     CSPD[02]_EMIT, EMIT/000400,             !EXPECTED DATA TO BE READ OUT OF SERVICE<9:8> AFTER LOAD:
16054             NEXT,   J/SETLED702A                            !"0000 0001 0000 0000"
      (5437)  DCS[0,00,0,0,0,0]  BM[0000..10,00,..01,00,.000..000...0,0,0..0..0...0,1101...1..0000,0...11,000...100,100,001]
16055
16056     5441:  !(FREE)
16057     SETLED702A:
16058             P3,     SET-CONSOLE-LED,                        !ENTER INTO 18. BIT MODE FOR PBA<17:16> READ
16059             NEXT,   J/SETKT702A                             !
      (5441)  DCS[0,00,0,0,0,0]  BM[0100..00,00,..00,00,.100..001...0,0,0..0..0...1,1011...0..0000,0...11,000...100,100,010]

16060
16061     5442:  !(FREE)
16062     SETKT702A:
16063             P0,     BUMP-VERIFY,                            !COUNT
16064                     BUSDIN_SERVICE-[I],                     !READ SERVICE PORT BITS<9:8>
16065                     KT-NO-RELOCATE-[I],                     !SETUP KT FOR BA<17:16> LOADABILITY
16066             NEXT,   J/LOADBA702A                            !
```

```
    (5442)  DCS[0,00,0,0,0,1]  BM[0101..01,00..00,00..000..010...0,0,0..0..0...1,1001...0..0000,0...11,000...100,100,011]

        5443:  !(FREE)
        LOADBA702A:
                P1,      BA_BSPHI(C052525),                  !LOAD BA<17:16> WITH PATTERN "01"
                NEXT,    J/GOTEST702A                        !
    (5443)  DCS[0,00,0,0,0,0]  BM[0000..01,11..00,00..111..000...0,0,0..1..0...0,0000...0..0000,0...11,000...100,100,100]

        5444:  !(FREE)
        GOTEST702A:
                SETUP,   RETURN/TEST702B,                    !GO TO SUBR THAT:
                NEXT,    CALL[GETPROCDAT]                    !  (SERVICE<9:8>)-XOR-CSP(02)->D, BUT(D-IS-ZERO)
    (5444)  DCS[0,00,0,0,0,0]  BM[0110..00,11..11,10..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,111,011]








        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST-702-B CHECKS THAT BA<17:16> CAN BE LOADED, AND READ BACK WITH "10"
        !  WHEN IN 18. BIT CONSOLE MODE AND KT-NO-RELOCATE MODE
        6761:
        TEST702B:
                P0,      LOAD-ENUA(ZTARGET402),              !SETUP FOR D=ZERO COMPARE
                         LOAD-ERROR(TEST702B),               !ERROR DIRECTORY KEY
                         DCS-CTR(C11.),                      !COMPARE AT TARGET
                NEXT,    J/EXPEC702B                         !
    (6761)  DCS[1,00,1,0,0,0]  BM[0100..00,11..11,00..000..010...0,0,0..0..0...0,0000...0..0000,0...11,000...100,110,000]

        6460:  !(FREE)
        EXPEC702B:
                P3,      CSPD[02]_EMIT, EMIT/001000,         !EXPECTED DATA TO BE READ OUT OF SERVICE<9:8> AFTER LOAD:
                NEXT,    J/SETKT702B                         !"0000 0010 0000 0000"
    (6460)  DCS[0,00,0,0,0,0]  BM[0000..10,00..10,00..000..000...0,0,0..0..0...0,1101...1..0000,0...11,000...100,110,001]

        6461:  !(FREE)
        SETKT702B:
                P0,      BUSDIN_SERVICE-[I],                 !READ SERVICE PORT BITS<9:8>
                         KT-NO-RELOCATE-[J],                 !SETUP KT FOR BA<17:16> LOADABILITY
                NEXT,    J/LOADBA702B                        !
    (6461)  DCS[0,00,0,0,0,0]  BM[0101..01,00..00,00..000..010...0,0,0..0..0...1,1001...0..0000,0...11,000...100,110,010]

        6462:  !(FREE)
        LOADBA702B:
                P0,      BUMP-VERIFY,                        !COUNT
                P1,      BA_BSPHI(C125252),                  !LOAD BA<17:16> WITH PATTERN "10"
                NEXT,    J/GOTEST702B                        !
    (6462)  DCS[0,00,0,0,0,1]  BM[0000..01,11..00,00..110..000...0,0,0..1..0...0,0000...0..0000,0...11,000...100,110,011]

        6463:  !(FREE)
```



```
        GOTEST702B:
                SETUP,   RETURN/SCOPE702,                    !GO TO SUBR THAT:
                NEXT,    CALL[GETPROCDAT]                    !  (SERVICE<9:8>)-XOR-CSP(02)->D, BUT(D-IS-ZERO)
    (6463)  DCS[0,00,0,0,0,0]  BM[0101..00,10..00,11..011..111...0,0,0..0..0...0,0000...0..0000,0...11,100...011,111,011]



        5433:  !(FREE)
        SCOPE702:
                P3,      CSPD[04]_EMIT, EMIT/177777,         !RESET MASK FOR SUBSEQUENT TESTS
                NEXT,    BUTD[SCOPE],                        !NO ERROR:  "TEST710A"  (+1. WORDS)
                         J/TEST710A                          !   ERROR:  "MASK702A"  (-11. WORDS)
    (5433)  DCS[0,00,0,1,0,0]  BM[1111..10,11..11,11..111..111...0,0,0..0..0...0,1011...1..0000,0...11,000...100,111,101]





        !.PAGE=====================================================================================

        .TOC    *    TEST710-722:  BUS FUNCTION DECODE, BUS ERROR CONDITIONS

        !***************************************************************************************
        !*
        !*      TESTS:  710A - 722C                         UWORDS:  133 + 274
        !*
        !*      FUNCTIONS:
        !*
        !*      WE GET SNEAKY HERE AND TEST THE FULL BUS DECODE/STATUS MUX LOGIC, AND THE BUS  ERROR
        !*      CONDITIONS (ODD ADDRESS, INTERNAL ADDRESS, ETC) ALMOST WITHOUT EVER GOING OUT ON THE
        !*      BUS (WE DO ONCE, FOR SSYN TIMEOUT).
        !*
        !***************************************************************************************



        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TESTING 'DATO', 'ODD-ADDRESS' JAMUPP, 18./16. BIT IO-PAGE DECODE

        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST-710-A FIRST ATTEMPTS TO DO A BUS "DATO" FUNCTION, TRYING TO FORCE AN "ODD ADDRESS"
        !  ABORT/JAMUPP
        5475:

        TEST710A:
                P0,      LOAD-ENUA(4777),                    !JAMUPP ADDRESS
                         LOAD-ERROR(TEST710A),               !ERROR DIRECTORY KEY
                         DCS-CTR(C6.),                       !COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
                NEXT,    J/LOADRET710A                       !
    (5475)  DCS[1,00,1,0,0,0]  BM[1001..00,10..01,11..111..111...0,0,0..0..0...0,0000...0..0000,0...11,000...100,111,010]
```

```
    5472:
    LOADRET710A:
            P3,     CSPD[00]_EMIT, RETURN/TEST710B,          !RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
            NEXT,   GOTO-PAGE(4),                             !XFER
                    J/LOADADR710A                             !
 (5472) DCS[0,00,0,0,0,0]  BM[0110,,10,11,,01,00,,100,,100,,,0,0,0,,0,,0,,,0,1111,,,1,,0000,0,,,11,100,,,011,000,111]

    4307:  !(FREE)
    LOADADR710A:
            P3,     CSPD[16]_EMIT, EMIT/160001,               !"DIAGNOSTIC" UNIBUS I/O PAGE ADDRESS; ODD BYTE
            NEXT,   J/SETJAM710A                              !
 (4307) DCS[0,00,0,0,0,0]  BM[1110,,10,00,,00,00,,000,,001,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,011,001,010]

    4312:  !(FREE)
    SETJAM710A:
            P2-T,   SR_CSPD(D16),                             !SET BIT<00>=(1) FOR JAMUPP EXPECTED
            NEXT,   J/BUSFCN710A                              !
 (4312) DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0001,,,0,,0000,0,,,11,000,,,011,001,011]

    4313:  !(FREE)
    BUSFCN710A:
            P1,     BA_SR, BSPHI(C177777),                    !SET BA<17:00>=(760001), ALTERED TO(160001)
                                                              !  SINCE WE'VE LEFT 18. BIT MODE (IN LOADING BA, THAT IS)
            P2-T,   D_ZERO,                                   !
            P3,     DATO,                                     !DO A BUS "DATO", SHOULD GET ODD ADDRESS ABORTED
            NEXT,   J/NEXT710A                                !GO DELAY
 (4313) DCS[0,00,0,0,0,0]  BM[0011,,01,11,,00,00,,101,,000,,,0,1,0,,1,,0,,,1,0010,,,0,,0000,0,,,11,000,,,100,100,101]

    !** AT THIS POINT JAMUPP SHOULD OCCUR **
    !** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
    !**  RETURN TO ADDRESS LEFT IN CSP(00) **

    !*** END UP HERE IF NO JAMUPP ***
    4445:
    NEXT710A:
            SETUP,  RETURN/TEST710A,                          !FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
            NEXT,   GOTO-PAGE(7),                             !  MUST DELAY A FEW MICROWORDS FOR BUS
                    J/BUTD-IS-ZERO                            !  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
 (4445) DCS[0,00,0,0,0,0]  BM[0101,,00,10,,01,11,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]


    !*** END UP HERE IF JAMUPP ***


    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-710-B CHECKS THAT THE RIGHT JAM (ODD ADDRESS) IS INDICATED IN THE JAMREG:
    !
    !       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
    !       FCN:      ODD   0  SSYN  YEL  RED  WCS  PON  MEM SSYN CACH  ILL  MGT  RED  ODD  WCS UBRK
    !                 ADR      TIME  ZON  ZON  PAR  DIS  PAR TIME  ERR  ADR  ABT  ZON  ADR  PAR TRAP
    !       (101004)   1    0    0    0    0    0    1    0    0    0    0    0    0    1    0    0
```



```
    6644:
    TEST710B:
            P0,     LOAD-ENUA(ZTARGET402),                    !SETUP FOR D=ZERO COMPARE
                    LOAD-ERROR(TEST710B),                     !ERROR DIRECTORY KEY
                    DCS-CTR(C10.),                            !COMPARE AT TARGET
            NEXT,   J/GOTEST710B                              !
 (6644) DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,110,100]

    6464:  !(FREE)
    GOTEST710B:
            SETUP,  RETURN/TEST710C,                          !GO TO SUBR WHICH:
            NEXT,   CALL[ODDJAMTOD]                           !  (JAMREG)-XOR-(101004) -> D, BUT(D=ZERO)  [ODD-ADDRESS]
 (6464) DCS[0,00,0,0,0,0]  BM[0110,,00,11,,01,00,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,100]



    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-710-C CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
    !  NOTE PBA<17:16> READ "TRUE" (OUT OF BA) WHEN IN 18. BIT CONSOLE MODE
    !
    !       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
    !       FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW CACH  YEL
    !                     SERV      TIME            17   16  ERR  ERR  ERR SERV SERV FAIL  ERR  ZON
    !       (002340)   0    0    0    0    0    1    0    0    1    1    1    0    0    0    0    0

    6645:
    TEST710C:
            P0,     LOAD-ENUA(ZTARGET402),                    !SETUP FOR D=ZERO COMPARE
                    LOAD-ERROR(TEST710C),                     !ERROR DIRECTORY KEY
                    DCS-CTR(C10.),                            !COMPARE AT TARGET
            NEXT,   J/EXPEC710C                               !
 (6645) DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,110,101]

    6465:  !(FREE)
    EXPEC710C:
            P3,     CSPD[02]_EMIT, EMIT/002340,               !DATO(1)H SET, PBA<17:16>="00" IN 18. BIT CONSOLE MODE
            NEXT,   J/GOTEST710C                              !  IN SERVICE REG
 (6465) DCS[0,00,0,0,0,0]  BM[0000,,10,01,,00,11,,100,,000,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,110,110]

    6466:  !(FREE)
    GOTEST710C:
            SETUP,  RETURN/TEST710D,                          !GO TO SUBR WHICH:
            NEXT,   CALL[SERVICETOD]                          !  (SERVICE)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
 (6466) DCS[0,00,0,0,0,0]  BM[0110,,00,10,,11,11,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,000]



    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-710-D CHECKS THAT PBA<17:16> ARE INDICATED IN SERVICE REG:
```

```
!  NOTE PBA<17:16> READ AS BA<15:13>="111" WHEN IN 16, BIT MODE
!
!        BIT:      15   14   13   12   11    10   09   08   07   06   05   04   03   02   01   00
!        FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
!                     SERV      TIME              17   16  ERR  ERR  ERR SERV SERV FAIL  ERR ZON
!        (003740)  0    0    0    0    0    1    1    1    1    1    1    0    0    0    0    0

   6574:
   TEST710D:
          P0,      LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                   LOAD-ERROR(TEST710D),                   !ERROR DIRECTORY KEY
                   DCS-CTR(C11.),                          !COMPARE AT TARGET
          NEXT,    J/EXPEC710D                             !
 (6574)  DCS[1.00.1.0.0.0]  BM[0100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...100.110.111]

   6467:  !(FREE)
   EXPEC710D:
          P0,      BUMP-VERIFY,                            !COUNT
          P3,      CSPD[02]_EMIT, EMIT/003740,             !DATO(1)H SET, PBA<17:16>="11" IN 16, BIT MODE
          NEXT,    J/CLEAR710D                             !  IN SERVICE REG
 (6467)  DCS[0.00.0.0.0.1]  BM[0000..10.01..11.11..100..000...0.0.0..0..0...0.1101...1..0000.0...11.000...100.111.000]

   6470:  !(FREE)
   CLEAR710D:
          P3,      CLR-JAM-ERRORS-[I],                     !CLEAR OUT JAM-REG, FOR USE IN NEXT TEST
                   CLEAR-CONSOLE-LED,                      !BACK TO 16, BIT MODE
          NEXT,    J/GOTEST710D                            !
 (6470)  DCS[0.00.0.0.0.0]  BM[0100..00.00..10.00..010..001...0.0.0..0..0...1.1011...0..0000.0...11.000...100.111.001]

   6471:  !(FREE)
   GOTEST710D:
          SETUP,   RETURN/TEST710E,                        !GO TO SUBR WHICH:
          NEXT,    CALL[SERVICETOD]                        !  (SERVICE)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
 (6471)  DCS[0.00.0.0.0.0]  BM[0110..00.10..11.11..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.000]



   !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

   !TEST-710-E CHECKS THAT THE CLEAR-JAM-ERRORS CLEARED THE JAM REG TO (001000)
   6575:
   TEST710E:
          P0,      LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                   LOAD-ERROR(TEST710E),                   !ERROR DIRECTORY KEY
                   DCS-CTR(C10.),                          !COMPARE AT TARGET
          NEXT,    J/GOTEST710E                            !
 (6575)  DCS[1.00.1.0.0.0]  BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...100.111.010]

   6472:  !(FREE)
   GOTEST710E:
          P0,      BUMP-VERIFY,                            !COUNT
          SETUP,   RETURN/SCOPE710,                        !GO TO SUBR WHICH:
                                                           !  CSP(02) <- (001000)
```



```
          NEXT,    CALL[CLRJAMTOD]                         !  (JAMREG)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
 (6472)  DCS[0.00.0.0.0.1]  BM[0101..00.10..01.00..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.101]



   5445:  !(FREE)
   SCOPE710:
          P2-U,    IR_EMIT, EMIT/123456,                   !A "CMP-BYTE" INSTR, FOR NEXT TEST SERIES
          NEXT,    BUTD[SCOPE],                            !NO ERROR:  "TEST711A"  (+1, WORDS)
                   J/TEST711A                              !   ERROR:  "LOADRET710A"  (-17, WORDS)
 (5445)  DCS[0.00.0.1.0.0]  BM[1010..00.01..11.00..101..110...0.0.0..0..0...1.1010...0..0000.0...11.000...100.111.011]






   !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

   !TESTING 'DATOB*BYTE', 'SSYN TIMEOUT' JAMUPP

   !  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

   !TEST-711-A DOES A BUS "DATOB*BYTE" FUNCTION, TRYING TO FORCE AN "SSYN TIMEOUT" ABORT/JAMUPP
   5473:
   TEST711A:
          P0,      LOAD-ENUA(4777),                        !JAMUPP ADDRESS
                   LOAD-ERROR(TEST711A),                   !ERROR DIRECTORY KEY
                   DCS-CTR(C4.),                           !COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
          NEXT,    J/LOADRET711A                           !
 (5473)  DCS[1.00.1.0.0.0]  BM[1011..00.10..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.000...100.111.000]

   5470:
   LOADRET711A:
          P0,      BUMP-VERIFY,                            !COUNT
          P3,      CSPD[00]_EMIT, RETURN/TEST711B,         !RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
          NEXT,    GOTO-PAGE(4),                           !XFER
          NEXT,    J/BUSFCN711A                            !
 (5470)  DCS[0.00.0.0.0.1]  BM[0110..10.10..10.11..100..100...0.0.0..0..0...0.1111...1..0000.0...11.100...011.001.001]

   4311:  !(FREE)
   BUSFCN711A:
          !NOTE:   BA=(160001) FROM PREVIOUS TEST
          P2-T,    SR_CSPB(B16),                           !SET BIT<00>=(1) FOR JAMUPP EXPECTED
          P3,      DATOB,                                  !DO A BUS "DATOB*BYTE", SHOULD GET SSYN TIMEOUT ABORTED
                                                           !  SINCE WERE USING THE "DIAGNOSTIC" UNIBUS TIMEOUT ADDR

          NEXT,    J/NEXT711A                              !GO DELAY
 (4311)  DCS[0.00.0.0.0.0]  BM[1010..11.01..00.00..000..000...0.0.1..0..0...1.0101...0..0000.0...11.000...100.100.110]

   !** AT THIS POINT JAMUPP SHOULD OCCUR **
   !** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
   !**  RETURN TO ADDRESS LEFT IN CSP(00) **
```

```
	!*** END UP HERE IF NO JAMUPP ***
	4446:
	NEXT711A:
		SETUP,	RETURN/TEST711A,		!FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
		NEXT,	GOTO-PAGE(7),			!  MUST DELAY A FEW MICROWORDS FOR BUS
			J/BUTD-IS-ZERO			!  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
   (4446)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,01,11,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]


	!*** END UP HERE IF JAMUPP ***


	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!TEST-711-B CHECKS THAT THE RIGHT JAM (SSYN TIMEOUT) IS INDICATED IN THE JAMREG:
	!
	!	BIT:	15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
	!	FCN:	ODD   0  SSYN  YEL  RED  WCS  POW  MEM SSYN CACH  ILL  NGT  RED  ODD  WCS UBRK
	!		ADR      TIME  ZON  ZON  PAR  DIS  PAR TIME  ERR  ADR  ABT  ZON  ADR  PAR TRAP
	!	(021200)  0    0    1    0    0    0    1    0    1    0    0    0    0    0    0    0

	6534:
	TEST711B:
		P0,	LOAD-ENUA(ZTARGET402),		!SETUP FOR D=ZERO COMPARE
			LOAD-ERROR(TEST711B),		!ERROR DIRECTORY KEY
			DCS-CTR(C10,),			!COMPARE AT TARGET
		NEXT,	J/EXPEC711B			!
   (6534)  DCS[1,00,1,0,0,0]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,111,011]

	6473:  !(FREE)
	EXPEC711B:
		P0,	BUMP-VERIFY,			!COUNT
		P3,	CSPD[02]_EMIT, EMIT/021200,	!"SSYN TIMEOUT(1)H" SET
		NEXT,	J/GOTEST711B			!  IN JAMREG
   (6473)  DCS[0,00,0,0,0,1]  BM[0010,,10,00,,10,10,,000,,000,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,111,100]

	6474:  !(FREE)
	GOTEST711B:
		SETUP,	RETURN/TEST711C,		!GO TO SUBR WHICH:
		NEXT,	CALL[JAMTOD]			!  (JAMREG)-XOR-CSP(02) -> D, BUT(D=IS-ZERO)
   (6474)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,11,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,110]



	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!TEST-711-C CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
	!  BACK IN 16. BIT MODE, SINCE I-O PAGE, PBA<17:16> READ AS "11"
	!
	!	BIT:	15   14   13   12   11    10   09   08   07   06   05   04   03   02   01   00
	!	FCN:	DATI  BG   0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
```



```
	!		    SERV      TIME            17   16  ERR  ERR  ERR SERV SERV FAIL  ERR ZON
	!	(005740)  0    0    0    0    1    0    1    1    1    1    1    0    0    0    0    0

	6530:
	TEST711C:
		P0,	LOAD-ENUA(ZTARGET402),		!SETUP FOR D=ZERO COMPARE
			LOAD-ERROR(TEST711C),		!ERROR DIRECTORY KEY
			DCS-CTR(C11,),			!COMPARE AT TARGET
		NEXT,	J/EXPEC711C			!
   (6530)  DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,111,101]

	6475:  !(FREE)
	EXPEC711C:
		P3,	CSPD[02]_EMIT, EMIT/005740,	!DATOB(1)H SET, PBA<17:16>="11"
		NEXT,	J/GOTEST711C			!  IN SERVICE REG
   (6475)  DCS[0,00,0,0,0,0]  BM[0000,,10,10,,11,11,,100,,000,,,0,0,0,,0,,0,,,0,1101,,,1,,0000,0,,,11,000,,,100,111,110]

	6476:  !(FREE)
	GOTEST711C:
		SETUP,	RETURN/TEST711D,		!GO TO SUBR WHICH:
							!  CLR-JAM-ERRORS-[I], FOR NEXT TEST
		NEXT,	CALL[CJESERVICETOD]		!  (SERVICE)-XOR-CSP(02) -> D, BUT(D=IS-ZERO)
   (6476)  DCS[0,00,0,0,0,0]  BM[0110,,00,10,,10,10,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,111]



	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!TEST-711-D CHECKS THAT THE CLEAR-JAM-ERRORS CLEARED THE JAM REG TO (001000)
	6526:
	TEST711D:
		P0,	LOAD-ENUA(ZTARGET402),		!SETUP FOR D=ZERO COMPARE
			LOAD-ERROR(TEST711D),		!ERROR DIRECTORY KEY
			DCS-CTR(C10,),			!COMPARE AT TARGET
			BUMP-VERIFY,			!COUNT
		NEXT,	J/GOTEST711D			!
   (6526)  DCS[1,00,1,0,0,1]  BM[0101,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,111,111]

	6477:  !(FREE)
	GOTEST711D:
		SETUP,	RETURN/SCOPE711,		!GO TO SUBR WHICH:
							!  CSP(02) <- (001000)
		NEXT,	CALL[CLRJAMTOD]			!  (JAMREG)-XOR-CSP(02) -> D, BUT(D=IS-ZERO)
   (6477)  DCS[0,00,0,0,0,0]  BM[0101,,00,10,,01,00,,110,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,101]



	5146:  !(FREE)
	SCOPE711:
		NEXT,	BUTD[SCOPE],			!NO ERROR:  "TEST712A"  (+1, WORDS)
			J/TEST712A			!   ERROR:  "LOADRET711A"  (-11, WORDS)
   (5446)  DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,111,001]
```

```
	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;TESTING 'DATI', 'INTERNAL ADDRESS' JAMUPP

	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;TEST-712-A DOES A BUS "DATI" FUNCTION TO AN INTERNAL ADDRESS, TRYING TO FORCE AN "INTERNAL ADDRESS" ABORT/JAMUPP
	5471:
	TEST712A:
		P0,	LOAD-ENUA(4777),			;JAMUPP ADDRESS
			LOAD-ERROR(TEST712A),			;ERROR DIRECTORY KEY
			DCS-CTR(C5.),				;COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
		NEXT,	J/LOADRET712A				;
    (5471)  DCS[1.00.1.0.0.0]  BM[1010..00.10..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11,000...100.110.110]

	5466:
	LOADRET712A:
		P0,	BUMP-VERIFY,				;COUNT
		P3,	CSPD[00]_EMIT, RETURN/TEST712B,		;RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
		NEXT,	GOTO-PAGE(4),				;XFER
			J/GENADR712A				;
    (5466)  DCS[0.00.0.0.0.1]  BM[0101..10.10..10.00..101..100...0.0.0..0..0...0.1111...1..0000.0...11.100...011.001.100]

	4314:	;(FREE)
	GENADR712A:
		P2-T,	D_NOT-ASPHI(C000001),			;MAKE D=(177776), INTERNAL ADDRESS OF PSW
		P3,	ASPLO[11]_D,				;  AND SAVE IT
		NEXT,	J/BUSFCN712A				;
    (4314)  DCS[0.00.0.0.0.0]  BM[0000..00.00..11.01..000..000...0.1.0..0..0...0.0000...0..0001.0...11.000...011.001.110]

	4316:	;(FREE)
	BUSFCN712A:
		P1,	BA_ASPLO(R11),				;BA=(177776)
		P2-T,	SR_SSPHI(C000001),			;SET BIT<00>=(1) FOR JAMUPP EXPECTED
		P3,	DATI,					;DO A BUS "DATI", SHOULD GET INTERNAL ADDR ABORTED
		NEXT,	J/NEXT712A				;GO DELAY
    (4316)  DCS[0.00.0.0.0.0]  BM[1010..01.11..10.01..000..000...0.0.1..1..0...1.0110...0..0000.0...11.000...100.100.111]

	;** AT THIS POINT JAMUPP SHOULD OCCUR **
	;** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
	;**  RETURN TO ADDRESS LEFT IN CSP(00) **

	;*** END UP HERE IF NO JAMUPP ***
	4447:
	NEXT712A:
		SETUP,	RETURN/TEST712A,			;FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
		NEXT,	GOTO-PAGE(7),				;  MUST DELAY A FEW MICROWORDS FOR BUS
```



```
			J/BUTD-IS-ZERO				;  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
    (4447)  DCS[0.00.0.0.0.0]  BM[0101..00.10..01.11..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]


	;*** END UP HERE IF JAMUPP ***


	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;TEST-712-B CHECKS THAT THE RIGHT JAM (INTERNAL ADDRESS) IS INDICATED IN THE JAMREG:
	;  FOR THIS JAM, THE JAMREG SHOULD REMAIN CLEAR
	;
	;	BIT:	  15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
	;	FCN:	 ODD    0 SSYN  YEL  RED  WCS  POW  MEM SSYN CACH  ILL  MGT  RED  ODD  WCS UBRK
	;		 ADR      TIME  ZON  ZON  PAR  DIS  PAR TIME  ERR  ADR  ABT  ZON  ADR  PAR TRAP
	;	(001000)   0    0    0    0    0    0    1    0    0    0    0    0    0    0    0    0

	5505:
	TEST712B:
		P0,	LOAD-ENUA(ZTARGET402),			;SETUP FOR D=ZERO COMPARE
			LOAD-ERROR(TEST712B),			;ERROR DIRECTORY KEY
			DCS-CTR(C10.),				;COMPARE AT TARGET
		NEXT,	J/GOTEST712B				;
    (5505)  DCS[1.00.1.0.0.0]  BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...100.101.000]

	5450:	;(FREE)
	GOTEST712B:
		SETUP,	RETURN/TEST712C,			;GO TO SUBR WHICH:
							;  (001000) -> CSP(02)
		NEXT,	CALL[CLRJAMTOD]				;  (JAMREG)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
    (5450)  DCS[0.00.0.0.0.0]  BM[0110..00.10..10.10..100..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.101]



	; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	;TEST-712-C CHECKS THAT THE "OTHER-JAM-H" SIGNAL IS LOW, INDICATING AN INTERNAL ADDRESS JAM
	6524:
	TEST712C:
		P0,	LOAD-ENUA(ZTARGET401),			;BIT<01> CLEAR
			LOAD-ERROR(TEST712C),			;ERROR DIRECTORY KEY
			DCS-CTR(C3.),				;COMPARE AT TARGET
		NEXT,	J/GOBUT712C				;
    (6524)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11.000...101.000.000]

	6500:	;(FREE)

	GOBUT712C:
		SETUP,	RETURN/TEST712D,			;RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				;BUT TABLE
			J/BUTOTHERJAM				;"OTHER JAM H" IN BIT<01>
    (6500)  DCS[0.00.0.0.0.0]  BM[0110..00.10..10.10..011..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.101.010]
```

```
16541
16542
16543
16544    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16545
16546    !TEST-712-D CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
16547    !  BACK IN 16. BIT MODE, SINCE I-O PAGE, PBA<17:16> READ AS "11"
16548    !
16549    !       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
16550    !       FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  NIB  LOB  TAG  CON  FLT  POW  CACH YEL
16551    !                SERV       TIME             17   16  ERR  ERR  ERR SERV SERV FAIL   ERR ZON
16552    !       (101740)   1    0    0    0    0    0    1    1    1    1    1    0    0    0    0    0
16553
16554    6523:
16555    TEST712D:
16556            P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR BUSERO COMPARE
16557                    LOAD-ERROR(TEST712D),                   !ERROR DIRECTORY KEY
16558                    DCS-CTR(C11.),                          !COMPARE AT TARGET
16559            NEXT,   J/EXPEC712D                             !
      (6523)  DCS[1,00,1,0,0,0]  BM[0100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000..101.000.001]
16560
16561    6501:  !(FREE)
16562    EXPEC712D:
16563            P3,     CSPD[02]_EMIT, EMIT/101740,             !DATI(1)R SET, PBA<17:16>="11"
16564            NEXT,   J/GOTEST712D                            !  IN SERVICE REG
      (6501)  DCS[0,00,0,0,0,0]  BM[1000..10.00..11.11..100..000...0.0.0...0..0...0.1101...1..0000.0...11.000..101.000.010]
16565
16566    6502:  !(FREE)
16567    GOTEST712D:
16568            SETUP,  RETURN/SCOPE712,                        !GO TO SUBR WHICH:
16569                                                            !  CLR-JAM-ERRORS-[I], FOR NEXT TEST
16570            NEXT,   CALL[CJESERVICETOD]                     !  (SERVICE)-XOR-CSP(02) -> D, BUT(D=IS-ZERO)
      (6502)  DCS[0,00,0,0,0,0]  BM[0101..00.10..01.00..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100..010.100.111]
16571
16572
16573
16574
16575    5447:  !(FREE)
16576    SCOPE712:
16577            NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST713A"  (+1, WORDS)
16578                    J/TEST713A                              !   ERROR:  "LOADRET712A"  (-12, WORDS)
      (5447)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.000..100.110.111]
16579
16580
16581
16582
16583
16584
16585    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16586
16587    !TESTING 'DATI-NOINT', 'ILLEGAL INTERNAL ADDRESS' JAMUPP
16588
16589    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```



```
16590
16591    !TEST-713-A DOES A BUS "DATI-NOINT" FUNCTION TO AN INTERNAL ADDRESS, TRYING TO FORCE
16592    !  AN "ILLEGAL INTERNAL ADDRESS" ABORT/JAMUPP
16593    5467:
16594    TEST713A:
16595            P0,     LOAD-ENUA(4777),                        !JAMUPP ADDRESS
16596                    LOAD-ERROR(TEST713A),                   !ERROR DIRECTORY KEY
16597                    DCS-CTR(C4.),                           !COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
16598                    BUMP-VERIFY,                            !COUNT
16599            NEXT,   J/LOADRET713A                           !
      (5467)  DCS[1,00,1,0,0,1]  BM[1011..00.10..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.000..100.110.100]
16600
16601    5464:
16602    LOADRET713A:
16603            P3,     CSPD[00]_EMIT, RETURN/TEST713B,         !RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
16604            NEXT,   GOTO-PAGE(7),                           !XFER
16605                    J/BUSFCN713A                            !
      (5464)  DCS[0,00,0,0,0,0]  BM[0101..10.11..00.01..110..111...0.0.0..0..0...0.1111...1..0000.0...11.100..001.110.111]
16606
16607    7167:  !(FREE)
16608    BUSFCN713A:
16609            P1,     BA_ASPLO(R11),                          !BA=(177776), GENERATED IN PREVIOUS SET OF TESTS
16610            P2-T,   SR_BSPHI(C000001),                      !SET BIT<00>=(1) FOR JAMUPP EXPECTED
16611            P3,     DATI-NOINT,                             !DO A BUS "DATI-NOINT",
16612                                                            ! SHOULD GET "ILLEGAL INTERNAL ADDR" ABORTED
16613            NEXT,   J/NEXT713A                              !GO DELAY
      (7167)  DCS[0,00,0,0,0,0]  BM[1010..01.11..10.01..000..000...0.0.1..1..0...1.0001...0..0000.0...11.000...011.110.101]
16614
16615    !** AT THIS POINT JAMUPP SHOULD OCCUR **
16616    !** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
16617    !**  RETURN TO ADDRESS LEFT IN CSP(00) **
16618
16619    !*** END UP HERE IF NO JAMUPP ***
16620    7365:
16621    NEXT713A:
16622            SETUP,  RETURN/TEST713A,                        !FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
16623            NEXT,   GOTO-PAGE(7),                           !  MUST DELAY A FEW MICROWORDS FOR BUS
16624                    J/BUTD-IS-ZERO                          !  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
      (7365)  DCS[0,00,0,0,0,0]  BM[0101..00.10..01.10..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100..011.100.001]
16625
16626
16627    !*** END UP HERE IF JAMUPP ***
16628
16629
16630    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16631
16632    !TEST-713-B CHECKS THAT THE RIGHT JAM (ILLEGAL INTERNAL ADDRESS) IS INDICATED IN THE JAMREG:
16633    !
16634    !       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
16635    !       FCN:     ODD    0  SSYN YEL  RED  WCS  POW  MEM  SSYN CACH ILL  MGT  RED  ODD  WCS  UBRK
16636    !                ADR       TIME ZON  ZON  PAR  DIS  PAR  TIME  ERR ADR  ABT  ZON  ADR  PAR  TRAP
16637    !       (001040)  0    0    0    0    0    0    1    0    0    0    1    0    0    0    0    0
16638
```

```
16639     5616:
16640     TEST713B:
16641             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
16642                     LOAD-ERROR(TEST713B),                   ;ERROR DIRECTORY KEY
16643                     DCS-CTR(C10.),                          ;COMPARE AT TARGET
16644                     BUMP-VERIFY,                            ;COUNT
16645             NEXT,   J/EXPEC713B                             ;
     (5616)  DCS[1,00,1,0,0,1]  BM[0101..00.11..11.00..000..010...0.0.0...0.0...0.0000...0..0000.0...11,000...100,101,010]
16646
16647     5452:  ;(FREE)
16648     EXPEC713B:
16649             P3,     CSPD[02]_EMIT, EMIT/001040,             ;"ILLEGAL INTERNAL ADDRESS(1)H" SET
16650             NEXT,   J/GOTEST713B                            ;
     (5452)  DCS[0,00,0,0,0,0]  BM[0000..10.00..10.00..100..000...0.0.0...0.0...0.1101...1..0000.0...11,000...100,101,011]
16651
16652     5453:  ;(FREE)
16653     GOTEST713B:
16654             SETUP,  RETURN/TEST713C,                        ;GO TO SUBR WHICH:
16655             NEXT,   CALL[JAMTOD]                            ;  (JAMBUS)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
     (5453)  DCS[0,00,0,0,0,0]  BM[0110..00.10..10.10..010..111...0.0.0...0.0...0.0000...0..0000.0...11,100...010,101,110]
16656
16657
16658
16659     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16660
16661     ;TEST-713-C CHECKS THAT THE "OTHER-JAM-H" SIGNAL IS HIGH, INDICATING A JAM PRESENT OTHER
16662     ;   THAN ONLY A VALID "INTERNAL ADDRESS" JAM
16663     5522:
16664     TEST713C:
16665             P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<01> SET
16666                     LOAD-ERROR(TEST713C),                   ;ERROR DIRECTORY KEY
16667                     DCS-CTR(C3.),                           ;COMPARE AT TARGET
16668             NEXT,   J/GOBUT713C                             ;
     (5522)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..011...0.0.0...0.0...0.0000...0..0000.0...11,000...101,000,011]
16669
16670     5503:  ;(FREE)
16671     GOBUT713C:
16672             SETUP,  RETURN/TEST713D,                        ;RETURN TO START OF NEXT SUBTEST
16673             NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
16674                     J/BUTOTHERJAM                           ;"OTHER JAM H" IN BIT<01>
     (6503)  DCS[0,00,0,0,0,0]  BM[0110..00.10..10.10..001..111...0.0.0...0.0...0.0000...0..0000.0...11,100...011,101,010]
16675
16676
16677
16678     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16679
16680     ;TEST-713-D CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
16681     ;  BACK IN 16. BIT MODE, SINCE I=0 PAGE, PBA<17:16> READ AS "11"
16682     ;
16683     ;       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
16684     ;       FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
16685     ;                  SERV      TIME             17   16  ERR  ERR  ERR SERV SERV FAIL   ERR ZON
```



```
16686     ;       (101740)   1    0    0    0    0    0    1    1    1    1    1    0    0    0    0    0
16687
16688     6521:
16689     TEST713D:
16690             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
16691                     LOAD-ERROR(TEST713D),                   ;ERROR DIRECTORY KEY
16692                     DCS-CTR(C11.),                          ;COMPARE AT TARGET
16693                     BUMP-VERIFY,                            ;COUNT
16694             NEXT,   J/EXPEC713D                             ;
     (6521)  DCS[1,00,1,0,0,1]  BM[0100..00.11..11.00..000..010...0.0.0...0.0...0.0000...0..0000.0...11,000...101,000,100]
16695
16696     6504:  ;(FREE)
16697     EXPEC713D:
16698             P3,     CSPD[02]_EMIT, EMIT/101740,             ;DATI(1)H SET, PBA<17:16>="11"
16699             NEXT,   J/GOTEST713D                            ;  IN SERVICE REG
     (6504)  DCS[0,00,0,0,0,0]  BM[1000..10.00..11.11..100..000...0.0.0...0.0...0.1101...1..0000.0...11,000...101,000,101]
16700
16701     6505:  ;(FREE)
16702     GOTEST713D:
16703             SETUP,  RETURN/SCOPE713,                        ;GO TO SUBR WHICH:
16704                                                             ;  CLR-JAM-ERRORS-[I], FOR NEXT TEST
16705             NEXT,   CALL[CJESERVICETOD]                     ;  (SERVICE)-XOR-CSP(02) -> D, BUT(D-IS-ZERO)
     (6505)  DCS[0,00,0,0,0,0]  BM[0101..00.10..01.01..001..111...0.0.0...0.0...0.0000...0..0000.0...11,100...010,100,111]
16706
16707
16708
16709
16710     5451:  ;(FREE)
16711     SCOPE713:
16712             NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST720A"  (+1, WORDS)
16713                     J/TEST720A                              ;   ERROR:  "LOADRET713A"  (-11. WORDS)
     (5451)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,000...100,110,101]
16714
16715
16716
16717
16718
16719
16720
16721     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16722
16723     ;TESTING 'DATIB*-BYTE', 'ODD-ADDRESS' JAMUPP, I/O-PAGE-PBA<17:16> DECODE
16724
16725     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16726
16727     ;TEST-720-A ATTEMPTS TO DO A BUS "DATIB*-BYTE" FUNCTION, TRYING TO FORCE AN "ODD ADDRESS"

16728     ;  ABORT/JAMUPP, ALSO CHECKING THAT ALL SERVICE / JAM STATUS BITS SET CORRECTLY
16729     5465:
16730     TEST720A:
16731             P0,     LOAD-ENUA(4777),                        ;JAMUPP ADDRESS
16732                     LOAD-ERROR(TEST720A),                   ;ERROR DIRECTORY KEY
16733                     DCS-CTR(C7.),                           ;COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
16734             NEXT,   J/LOADRET720A                           ;
```

```
      (5465)  DCS[1,00,1,0,0,0]  BM[1000..00.10..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.000...100.110.010]
16735
16736     5462:
16737     LOADRET720A:
16738             P3,     CSPD[00]_EMIT, RETURN/TEST720B,          ;RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
16739             NEXT,   GOTO-PAGE(7),                            ;XFER
16740                     J/LOADIR720A                             ;
      (5462)  DCS[0,00,0,0,0,0]  BM[0110..10.10..10.10..000..111...0.0.0..0..0...0.1111...1..0000.0...11.100...001.111.010]
16741
16742     7172:  ;(FREE)
16743     LOADIR720A:
16744             P2=0,   IR_EMIT, EMIT/000000,                    ;"HALT" INSTRUCTION IS =BYTE
16745             NEXT,   J/SETADR720A                             ;
      (7172)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...001.111.100]
16746
16747     7174:  ;(FREE)
16748     SETADR720A:
16749             P3,     CSPD[16]_EMIT, EMIT/060001,              ;BIT<15:13>="011", =IOPAGE; ODD=ADDRESS
16750             NEXT,   J/SETJAM720A                             ;
      (7174)  DCS[0,00,0,0,0,0]  BM[0110..10.00..00.00..000..001...0.0.0..0..0...0.0001...1..0000.0...11.000...001.111.101]
16751
16752     7175:  ;(FREE)
16753     SETJAM720A:
16754             P2=T,   SR_CSPD(D16),                            ;SET BIT<00>=(1) FOR JAMUPP EXPECTED
16755             NEXT,   J/BUSFCN720A                             ;
      (7175)  DCS[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.0001...0..0000.0...11.000...001.111.110]
16756
16757     7176:  ;(FREE)
16758     BUSFCN720A:
16759             P1,     BA_SR,                                   ;SET BA<17:00>=(060001)
16760             P3,     DATIB,                                   ;DO A BUS "DATIB=BYTE", SHOULD GET ODD ADDRESS ABORTED
16761             NEXT,   J/NEXT720A                               ;GO DELAY
      (7176)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..1..0...1.0011...0..0000.0...11.000...011.110.100]
16762
16763     ;** AT THIS POINT JAMUPP SHOULD OCCUR **
16764     ;** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
16765     ;**  RETURN TO ADDRESS LEFT IN CSP(00) **
16766
16767     ;*** END UP HERE IF NO JAMUPP ***
16768     7364:
16769     NEXT720A:
16770             SETUP,  RETURN/TEST720A,                         ;FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
16771             NEXT,   GOTO-PAGE(7),                            ;  MUST DELAY A FEW MICROWORDS FOR BUS
16772                     J/BUTD-IS-ZERO                           ;  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
      (7364)  DCS[0,00,0,0,0,0]  BM[0101..00.10..01.10..101..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
16773
16774
16775     ;*** END UP HERE IF JAMUPP ***
16776
16777
16778     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16779
16780     ;TEST-720-B CHECKS THAT THE RIGHT JAM (ODD ADDRESS) IS INDICATED IN THE JAMREG:
```



```
16781     ;
16782     ;       BIT:     15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
16783     ;       FCN:    ODD    0  SSYN YEL  RED  WCS  POW  MEM  SSYN CACH ILL  MGT  RED  ODD  WCS  UBRK
16784     ;               ADR        TIME ZON  ZON  PAR  DIS  PAR  TIME  ERR ADR  ABT  ZON  ADP  PAR  TRAP
16785     ;       (101004) 1    0    0    0    0    0    1    0    0    0    0    0    0    1    0    0
16786
16787     6520:
16788     TEST720B:
16789             P0,     LOAD=ENUA(ZTARGET402),                   ;SETUP FOR D=ZERO COMPARE
16790                     LOAD=ERROR(TEST720B),                    ;ERROR DIRECTORY KEY
16791                     DCS=CTR(C10,),                           ;COMPARE AT TARGET
16792                     BUMP=VERIFY,                             ;COUNT
16793             NEXT,   J/GOTEST720B                             ;
      (6520)  DCS[1,00,1,0,0,1]  BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...101.000.110]
16794
16795     6506:  ;(FREE)
16796     GOTEST720B:
16797             SETUP,  RETURN/TEST720C,                         ;GO TO SUBR WHICH:
16798             NEXT,   CALL[ODDJAMTOD]                          ;  (JAMREG)-XOR-(101004) -> D, BUT(D=ZERO)  [ODD=ADDRESS]
      (6506)  DCS[0,00,0,0,0,0]  BM[0100..00.11..11.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.100]
16799
16800
16801
16802     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
16803
16804     ;TEST-720-C CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
16805     ;  NOTE:  PBA<17:16> SHOULD NOT BE FORCED TO "11", IN 16. BIT MODE, WHEN BA<15:13>="011"
16806     ;
16807     ;       BIT:     15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
16808     ;       FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
16809     ;                SERV       TIME             17   16  ERR  ERR  ERR SERV SERV FAIL   ERR ZON
16810     ;       (100340)   1    0    0    0    0    0    0    0    1    1    1    0    0    0    0    0
16811
16812     4760:
16813     TEST720C:
16814             P0,     LOAD=ENUA(ZTARGET402),                   ;SETUP FOR D=ZERO COMPARE
16815                     LOAD=ERROR(TEST720C),                    ;ERROR DIRECTORY KEY
16816                     DCS=CTR(C11,),                           ;COMPARE AT TARGET
16817             NEXT,   J/GOTEST720C                             ;
      (4760)  DCS[1,00,1,0,0,0]  BM[0100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.001.111]
16818
16819     4317:  ;(FREE)
16820     GOTEST720C:
16821             SETUP,  RETURN/TEST721A,                         ;GO TO SUBR WHICH:
16822                                                              ;  CLR=JAM-ERRORS, TO RESET FOR NEXT TEST
16823             NEXT,   CALL[DATISERVICETOD]                     ;  (SERVICE)-XOR-(100340) -> D, BUT(D=ZERO)  (DATI[1]H)

      (4317)  DCS[0,00,0,0,0,0]  BM[0100..00.10..11.11..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.101]
16824
16825

16826
16827
16828
```

```
    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TESTING 'DATOB*-BYTE', 'ODD-ADDRESS' JAMUPP, I/O-PAGE-PBA<17:16> DECODE

    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-721-A ATTEMPTS TO DO A BUS "DATOB*-BYTE" FUNCTION, TRYING TO FORCE AN "ODD ADDRESS"
    !  ABORT/JAMUPP, ALSO CHECKING THAT ALL SERVICE / JAN STATUS BITS SET CORRECTLY
    4571:
    TEST721A:
            P0,     LOAD-ENUA(4777),                        !JAMUPP ADDRESS
                    LOAD-ERROR(TEST721A),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C6.),                           !COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
            NEXT,   J/LOADRET721A                           !
  (4571) DCS[1.00.1.0.0.0] BM[1001..00.10..01.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.000]

    4320: !(FREE)
    LOADRET721A:
            P3,     CSPD[00]_EMIT, RETURN/TEST721B,         !RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
            NEXT,   GOTO-PAGE(7),                           !XFER
            NEXT,   J/SETADR721A                            !
  (4320) DCS[0.00.0.0.0.0] BM[0100..10.10..11.11..011..111...0.0.0..0..0...0.1111...1..0000.0...11.100...001.111.011]

    7173: !(FREE)
    SETADR721A:
            P3,     CSPD[16]_EMIT, EMIT/120001,             !BIT<15:13>="101", =IOPAGE; ODD-ADDRESS
            NEXT,   J/SETJAM721A                            !
  (7173) DCS[0.00.0.0.0.0] BM[1010..10.00..00.00..000..001...0.0.0..0..0...0.0001...1..0000.0...11.000...010.000.000]

    7200: !(FREE)
    SETJAM721A:
            P2-T,   SR_CSPD(D16),                           !SET BIT<00>=(1) FOR JAMUPP EXPECTED
            NEXT,   J/BUSFCN721A                            !
  (7200) DCS[0.00.0.0.0.0] BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.0001...0..0000.0...11.000...010.000.001]

    7201: !(FREE)
    BUSFCN721A:
                                                            !NOTE:  "IR"=(000000)=-BYTE FROM PREV TEST
            P1,     BA_SR,                                  !SET BA<17:00>=(120001)
            P3,     DATOB,                                  !DO A BUS "DATOB*-BYTE", SHOULD GET ODD ADDRESS ABORTED
            NEXT,   J/NEXT721A                              !GO DELAY
  (7201) DCS[0.00.0.0.0.0] BM[0000..00.00..00.00..000..000...0.0.0..1..0...1.0101...0..0000.0...11.000...011.110.010]

    !** AT THIS POINT JAMUPP SHOULD OCCUR **
    !** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
    !**  RETURN TO ADDRESS LEFT IN CSP(00) **

    !*** END UP HERE IF NO JAMUPP ***
    7362:
    NEXT721A:
            SETUP,  RETURN/TEST721A,                        !FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
```



```
            NEXT,   GOTO-PAGE(7),                           ! MUST DELAY A FEW MICROWORDS FOR BUS
                    J/BUTD-IS-ZERO                          ! ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
  (7362) DCS[0.00.0.0.0.0] BM[0100..00.10..11.11..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]


    !*** END UP HERE IF JAMUPP ***


    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-721-B CHECKS THAT THE RIGHT JAM (ODD ADDRESS) IS INDICATED IN THE JAMREG:
    !
    !       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
    !       FCN:      ODD   0  SSYN YEL  RED  WCS  POW  MEM  SSYN CACH ILL  MGT  RED  ODD  WCS  UBRK
    !                 ADR      TIME ZON  ZON  PAR  DIS  PAR  TIME  ERR ADR  ABT  ZON  ADR  PAR  TRAP
    !       (101004)  1    0    0    0    0    0    1    0    0    0    0    0    0    1    0    0

    4573:
    TEST721B:
            P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                    LOAD-ERROR(TEST721B),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C10.),                          !COMPARE AT TARGET
            NEXT,   J/GOTEST721B                            !
  (4573) DCS[1.00.1.0.0.0] BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.001]

    4321: !(FREE)
    GOTEST721B:
            SETUP,  RETURN/TEST721C,                        !GO TO SUBR WHICH:
            NEXT,   CALL[ODDJAMTOD]                         !  (JAMREG)-XOR-(101004) -> D, BUT(D=ZERO)  [ODD-ADDRESS]
  (4321) DCS[0.00.0.0.0.0] BM[0100..00.10..11.11..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.100]



    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST-721-C CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
    !  NOTE:  PBA<17:16> SHOULD NOT BE FORCED TO "11", IN 16, BIT MODE, WHEN BA<15:13>="101"
    !
    !       BIT:      15   14   13   12   11    10   09   08   07   06   05   04   03   02   01   00
    !       FCN:      DATT BG    0   NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
    !                      SERV      TIME            17   16  ERR  ERR  ERR  SERV SERV FAIL  ERR ZON
    !       (002340)  0    0    0    0    0     1    0    0    1    1    1    0    0    0    0    0

    4577:
    TEST721C:
            P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE

                    LOAD-ERROR(TEST721C),                   !ERROR DIRECTORY KEY
                    DCS-CTR(C11.),                          !COMPARE AT TARGET
            NEXT,   J/GOTEST721C                            !
  (4577) DCS[1.00.1.0.0.0] BM[0100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.010]

    4322: !(FREE)
    GOTEST721C:
```

```
        SETUP,  RETURN/SCOPE721,                        !GO TO SUBR WHICH:
                                                        !  CLR-JAM-ERRORS, TO RESET FOR NEXT TEST
        NEXT,   CALL[DATOSERVICETOD]                    !  (SERVICE)-XOR-(002340) -> D, BUT(D=ZERO)  (DATO[1]H)
 (4322) DCS[0,00,0,0,0,0]  BM[0101,,00,10,,01,01,,100,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,110]




   5454:  !(FREE)
   SCOPE721:
        NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST722A"  (+1, WORDS)
                J/TEST722A                              !   ERROR:  "LOADRET720A"  (-24, WORDS)
 (5454) DCS[0,00,0,1,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,110,011]





   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !TESTING 'INVALIDATE', 'ODD-ADDRESS' JAMUPP, I/O-PAGE-PBA<17:16> DECODE

   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !TEST-722-A ATTEMPTS TO DO A BUS "INVALIDATE" FUNCTION, TRYING TO FORCE AN "ODD ADDRESS"
   !  ABORT/JAMUPP, ALSO CHECKING THAT ALL SERVICE / JAM STATUS BITS SET CORRECTLY
   5463:
   TEST722A:
        P0,     LOAD-ENUA(4777),                        !JAMUPP ADDRESS
                LOAD-ERROR(TEST722A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C6,),                           !COMPARE JUST AFTER BUS CYCLE UWORD, AT JAM
        NEXT,   J/LOADRET722A                           !
 (5463) DCS[1,00,1,0,0,0]  BM[1001,,00,10,,01,11,,111,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,101,110]

   5456:  !(FREE)
   LOADRET722A:
        P3,     CSPD[00]_EMIT, RETURN/TEST722B,         !RETURN AFTER SUCCESSFUL JAM TO NEXT TEST
        NEXT,   GOTO-PAGE(4),                           !XFER
        NEXT,   J/SETADR722A                            !
 (5456) DCS[0,00,0,0,0,0]  BM[0100,,10,10,,01,10,,100,,100,,,0,0,0,,0,,0,,,0,1111,,,1,,0000,0,,,11,100,,,100,111,000]

   4470:
   SETADR722A:
        P3,     CSPD[16]_EMIT, EMIT/140001,             !BIT<15:13>="110", =IOPAGE; ODD-ADDRESS
        NEXT,   J/SETJAM722A                            !
 (4470) DCS[0,00,0,0,0,0]  BM[1100,,10,00,,00,00,,000,,001,,,0,0,0,,0,,0,,,0,0001,,,1,,0000,0,,,11,000,,,011,010,011]

   4323:  !(FREE)
   SETJAM722A:
        P2-T,   SR_CSPD(D16),                           !SET BIT<00>=(1) FOR JAMUPP EXPECTED
        NEXT,   J/BUSFCN722A                            !
 (4323) DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000,,,0,0,1,,0,,0,,,0,0001,,,0,,0000,0,,,11,000,,,011,010,100]
```



```
   4324:  !(FREE)
   BUSFCN722A:
        P1,     BA_SR,                                  !SET BA<17:00>=(140001)
        P3,     INVALIDATE,                             !DO A BUS "INVALIDATE", SHOULD GET ODD ADDRESS ABORTED
        NEXT,   J/NEXT722A                              !GO DELAY
 (4324) DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,00,,000,,000,,,0,0,0,,1,,0,,,1,0111,,,0,,0000,0,,,11,000,,,101,010,100]

   !** AT THIS POINT JAMUPP SHOULD OCCUR **
   !** CLASSIC FLOW (4777) -> (4757) -> (7XXX) -> (4XXX), AND THEN WE'RE BACK HERE **
   !**  RETURN TO ADDRESS LEFT IN CSP(00) **

   !*** END UP HERE IF NO JAMUPP ***
   4524:
   NEXT722A:
        SETUP,  RETURN/TEST722A,                        !FORCE A SCOPE LOOP ON THIS TEST, BUT FIRST
        NEXT,   GOTO-PAGE(7),                           !  MUST DELAY A FEW MICROWORDS FOR BUS
                J/BUTD-IS-ZERO                          !  ERROR TO TAKE EFFECT  (IGNORE "BUT" OUTCOME HERE)
 (4524) DCS[0,00,0,0,0,0]  BM[0101,,00,10,,01,10,,011,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,011,100,001]


   !*** END UP HERE IF JAMUPP ***


   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

   !TEST-722-B CHECKS THAT THE RIGHT JAM (ODD ADDRESS) IS INDICATED IN THE JAMREG:
   !
   !       BIT:     15    14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
   !       FCN:     ODD    0  SSYN YEL  RED  WCS  POW  MEM  SSYN CACH ILL  MGT  RED  ODD  WCS  UBRK
   !                ADR       TIME ZON  ZON  PAR  DIS  PAR  TIME ERR  ADR  ABT  ZON  ADR  PAR  TRAP
   !       (101004)  1     0    0    0    0    0    1    0    0    0    0    0    0    1    0    0

   4464:
   TEST722B:
        P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                LOAD-ERROR(TEST722B),                   !ERROR DIRECTORY KEY
                DCS-CTR(C11,),                          !COMPARE AT TARGET
                BUMP-VERIFY,                            !COUNT
        NEXT,   J/GOTEST722B                            !
 (4464) DCS[1,00,1,0,0,1]  BM[0100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,010,101]

   4325:  !(FREE)
   GOTEST722B:
        SETUP,  RETURN/TEST722C,                        !GO TO SUBR WHICH:
        NEXT,   CALL[ODDJAMTOD]                         !  (JAMREG)-XOR-(101004) -> D, BUT(D=ZERO)  [ODD-ADDRESS]

 (4325) DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,10,,101,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,101,100]



   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

```
17020     ;TEST-722-C CHECKS THAT THE RIGHT BUS FUNCTION DECODE / PBA<17:16> ARE INDICATED IN SERVICE REG:
17021     ;  NOTE:  PBA<17:16> SHOULD NOT BE FORCED TO "11", IN 16. BIT MODE, WHEN BA<15:13>#"110"
17022     ;
17023     ;       BIT:      15   14   13   12   11   10   09   08   07   06   05   04   03   02   01   00
17024     ;       FCN:    DATI   BG    0  NPR DATOB DATO PBA  PBA  HIB  LOB  TAG  CON  FLT  POW  CACH YEL
17025     ;                SERV       TIME              17   16  ERR  ERR  ERR SERV SERV FAIL   ERR ZON
17026     ;       (002340)   0    0    0    0    0    1    0    0    1    1    1    0    0    0    0    0
17027
17028     4465:
17029     TEST722C:
17030             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
17031                     LOAD-ERROR(TEST722C),                   ;ERROR DIRECTORY KEY
17032                     DCS-CTR(C11.),                          ;COMPARE AT TARGET
17033             NEXT,   J/GOTEST722C                            ;
    (4465)  DCS[1,00,1,0,0,0]  BM[0100..00,11..11,00..000..010...0,0,0...0..0...0,0000...0..0000,0...11,000...011,010,110]
17034
17035     4326:  ;(FREE)
17036     GOTEST722C:
17037             SETUP,  RETURN/SCOPE722,                        ;GO TO AUBR WHICH:
17038                                                             ;  CLR=JAM=ERRORS, TO RESET FOR NEXT TEST
17039             NEXT,   CALL[DATOSERVICETOD]                    ;  (SERVICE)=XOR=(002340) => D, BUT(D=ZERO)  (DATO[1]H)
    (4326)  DCS[0,00,0,0,0,0]  BM[0100..00,01..10,10..111..111...0,0,0...0..0...0,0000...0..0000,0...11,100...010,100,110]
17040
17041
17042
17043
17044     4327:  ;(FREE)
17045     SCOPE722:
17046             NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "TEST730A"  (+1, WORDS)
17047                     J/TEST730A                              ;   ERROR:  "SETADR720A"  (-11, WORDS)
    (4327)  DCS[0,00,0,1,0,0]  BM[0000..00,00..00,00..000..000...0,0,0...0..0...0,0000...0..0000,0...11,000...100,111,001]
17048
17049
17050
17051
17052
17053     ;.PAGE=================================================================================================
17054
17055
17056     .TOC    *    TEST730-731:  BUS CYCLES TO/FROM MEMORY
17057
17058     ;*****************************************************************************
17059     ;*
17060     ;*      TESTS:  730A - 731E                             UWORDS:  063 + 057
17061     ;*
17062     ;*      FUNCTIONS:
17063     ;*
17064     ;*      THESE TESTS CHECK THAT ACTUAL BUS CYCLES CAN BE CORRECTLY EXECUTED.
17065     ;*
17066     ;*****************************************************************************
17067
17068
17069
```



```
17070
17071
17072
17073     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17074
17075     ;THIS FIRST SERIES OF TESTS DOES A DATO/DATIP/DATO/DATIB SEQUENCE, CHECKING THAT
17076     ;EACH FUNCTION OPERATES AS EXPECTED.
17077
17078     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17079
17080     ;TEST-730-A DOES A DATO, AND THEN CHECKS THAT THE DBUF LATCH (DS) ALSO GETS LOADED WITH THE
17081     ;  DATA, AND THAT IT IS ENABLED ON BUSDIN IN THE MICROWORD AFTER THE BUS CYCLE (IE, EMIT
17082     ;  IS TEMPORARILY DISABLED)
17083     4471:
17084     TEST730A:
17085             P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
17086                     LOAD-ERROR(TEST730A),                   ;ERROR DIRECTORY KEY
17087                     DCS-CTR(C9.),                           ;COMPARE AT TARGET
17088             NEXT,   J/LOADIR730A                            ;
    (4471)  DCS[1,00,1,0,0,0]  BM[0110..00,11..11,00..000..010...0,0,0...0..0...0,0000...0..0000,0...11,000...111,101,100]
17089
17090     4754:
17091     LOADIR730A:
17092             P2=U,   IR_EMIT, EMIT/125200,                   ;"CMP-BYTE" INSTR; INSTR5=E88(412) DECODE
17093             NEXT,   J/LOADDATA730A                          ;
    (4754)  DCS[0,00,0,0,0,0]  BM[1010..00,10..10,10..000..000...0,0,0...0..0...1,1010...0..0000,0...11,000...011,011,000]
17094
17095     4330:  ;(FREE)
17096     LOADDATA730A:
17097             P3,     CSPD[16]_EMIT, EMIT/125252,             ;PATTERN (125252) IN BASCON AREA
17098             NEXT,   J/BUSFCN730A                            ;
    (4330)  DCS[0,00,0,0,0,0]  BM[1010..10,10..10,10..101..010...0,0,0...0..0...0,0001...1..0000,0...11,000...011,011,001]
17099
17100     4331:  ;(FREE)
17101     BUSFCN730A:
17102             P0,     BUMP=VERIFY,                            ;COUNT
17103             P1,     BA_ASPHI(C000000),                      ;USE MEMORY ADDR(000000)
17104             P2=T,   D_CSPD(B16), D[C]_0,                    ;USE DATA (125252)
17105             P3,     DATO,                                   ;FOR A BUS "DATO" CYCLE
17106             NEXT,   J/GETDBUF730A                           ;
    (4331)  DCS[0,00,0,0,0,1]  BM[1010..11,01..11,01..100..000...0,1,0...1..0...1,0010...0..0000,0...11,000...011,011,010]
17107
17108     4332:  ;(FREE)
17109     GETDBUF730A:
17110             P0,     BUMP=VERIFY,                            ;COUNT
17111             P3,     CSPD[17]_BUSDIN, EMIT/037777,           ;DBUF SHOULD BE ENABLED; EMIT IS NOISE

17112             P3=T,   D_JUNK, SAVE=D[C],                      ;MANGLE DATA IN D, DONT CARE WHAT RESULTS
17113             NEXT,   J/COMP730A                              ;
    (4332)  DCS[0,00,0,0,0,1]  BM[0011..10,11..11,11..111..111...1,1,0...0..0...0,0000...1..0000,0...11,000...011,011,011]
17114
17115     4333:  ;(FREE)
17116     COMP730A:
17117             P0,     BUMP=VERIFY,                            ;COUNT
17118             P2=T,   D_CSPD[17]=XOR=ASPHI(C125252),           ;COMPARE RECEIVED;EXPECTED
```

```
                NEXT,   J/ZAPDBUF730A                              !
        (4333)  DCS[0.00.0.0.0.1]  BM[0110..10.00..11.01..110..000...0.1.0..0..0...0.0000...0..0000.0...11.000...011.011.100]

        4334:  !(FREE)
        ZAPDBUF730A:
                P3,     DBUF_D-[I],                                !COPY ZEROED(?) D-REG INTO DBUF
                NEXT,   J/GOBUT730A                                !
        (4334)  DCS[0.00.0.0.0.0]  BM[0100..00.00..00.00..000..100...0.0.0..0..0...1.1011...0..0000.0...11.000...011.011.101]

        4335:  !(FREE)
        GOBUT730A:
                SETUP,  RETURN/TEST730B,                           !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                              !BUT TABLE
                        J/BUTD-IS-ZERO                             !CHECK FOR EQUALITY
        (4335)  DCS[0.00.0.0.0.0]  BM[0100..00.10..01.10..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]







        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST-730-B DOES A DATIP, AND THEN CHECKS THAT:
        !  1) NO ODD ADDRESS ERROR RESULTS
        !  2) THE RIGHT DATA (OUTPUT ABOVE) IS RETRIEVED  (NOTE DBUF LATCH WAS ZEROED
        !     TO ALTER ITS COPY OF THE DATA)
        !  3) THE BUS HOLDING FUNCTION OF THE 'DATIP' SHOULD BE EMPLOYED; 'BBSY' SHOULD REMAIN ASSERTED
        !       WELL PAST THE 'NORMAL' 1 MICROWORD AFTER THE BUS CYCLE.  IN FACT, IT SHOULD REMAIN ASSERTED
        !       (HOLDING BUSDIN=UNIBUS-DATA-BUFFER, NOT EMIT, ETC) UNTIL CLEARED BY ANOTHER BUS CYCLE
        !       (NOT A DATIP), OR A BUTA(LAST) [DONE HERE].
        4466:
        TEST730B:
                P0,     LOAD-ENUA(ZTARGET402),                     !SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TEST730B),                      !ERROR DIRECTORY KEY
                        DCS-CTR(C7.),                              !COMPARE AT TARGET
                NEXT,   J/EXPEC730B                                !
        (4466)  DCS[1.00.1.0.0.0]  BM[1000..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.110]

        4336:  !(FREE)
        EXPEC730B:
                P3,     CSPD[02]_EMIT, EMIT/000340,                !SERVICE PORT BITS FOR A "DATIP"
                NEXT,   J/BUSFCN730B                               !
        (4336)  DCS[0.00.0.0.0.0]  BM[0000..10.00..00.11..100..000...0.0.0..0..0...0.1101...1..0000.0...11.000...011.011.111]

        4337:  !(FREE)
        BUSFCN730B:
                P1,     BA_ASPHI(C000001),                         !USE MEMORY ADDR(000001), ODD BYTE
                P2-T,   D_ZERO, D[C]_ALU15,                        !ZAP D
                P3,     DATIP,                                     !FOR A BUS "DATIP" CYCLE
                        BUTA(CLR-FLAG-RES-UCON),                   !RESET BUSDIN TO EMIT/ZAP DBUF_D UCON
                NEXT,   J/GETIT730B                                !
```



```
        (4337)  DCS[0.00.0.0.0.0]  BM[0011..00.00..11.01..000..100...0.1.0..1..0...1.0100...0..0000.0...11.010...011.100.000]

        4340:  !(FREE)
        GETIT730B:
                P0,     BUMP-VERIFY,                               !COUNT
                P3,     CSPD[17]_BUSDIN, EMIT/052525,              !UNIBUS DATA SHOULD BE ENABLED; EMIT IS NOISE
                NEXT,   J/GOBUT730B                                !
        (4340)  DCS[0.00.0.0.0.1]  BM[0101..10.01..01.01..010..101...0.0.0..0..0...0.0000...1..0000.0...11.000...011.100.001]

        4341:  !(FREE)
        GOBUT730B:
                SETUP,  RETURN/TEST730C,                           !EXEC SUBR WHICH:
                NEXT,   CALL[CSP17XOR125252]                       !  CSP(17)-XOR-(125252) => D, BUT(D=ZERO)
        (4341)  DCS[0.00.0.0.0.0]  BM[0100..00.10..01.10..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.000.011]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST-730-C NOW CHECKS THAT THE 'DATIP' FUNCTION IS STILL HOLDING THE BUS BY
        !  VERIFYING THAT THE UNIBUS DATA BUFFER IS STILL ENABLED ON BUSDIN, DATA=(125252)
        4460:
        TEST730C:
                P0,     LOAD-ENUA(ZTARGET402),                     !SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TEST730C),                      !ERROR DIRECTORY KEY
                        DCS-CTR(C5.),                              !COMPARE AT TARGET
                        BUMP-VERIFY,                               !COUNT
                NEXT,   J/GOBUT730C                                !
        (4460)  DCS[1.00.1.0.0.1]  BM[1010..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.100.010]

        4342:  !(FREE)
        GOBUT730C:
                SETUP,  RETURN/TEST730C1,                          !EXEC SUBR WHICH:
                                                                   !  1) BUSDIN => CSP(17), EMIT=(052525)
                NEXT,   CALL[BUSDINXOR125252]                      !  2) CSP(17)-XOR-(125252) => D, BUT(D=ZERO)
        (4342)  DCS[0.00.0.0.0.0]  BM[0100..00.10..01.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...001.111.111]





        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST-730-C1 NOW CHECKS THAT THE 'DATIP' FUNCTION WILL RELEASE THE BUS BY

        !  VERIFYING THAT THE UNIBUS DATA BUFFER IS NOT ENABLED ON BUSDIN, DATA=(125252),
        !  AFTER ISSUING BUTA(LAST), WHICH SHOULD CLEAR THE DATIP/BBSY FLOP
        4450:
        TEST730C1:
                P0,     LOAD-ENUA(ZTARGET402),                     !SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TEST730C1),                     !ERROR DIRECTORY KEY
```

```
17214                   DCS-CTR(C6,),                           !COMPARE AT TARGET
17215           P3,     BUTA(LAST),                             !ACTIVE BUT EFFECT:  CLEAR OUT DATIP
17216           NEXT,   J/GOBUT730C1                            !
     (4440)  DCS[1,00,1,0,0,0]  BM[1010..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...10,000...100,100,011]
17217
17218   4443:
17219   GOBUT730C1:
17220           SETUP,  RETURN/TEST730D,                        !EXEC SUBR WHICH:
17221                                                           !  1) BUSDIN => CSP(17), EMIT=(052525)
17222           NEXT,   CALL[BUSDINXOR052525]                   !  2) CSP(17)-XOR-(052525) -> D, BUT(D=ZERO)
     (4443)  DCS[0,00,0,0,0,0]  BM[0100..00.10..01.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,000,100]
17223
17224
17225
17226
17227   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17228
17229   !TEST-730-D DOES A DATO FOLLOWED BY A DATIB+BYTE+ODD, AND THEN CHECKS THAT THE RIGHT DATA
17230   !  IS WRITTEN/RETRIEVED FROM MEMORY LOCATIONS (000000)/(000001)
17231   !  AND THAT THE EMIT-DISABLE/UNIBUS DATA BUFFER ENABLE IS HANDLED CORRECTLY
17232   4461:
17233   TEST730D:
17234           P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
17235                   LOAD-ERROR(TEST730D),                   !ERROR DIRECTORY KEY
17236                   DCS-CTR(C15,),                          !HOLD UP FOR NOW
17237           NEXT,   J/LOADDATA730D                          !
     (4461)  DCS[1,00,1,0,0,0]  BM[0000..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11,000...011,100,011]
17238
17239   4343:  !(FREE)
17240   LOADDATA730D:
17241           P3,     CSPD[16]_EMIT, EMIT/052525,             !PATTERN (052525) IN BASCON AREA
17242           NEXT,   J/SETZER730D                            !
     (4343)  DCS[0,00,0,0,0,0]  BM[0101..10.01..01.01..010..101...0.0.0..0..0...0.0001...1..0000.0...11,000...011,100,100]
17243
17244   4344:  !(FREE)
17245   SETZER730D:
17246           P1,     BA_ASPHI(C000000),                      !USE MEMORY ADDR(000000)
17247           P2=T,   D_CSPB(B16), D[C]_0,                    !USE DATA (052525)
17248           P3,     DATO,                                   !FOR A BUS "DATO" CYCLE
17249           NEXT,   J/MANGLED730D                           !
     (4344)  DCS[0,00,0,0,0,0]  BM[1010..11.01..11.01..100..000...0.1.0..1..0...1.0010...0..0000.0...11,000...011,100,101]
17250
17251   4345:  !(FREE)
17252   MANGLED730D:
17253           P3=T,   D_ASPHI(C125252), SAVE=D[C],            !MANGLE D CONTENTS, AFTER/AT P3=T
17254           NEXT,   J/BUSFCN730D                            !
     (4345)  DCS[0,00,0,0,0,0]  BM[1111..00.00..11.01..110..111...1.1.0..0..0...0.0000...0..0000.0...11,000...011,100,110]
17255
17256   4346:  !(FREE)
17257   BUSFCN730D:
17258           P0,     BUMP=VERIFY,                            !COUNT
17259                   DCS-CTR(C12,),                          !COMPARE AT TARGET
17260           P1,     BA_ASPHI(C000001),                      !ADDRESS ODD BYTE
```



```
17261           P3,     DATIB,                                  !BYTE READ => PLAIN DATI; NO ODD ADDRESS ERROR
17262           NEXT,   J/GETIT730D                             !
     (4346)  DCS[0,00,1,0,0,1]  BM[0011..00.00..11.01..000..000...0.0.0..1..0...1.0011...0..0000.0...11,000...011,100,111]
17263
17264   4347:  !(FREE)
17265   GETIT730D:
17266           P3,     CSPD[17]_BUSDIN, EMIT/000000,           !UNIBUS DATA SHOULD BE ENABLED; EMIT IS NOISE
17267           NEXT,   J/GOBUT730D                             !
     (4347)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.00..000..000...0.0.0..0..0...0.0000...1..0000.0...11,000...011,101,000]
17268
17269   4350:  !(FREE)
17270   GOBUT730D:
17271           SETUP,  RETURN/TEST730E,                        !GO TO SUBR WHICH:
17272           NEXT,   CALL[CLRSERVICETOD]                     !  (SERVICE)-XOR-(000340) => D, BUT(D=ZERO)
     (4350)  DCS[0,00,0,0,0,0]  BM[0100..00.10..01.10..010..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,100,100]
17273
17274
17275
17276
17277
17278
17279
17280   ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17281
17282
17283   !TEST-730-E NOW CHECKS THAT THE BUS FUNCTION ABOVE ACTUALLY RETRIEVED THE RIGHT DATA:
17284   !  THE (052525) WRITTEN TO MEMORY LOCATION (000000) IN TEST730D
17285   4462:
17286   TEST730E:
17287           P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
17288                   LOAD-ERROR(TEST730E),                   !ERROR DIRECTORY KEY
17289                   DCS-CTR(C4,),                           !COMPARE AT TARGET
17290           NEXT,   J/GOBUT730E                             !
     (4462)  DCS[1,00,1,0,0,0]  BM[1011..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11,000...011,101,001]
17291
17292   4351:  !(FREE)
17293   GOBUT730E:
17294           SETUP,  RETURN/SCOPE730,                        !EXEC SUBR WHICH:
17295           NEXT,   CALL[CSP17XOR052525]                    !  CSP(17)-XOR-(052525) -> D, BUT(D=ZERO)
     (4351)  DCS[0,00,0,0,0,0]  BM[0100..00.01..11.01..010..111...0.0.0..0..0...0.0000...0..0000.0...11,100...010,000,101]
17296
17297
17298   4352:  !(FREE)
17299   SCOPE730:
17300           NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST731A"  (+1, WORDS)
17301                   J/TEST731A                              !   ERROR:  "LOADIR730A"  (-24, WORDS)

     (4352)  DCS[0,00,0,1,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,000...111,101,101]
17302
17303
17304
17305
17306
```

```
	! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

	!THIS SECOND SERIES OF TESTS DOES A DATOB/DATI/DATI-CLKIR SEQUENCE, CHECKING THAT
	!EACH FUNCTION OPERATES AS EXPECTED.

	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

	!TEST-731-A DOES A DATOB*BYTE*ODD, AND THEN CHECKS THAT THE DBUF LATCH (DS) ALSO GETS LOADED WITH THE
	!  DATA, AND THAT IT IS ENABLED ON BUSDIN IN THE MICROWORD AFTER THE BUS CYCLE (IE, EMIT
	!  IS TEMPORARILY DISABLED)
	4755:
	TEST731A:
		P0,	LOAD-ENUA(ZTARGET402),			!SETUP FOR D=ZERO COMPARE
			LOAD-ERROR(TEST731A),			!ERROR DIRECTORY KEY
			DCS-CTR(C6.),				!COMPARE AT TARGET
		NEXT,	J/BUSFCN731A				!
    (4755)  DCS[1.00.1.0.0.0]  BM[1001..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...111.110.100]

	4764:
	BUSFCN731A:
		P1,	BA_ASPHI(C000001),			!USE MEMORY ADDR(000001), ODD BYTE
		P2-T,	D_ZERO, D[C]_ALU15,			!USE DATA (000), ONE BYTE (ODD) ONLY
		P3,	DATOB,					!FOR A BUS "DATOB*BYTE*ODD" CYCLE
		NEXT,	J/GETDBUF731A				!
    (4764)  DCS[0.00.0.0.0.0]  BM[0011..00.00..11.01..000..100...0.1.0..1..0...1.0101...0..0000.0...11.000...011.101.011]

	4353:  !(FREE)
	GETDBUF731A:
		P0,	BUMP-VERIFY,				!COUNT
		P3,	CSPD[17]_BUSDIN,			!DBUF SHOULD BE ENABLED; EMIT IS NOISE
		P3-T,	D_ASPHI(C177777), SAVE-D[C],		!MANGLE DATA IN D, DONT CARE WHAT RESULTS
		NEXT,	J/COMP731A				!
    (4353)  DCS[0.00.0.0.0.1]  BM[1111..10.00..11.01..101..111...1.1.0..0..0...0.0000...1..0000.0...11.000...011.101.100]

	4354:  !(FREE)
	COMP731A:
		P2-T,	D_CSPD(D17), SAVE-D[C],			!COMPARE RECEIVED:(000000)
		NEXT,	J/GOBUT731A				!
    (4354)  DCS[0.00.0.0.0.0]  BM[1010..10.00..00.00..000..111...0.1.0..0..0...0.0000...0..0000.0...11.000...011.101.101]

	4355:  !(FREE)
	GOBUT731A:
		SETUP,	RETURN/TEST731B,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				!BUT TABLE
			J/BUTD-IS-ZERO				!CHECK FOR EQUALITY
    (4355)  DCS[0.00.0.0.0.0]  BM[0100..00.10..01.01..111..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
```



```
	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

	!TEST-731-B NOW CHECKS THAT NONE OF THE ABOVE BUS FUNCTIONS HAS ALTERED THE IR FROM WHEN
	!  IT WAS LOADED IN TEST730A, WITH THE VALUE (125200), INSTR5-E88(412) DECODE
	4457:
	TEST731B:
		P0,	LOAD-ENUA(ZTARGET412),			!SETUP FOR INSTR5/E88 DECODE
			LOAD-ERROR(TEST731B),			!ERROR DIRECTORY KEY
			DCS-CTR(C5.),				!COMPARE AT TARGET
		NEXT,	J/BUSFCN731B				!
    (4457)  DCS[1.00.1.0.0.0]  BM[1010..00.11..11.00..001..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.101.110]

	4356:  !(FREE)
	BUSFCN731B:
		P1,	BA_ASPHI(C000000),			!USE MEMORY ADDR(000000)
		P3,	DATI,					!FOR A BUS "DATI" CYCLE
		NEXT,	J/GETIT731B				!
    (4356)  DCS[0.00.0.0.0.0]  BM[0000..00.00..11.01..100..000...0.0.0..1..0...1.0110...0..0000.0...11.000...011.101.111]

	4357:  !(FREE)
	GETIT731B:
		P0,	BUMP-VERIFY,				!COUNT
		P3,	CSPD[17]_BUSDIN, EMIT/152500,		!UNIBUS DATA SHOULD BE ENABLED; EMIT IS NOISE
		NEXT,	J/GOBUT731B				!  THIS DATA IS INSTR5-E88(405) DECODE
    (4357)  DCS[0.00.0.0.0.1]  BM[1101..10.01..01.01..000..000...0.0.0..0..0...0.0000...1..0000.0...11.000...011.110.000]

	4360:  !(FREE)
	GOBUT731B:
		SETUP,	RETURN/TEST731C,			!RETURN TO START OF NEXT SUBTEST
		NEXT,	GOTO-PAGE(7),				!BUT TABLE
			J/BUTINSTR5				!CHECK THAT IR STILL HAS DATA (125200)
    (4360)  DCS[0.00.0.0.0.0]  BM[0100..00.10..01.01..110..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.001]

	! -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

	!TEST-731-C NOW CHECKS THAT THE BUS FUNCTION ABOVE ACTUALLY RETRIEVED THE RIGHT DATA:

	!  THE (052525) WRITTEN TO MEMORY LOCATION (001)/(000) IN TEST730D
	!  AND THE (000) WRITTEN TO MEMORY LOCATION (001) IN TEST731A
	!  TOGETHER THESE FORM A (000125) IN MEMORY LOCATION (001)#(000):  INSTR5-E78(432) DECODE
	4456:
	TEST731C:
		P0,	LOAD-ENUA(ZTARGET432),			!SETUP FOR INSTR5-E78(432) DECODE
			LOAD-ERROR(TEST731C),			!ERROR DIRECTORY KEY
```

```
17404                   DCS-CTR(C7,),                           ;COMPARE AT TARGET
17405                   BUMP-VERIFY,                            ;COUNT
17406           NEXT,   J/COMP731C                              ;
     (4456)  DCS[1,00,1,0,0,1]  BM[1000,,00,11,,11,00,,011,,010...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,011,110,001]
17407
17408    4361:  ;(FREE)
17409    COMP731C:
17410           P2=T,   D_CSPD(D17), D[C]_0,                    ;GET DATA READ FROM DATI, ABOVE
17411           NEXT,   J/GOBUT731C                             ;
     (4361)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,000...0,1,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,011,110,010]
17412
17413    4362:  ;(FREE)
17414    GOBUT731C:
17415           SETUP,  RETURN/TEST731D,                        ;RETURN TO START OF NEXT SUBTEST
17416           NEXT,   CALL[DINTOIR=5]                         ;SUBR FOR:  D => IR, BUT(INSTR5)
     (4362)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,01,,101,,111...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,010,111,011]
17417
17418
17419
17420
17421
17422    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17423
17424    ;TEST-731-D DOES A DATI-CLKIR, AND THEN CHECKS THAT THE RIGHT DATA
17425    ;  IS WRITTEN/RETRIEVED FROM MEMORY LOCATIONS (0000001)/(0000001)
17426    ;  AND THAT THE EMIT-DISABLE/UNIBUS DATA BUFFER ENABLE IS HANDLED CORRECTLY
17427    4455:
17428    TEST731D:
17429           P0,     LOAD-ENUA(ZTARGET402),                  ;SETUP FOR D=ZERO COMPARE
17430                   LOAD-ERROR(TEST731D),                   ;ERROR DIRECTORY KEY
17431                   DCS-CTR(C14,),                          ;COMPARE AT TARGET
17432           NEXT,   J/LOADIR731D                            ;
     (4455)  DCS[1,00,1,0,0,0]  BM[0001,,00,11,,11,00,,000,,010...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,011,110,011]
17433
17434    4363:  ;(FREE)
17435    LOADIR731D:
17436           P2=U,   IR_EMIT, EMIT/125200,                   ;PREV DATA IN IR FOR INSTR5-E88(412)
17437           NEXT,   J/BUSFCN731D                            ;
     (4363)  DCS[0,00,0,0,0,0]  BM[1010,,00,10,,10,10,,000,,000...0,0,0,,0,,0...1,1010,,,0,,0000,0,,,11,000,,,011,110,100]
17438
17439    4364:  ;(FREE)
17440    BUSFCN731D:
17441           P1,     BA_ASPHI(C000000),                      ;FROM LOCATION (000000)
17442           P3,     DATI-CLKIR,                             ;DO A DATI, AND CLKIR
17443           NEXT,   J/MANGLED731D                           ;
     (4364)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,100,,000...0,0,0,,1,,0...1,0000,,,0,,0000,0,,,11,000,,,011,110,101]
17444
17445    4365:  ;(FREE)
17446    MANGLED731D:
17447           P2=U,   ;IR_DATA,                               ;IR SHOULD GET DATA HERE
17448                   EMIT/152500,                            ;NOISE ON EMIT:  INSTR5-E88(405)
17449           NEXT,   J/GOBUT731D                             ;
     (4365)  DCS[0,00,0,0,0,0]  BM[1101,,00,01,,01,01,,000,,000...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,011,110,110]
```



```
17450
17451    4366:  ;(FREE)
17452    GOBUT731D:
17453           SETUP,  RETURN/TEST731E,                        ;GO TO SUBR WHICH:
17454           NEXT,   CALL[CLRSERVICETOD]                     ;  (SERVICE)_XOR=(000340) -> D, BUT(D=ZERO)
     (4366)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,01,,100,,111...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,010,100,100]
17455
17456
17457
17458
17459
17460
17461
17462    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17463
17464
17465    ;TEST-731-E NOW CHECKS THAT THE BUS FUNCTION ABOVE ACTUALLY RETRIEVED THE RIGHT DATA:
17466    4454:
17467    TEST731E:
17468           P0,     LOAD-ENUA(ZTARGET432),                  ;SETUP FOR INSTR5-E78(432) DECODE
17469                   LOAD-ERROR(TEST731E),                   ;ERROR DIRECTORY KEY
17470                   DCS-CTR(C3,),                           ;COMPARE AT TARGET
17471           NEXT,   J/GOBUT731E                             ;
     (4454)  DCS[1,00,1,0,0,0]  BM[1100,,00,11,,11,00,,011,,010...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,000,,,011,110,111]
17472
17473    4367:  ;(FREE)
17474    GOBUT731E:
17475           SETUP,  RETURN/SCOPE731,                        ;RETURN TO SCOPE LOOP TEST WORD
17476           NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
17477                   J/BUTINSTR5                             ;CHECK FOR RIGHT DATA
     (4367)  DCS[0,00,0,0,0,0]  BM[0100,,00,01,,11,11,,000,,111...0,0,0,,0,,0...0,0000,,,0,,0000,0,,,11,100,,,011,000,001]
17478
17479
17480    4370:  ;(FREE)
17481    SCOPE731:
17482           P2=U,   IR_EMIT, EMIT/125200,                   ;RESET IR FOR SCOPE LOOP
17483           NEXT,   BUTD[SCOPE],                            ;NO ERROR:  "LOADIR740A"  (+5, WORDS)
17484                   J/LOADIR740A                            ;   ERROR:  "BUSFCN731A"  (-18, WORDS)
     (4370)  DCS[0,00,0,1,0,0]  BM[1010,,00,10,,10,10,,000,,000...0,0,0,,0,,0...1,1010,,,0,,0000,0,,,11,000,,,111,110,101]
17485
17486
17487    ;       -       -       -       -       -       -       -       -       -       -       -       -       -
17488
17489    ;       THESE SUBROUTINES ARE USED IN THE PREVIOUS TESTS:
17490
17491    7177:  ;(FREE)

17492    RDX12:
17493           P3,     CSPD[17]_BUSDIN, EMIT/052525,           ;ENTRY FOR "BUSDINXOR125252"
17494           NEXT,   J/C17X12                                ;
     (7177)  DCS[0,00,0,0,0,0]  BM[0101,,10,01,,01,01,,010,,101...0,0,0,,0,,0...0,0000,,,1,,0000,0,,,11,000,,,010,000,011]
17495
17496    7203:  ;(FREF)
```

```
C17X12:
        P2-T,   D_CSPD[17]-XOR-ASPHI(C125252),          !ENTRY FOR "CSP17XOR125252"
                SAVE-D[C],                              !
        NEXT,   J/BUTD-IS-ZERO                          !FINISH OUT BY TESTING RESULT OF COMPARISON
  (7203)  DCS[0.00.0.0.0.0]  BM[0110..10.00..11.01..110..111...0.1.0..0..0...0.0000...0..0000.0...11.000...011.100.001]


7204:  !(FREE)
BDX05:
        P3,     CSPD[17]_BUSDIN, EMIT/052525,           !ENTRY FOR "BUSDINXOR052525"
        NEXT,   J/C17X05                                !
  (7204)  DCS[0.00.0.0.0.0]  BM[0101..10.01..01.01..010..101...0.0.0..0..0...0.0000...1..0000.0...11.000...010.000.101]
7205:  !(FREE)
C17X05:
        P2-T,   D_CSPD[17]-XOR-ASPHI(C052525),          !ENTRY FOR "CSP17XOR052525"
                SAVE-D[C],                              !
        NEXT,   J/BUTD-IS-ZERO                          !FINISH OUT BY TESTING RESULT OF COMPARISON
  (7205)  DCS[0.00.0.0.0.0]  BM[0110..10.00..11.01..111..111...0.1.0..0..0...0.0000...0..0000.0...11.000...011.100.001]


!    -    -    -    -    -    -    -    -    -    -    -    -    -    -





!.PAGE=========================================================================================


.TOC    *    TEST740:  BUS CYCLE MODIFICATION - PREFETCH ALTERATION, OVERLAP YANK

!**************************************************************************************
!*
!*      TESTS:  740A - 740D                             UWORDS:  020 + 043
!*
!*      FUNCTIONS:
!*
!*      THESE FOUR TESTS CHECK THAT LOGIC CONCERNED WITH:
!*
!*              1) BC0/PREFETCH = BC0[1] * NOT(PREFETCH*BUT[INSTR1])
!*                      IE, ALTER BUS CODE (**1) => (**0), IN A PREFETCH SITUATION
!*
!*      AND     2) BEGIN-DATA-XFER = BEGIN[BUS/UCOM] * NOT(PULSE-SUPPRESS(0)) * NOT(INH-SPLO)
!*                      IE, 'YANK' [STOP] A BUS CYCLE IN A NON-OVERLAP SITUATION
!*
!**************************************************************************************





!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
```



```
!TEST-740-A CHECKS THAT BC[0]-H DOES NOT GET ALTERED FROM (1) => (0) WHEN:
!  BUTA[INSTR1]-H IS ASSERTED, BUT PREFETCH-H IS NEGATED
4765:
LOADIR740A:
        P2-U,   IR_EMIT, EMIT/056000,                   !(OVERLAP,-PREFETCH), (-BYTE,DOP,-SMO)
        NEXT,   J/TEST740A                              !
  (4765)  DCS[0.00.0.0.0.0]  BM[0101..00.11..00.00..000..000...0.0.0..0..0...1.1010...0..0000.0...11.000...111.100.100]

4744:
TEST740A:
        P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                LOAD-ERROR(TEST740A),                   !ERROR DIRECTORY KEY
                DCS-CTR(C12.),                          !COMPARE AT TARGET
        NEXT,   J/BUSFCN740A                            !
  (4744)  DCS[1.00.1.0.0.0]  BM[0011..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.111.001]
4371:  !(FREE)
BUSFCN740A:
        P0,     BUMP-VERIFY,                            !COUNT
        P1,     BA_ASPHI(C000000),                      !USE MEMORY ADDR (000000)
        P2-T,   SR_ZERO,                                !SR<00>=(0), FOR UNEXPECTED JAMUPPS
        P3,     DATIB,                                  !CODE=(3)/DATIB, POSSIBLY ALTERED TO (2)/DATO
                BUTA(INSTR-1),                          !ACTIVE EFFECT ONLY - BRANCH MASKED
        NEXT,   J/GOBUT740A                             !(056000) TARGETS TO (316), MASKED UNDER (776)
  (4371)  DCS[0.00.0.0.0.1]  BM[0011..00.00..11.01..100..000...0.0.1..1..0...1.0011...0..0000.0...00.110...111.111.110]
4776:
GOBUT740A:
        SETUP,  RETURN/LOADIR740B,                      !GO TO SUBR WHICH:
                                                        !  CLR-JAM-ERRORS, FOR INSURANCE
        NEXT,   CALL[DATISERVICETOD]                    !  (SERVICE)-XOR-(100340) => D, BUT(D=ZERO)
  (4776)  DCS[0.00.0.0.0.0]  BM[0100..00.01..11.11..010..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.100.101]





!  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

!TEST-740-B CHECKS THAT BC[0]-H DOES GET ALTERED FROM (1) => (0) WHEN:
!  BUTA[INSTR1]-H IS ASSERTED, AND PREFETCH-H IS ASSERTED
4372:  !(FREE)
LOADIR740B:
        P2-U,   IR_EMIT, EMIT/020606,                   !(OVERLAP,PREFETCH), (-BYTE,DOP,SMO)
        NEXT,   J/TEST740B                              !
  (4372)  DCS[0.00.0.0.0.0]  BM[0010..00.00..01.10..000..110...0.0.0..0..0...1.1010...0..0000.0...11.000...100.101.011]


4453:
TEST740B:
        P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO COMPARE
                LOAD-ERROR(TEST740B),                   !ERROR DIRECTORY KEY
                DCS-CTR(C12.),                          !COMPARE AT TARGET
        NEXT,   J/BUSFCN740B                            !
```

```
   (4453)  DCS[1,00,1,0,0,0]  BM[0011,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,011]

       4373:  !(FREE)
       BUSFCN740B:
               P1,      BA_ASPHI(C000000),                    !USE MEMORY ADDR (000000)
               P3,      DATIB,                                !CODE=(3)/DATIB, POSSIBLY ALTERED TO (2)/DATO
                        BUTA(INSTR-1),                        !ACTIVE EFFECT ONLY - BRANCH MASKED
               NEXT,    J/GOBUT740B                           !(020606) TARGETS TO (042), MASKED UNDER (766)
   (4373)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,100,,000,,,0,0,0,,1,,0,,,1,0011,,,0,,0000,0,,,00,110,,,111,110,110]

       4766:
       GOBUT740B:
               SETUP,   RETURN/TEST740C,                      !GO TO SUBR WHICH:
                                                              !  CLR-JAM-ERRORS, FOR INSURANCE
               NEXT,    CALL[DATOSERVICETOD]                  !  (SERVICE)-XOR-(002340) -> D, BUT(D=ZERO)
   (4766)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,01,01,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,110]




       ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

       !TEST-740-C CHECKS THAT BC(0)-H DOES NOT GET ALTERED FROM (1) -> (0) WHEN:
       !  BUTA[INSTR1]-H IS NEGATED, BUT PREFETCH-H IS ASSERTED
       4452:
       TEST740C:
               P0,      LOAD-ENUA(ZTARGET402),                !SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TEST740C),                 !ERROR DIRECTORY KEY
                        DCS-CTR(C12,),                        !COMPARE AT TARGET
                        BUMP-VERIFY,                          !COUNT
               NEXT,    J/BUSFCN740C                          !IR AS ABOVE;  (OVERLAP,PREFETCH), (-BYTE,DOP,SMO)
   (4452)  DCS[1,00,1,0,0,1]  BM[0011,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,011,111,100]

       4374:  !(FREE)
       BUSFCN740C:
               P1,      BA_ASPHI(C000000),                    !USE MEMORY ADDR (000000)
               P3,      DATIB,                                !CODE=(3)/DATIB, POSSIBLY ALTERED TO (2)/DATO
               NEXT,    J/GOBUT740C                           !(020606) TARGETS TO (042), MASKED UNDER (766)
   (4374)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,100,,000,,,0,0,0,,1,,0,,,1,0011,,,0,,0000,0,,,11,000,,,011,111,101]

       4375:  !(FREE)
       GOBUT740C:
               SETUP,   RETURN/LOADIR740D,                    !GO TO SUBR WHICH:
                                                              !  CLR-JAM-ERRORS, FOR INSURANCE
               NEXT,    CALL[DATISERVICETOD]                  !  (SERVICE)-XOR-(100340) -> D, BUT(D=ZERO)
   (4375)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,00,00,,000,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,101]
```



```
       ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

       !TEST-740-D CHECKS THAT WHEN BUTA[INSTR1]-H IS ASSERTED, AND OVERLAP-L IS
       !   NEGATED, THEN THE BUS CYCLE IS NOT EVEN ALLOWED TO BEGIN
       4400:  !(FREE)
       LOADIR740D:
               P0,      BUMP-VERIFY,                          !COUNT
               P2-U,    IR_EMIT, EMIT/076000,                 !(-OVERLAP,-PREFETCH), (-BYTE,-DOP,-SOP)
               NEXT,    J/TEST740D                            !
   (4400)  DCS[0,00,0,0,0,1]  BM[0111,,00,11,,00,00,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,100,101,001]

       4451:
       TEST740D:
               P0,      LOAD-ENUA(ZTARGET402),                !SETUP FOR D=ZERO COMPARE
                        LOAD-ERROR(TEST740D),                 !ERROR DIRECTORY KEY
                        DCS-CTR(C11,),                        !COMPARE AT TARGET
               NEXT,    J/BUSFCN740D                          !
   (4451)  DCS[1,00,1,0,0,0]  BM[0100,,00,11,,11,00,,000,,010,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,100,000,001]

       4401:  !(FREE)
       BUSFCN740D:
               P1,      BA_ASPHI(C000001),                    !USE MEMORY ADDR (000001), TRY TO FORCE ODD ADDR
               P3,      DATO,                                 !TRY TO ALTER SERVICE FROM (100340)/DATI TO (002340)/DATO
                        BUTA(INSTR-1),                        !ACTIVE EFFECT ONLY - BRANCH MASKED
               NEXT,    J/GOBUT740D                           !(076000) TARGETS TO (047), MASKED UNDER (767)
   (4401)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,11,01,,000,,000,,,0,0,0,,1,,0,,,1,0010,,,0,,0000,0,,,00,110,,,111,110,111]

       4767:
       GOBUT740D:
               SETUP,   RETURN/SCOPE740,                      !GO TO SUBR WHICH:
                                                              !  [CSP(02) LOADED IN LAST TEST; SAME VALUE= (100340)]
               NEXT,    CALL[CJESERVICETOD]                   !  (SERVICE)-XOR-CSP(02) -> D, BUT(D=ZERO)
   (4767)  DCS[0,00,0,0,0,0]  BM[0100,,00,10,,00,00,,010,,111,,,0,0,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,100,,,010,100,111]



       4402:  !(FREE)
       SCOPE740:
               P2-U,    IR_EMIT, EMIT/056000,                 !RELOAD IR FOR TEST740A
               NEXT,    BUTD[SCOPE],                          !NO ERROR:  "TEST761A"  (+1, WORDS)
                        J/TEST761A                            !   ERROR:  "LOADIR740A"  (-16, WORDS)
   (4402)  DCS[0,00,0,1,0,0]  BM[0101,,00,11,,00,00,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,111,100,101]




       !.PAGE===================================================================================================


       .TOC    *    TEST761-763:  TESTING UNIBUS INTERRUPT SERVICE WITH DL11-W LINE CLOCK

       !********************************************************************************
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```
17690     ;*
17691     ;*     TESTS:  761A - 763D                                  UWORDS: 060 + 045
17692     ;*
17693     ;*     FUNCTIONS:      TESTS 761A - 763D CAUSE AN INTERRUPT ON THE UNIBUS AT
17694     ;*                       LEVEL BR6, USING THE DL11-W LINE CLOCK AS A GENERATOR,
17695     ;*                       THEN TEST TO SEE THAT ALL THE APPROPRIATE BELLS AND
17696     ;*                       WHISTLES AND PARAPHERNALEAXJAISOOURE ARSO RESPOND.
17697     ;*
17698     ;*************************************************************************
17699
17700
17701
17702
17703
17704
17705     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17706
17707     ;THIS FIRST SET OF THREE TESTS CLEAR OUT ALL THE I-O UCON REGISTERS;
17708     ;CLR-JAM-ERRORS, CLR-YELLOW-ZONE, CLEAR-CONSOLE-SERVICE, CLR-NPR-TIMEOUT, CLR-PWR-FAIL, AND
17709     ;ALSO THIS TIME DO AN "INIT" ON THE UNIBUS, VIA THE BUS-INIT-UCON FUNCTION,
17710     ;ALSO SET ALL THE FLAGS<8:0>H=ZERO, AND THE FULL PS<15:00>H=ZERO,
17711     ;(IE, PROCESSOR PRIO=0, T-BIT=0),
17712     ;
17713     ;THEN CHECK TO SEE THAT ALL THE RELEVANT BUS CONTROL INTERRUPT LOGIC IS RESET.
17714
17715
17716
17717
17718
17719     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17720
17721     ;TEST 761A CHECKS THAT SERVICE-H=NOT(INTR-HIGH-H*FLAG7(0)H*BG-SERVICE(0)H) IS LOW,
17722     ;  WHEN INTR-HIGH-H=HIGH, FLAG7(0)H=HIGH, AND BG-SERVICE(0)H=HIGH
17723     ;  IE, AFTER UNIBUS-INIT, AND CLEAR SERVICE CONDITIONS, W/ PSW PRIO=000,
17724     ;  THERE SHOULD BE NOTHING PENDING
17725     4745:
17726     TEST761A:
17727           P0,     LOAD-ENUA(ZTARGET402),                 ;BIT<00> CLEAR
17728                   LOAD-ERROR(TEST761A),                  ;ERROR DIRECTORY KEY
17729                   DCS-CTR(C12,),                         ;COMPARE AT TARGET
17730           P3,     BUTA(CLR-FLAG-RES-UCON),               ;SET SR/LOAD, BUSDIN/EMIT
17731           NEXT,   J/ZERODSR761A                          ;
     (4745)  DCS[1,00,1,0,0,0]  BM[0011..00,11..11,00..000..010...0.0.0...0.0...0.0000...0..0000.0...11,010...111,111,010]
17732
17733     4772:
17734     ZERODSR761A:
17735           P2=T,   D_ZERO, SR_ZERO, D[C]_ALU15,           ;ZERO FOR FLAGS/PS/JAMUPP FLAG
17736           NEXT,   J/ZEROIT761A                           ;
     (4772)  DCS[0,00,0,0,0,0]  BM[0011..00,00..00,00..000..100...0.1.1...0..0...0.0000...0..0000.0...11,000...100,000,011]
17737
17738     4403:  ;(FREE)
17739     ZEROIT761A:
17740           P0,     BUMP-VERIFY,                           ;COUNT
17741                   BUSDIN_EMIT-[I],                       ;KEEP IT ON
```



```
17742           P3,     FLAG[8-0]_D[15-8]-[I],                 ;ZERO THE FLAGS
17743                   PS_D-[I],                              ;ZERO ALL OF THE PS
17744           NEXT,   J/CLEAR761A                            ;
     (4403)  DCS[0,00,0,0,0,1]  BM[1000..00,00..00,01..010..011...0.0.0...0..0...1.1011...0..0000.0...11,000...100,000,100]
17745
17746     4404:  ;(FREE)
17747     CLEAR761A:
17748           SETUP,  RETURN/GOBUT761A,                      ;GO TO SUBR WHICH DOES THE CLEARS AND BUS-INIT
17749           NEXT,   CALL[CLEAR-I-O-A]                      ;
     (4404)  DCS[0,00,0,0,0,0]  BM[0100..00,10..00,00..101..111...0.0.0...0..0...0.0000...0..0000.0...11,100...010,010,111]
17750
17751     4405:  ;(FREE)
17752     GOBUT761A:
17753           SETUP,  RETURN/TEST761B,                       ;RETURN TO START OF NEXT SUBTEST
17754           NEXT,   GOTO-PAGE(7),                          ;BUT TABLE
17755                   J/BUTSERVICE                           ;SERVICE-H IN BIT<00>
     (4405)  DCS[0,00,0,0,0,0]  BM[0100..00,11..11,11..001..111...0.0.0...0..0...0.0000...0..0000.0...11,100...011,100,101]
17756
17757
17758
17759
17760
17761     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17762
17763     ;TEST 761B CHECKS THAT VECTOR-LOAD[1]H=-(UNIBUS-INTR-L) IS LOW
17764     4771:
17765     TEST761B:
17766           P0,     LOAD-ENUA(ZTARGET401),                 ;BIT<01> CLEAR
17767                   LOAD-ERROR(TEST761B),                  ;ERROR DIRECTORY KEY
17768                   DCS-CTR(C3,),                          ;COMPARE AT TARGET
17769                   BUMP-VERIFY,                           ;COUNT
17770           NEXT,   J/GOBUT761B                            ;
     (4771)  DCS[1,00,1,0,0,1]  BM[1100..00,11..11,00..000..001...0.0.0...0..0...0.0000...0..0000.0...11,000...100,000,110]
17771
17772     4406:  ;(FREE)
17773     GOBUT761B:
17774           SETUP,  RETURN/TEST761C,                       ;RETURN TO START OF NEXT SUBTEST
17775           NEXT,   GOTO-PAGE(7),                          ;BUT TABLE
17776                   J/BUTVECTLOAD                          ;VECTOR-LOAD[1]H IN BIT<01>
     (4406)  DCS[0,00,0,0,0,0]  BM[0100..00,11..11,11..100..111...0.0.0...0..0...0.0000...0..0000.0...11,100...011,100,110]
17777
17778
17779
17780
17781
17782     ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17783
17784     ;TEST 761C CHECKS THAT BG-SERVICE(0)H=BR>PS-L IS HIGH WHEN NO DEVICES REQUEST INTR ON UNIBUS
17785     4774:

17786     TEST761C:
17787           P0,     LOAD-ENUA(ZTARGET407),                 ;BIT<02> SET  (ACTIVE LOW)
```

```
                  LOAD-ERROR(TEST761C),                   !ERROR DIRECTORY KEY
                  DCS-CTR(C3.),                           !COMPARE AT TARGET
          NEXT,   J/GOBUT761C                             !
  (4774) DCS[1.00.1.0.0.0] BM[1100..00.11..11.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...100.000.111]

    4407: !(FREE)
    GOBUT761C:
          SETUP,  RETURN/SCOPE761,                        !RETURN TO SCOPE LOOP TEST WORD
          NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                  J/BUTBGSERVL                            !BG-SERVICE[0]H IN BIT<02>
  (4407) DCS[0.00.0.0.0.0] BM[0100..00.10..00.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.110]



    4410: !(FREE)
    SCOPE761:
          P0,     BUMP-VERIFY,                            !COUNT
          P3,     CSPD[05]_EMIT, EMIT/177546,             !(177546) IS UNIBUS ADDR OF CSR FOR DL11-W
          NEXT,   BUTD[SCOPE],                            !NO ERROR:  "TEST762A" (+1, WORDS)
                  J/TEST762A                              !   ERROR:  "ERRODSR761A"  (-8, WORDS)
  (4410) DCS[0.00.0.1.0.1] BM[1111..10.11..11.01..100..110...0.0.0..0..0...0.1010...1..0000.0...11.000...111.111.011]





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !THE FOLLOWING FIVE TESTS NOW CAUSE AN INTERRUPT ON THE UNIBUS, AND THEN
    !CHECK THAT THE BUS CONTROL LOGIC RESPONDS CORRECTLY.
    !FIRST THE LINE CLOCK INTR ENABLE BIT<06> IS SET, AND THE PROCESSOR PRIORITY IS SET TO (6).
    !SINCE THE DL11-W IS A BR6 DEVICE, THE INTERRUPT SHOULD NOT COME THRU UNTIL THE PRIORITY IS
    !LOWERED TO LEVEL (5) OR LOWER.  NOTE THAT THE MICROCODE MUST GO IN TO A WAIT LOOP FOR A
    !MINIMUM OF 16.7 MILLISEC @ 60 HZ, OR 20 MILLISEC @ 50 HZ TO GUARANTEE THAT AN INTERRUPT WILL
    !BE PENDING.  THE DELAY, BASED UPON  UP3-UP3 = 170 NS, WILL BE 22.3 MILLISEC; AN ADEQUATE MARGIN.





    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - -

    !TEST 762A ENABLES THE INTERRUPT, THEN WAITS FOR THE DELAY PERIOD.
    4773:
    TEST762A:
          P0,     LOAD-ENUA(ZAPD762A),                    !COMPARE JUST AFTER BUS CYCLE INVOKED
                  LOAD-ERROR(TEST762A),                   !ERROR DIRECTORY KEY
                  DCS-CTR(C5.),                           !COMPARE JUST AFTER "DATO" INITIATED, BELOW
          NEXT,   J/DW11L762A                             !
  (4773) DCS[1.00.1.0.0.0] BM[1010..00.10..00.11..001..101...0.0.0..0..0...0.0000...0..0000.0...11.000...100.001.001]

    4411: !(FREE)
    DW11L762A:
```



```
          P2-T,   SR_CSPD(D05),                           !GET SR=(177546), ADDR OF DL11-W CSR
          NEXT,   GOTO-PAGE(7),                           !XFER
                  J/MASK762A                              !
  (4411) DCS[0.00.0.0.0.0] BM[1010..10.00..00.00..000..111...0.0.1..0..0...0.1010...0..0000.0...11.100...010.000.010]

    7202: !(FREE)
    MASK762A:
          P3,     CSPD[04]_EMIT, EMIT/177777,             !READ ALL BITS IN REGISTERS READ
          NEXT,   J/PRI06762A                             !
  (7202) DCS[0.00.0.0.0.0] BM[1111..10.11..11.11..111..111...0.0.0..0..0...0.1011...1..0000.0...11.000...010.000.111]

    7207: !(FREE)
    PRI06762A:
          P3,     CSPD[15]_EMIT,                          !EMITCON FOR:  PS<7:5>="110"=(6), T-BIT=0
                  EMIT/000300,                            !  AND BIT<06> SET FOR DL11-W INTR ENABLE
          NEXT,   J/GETIT762A                             !
  (7207) DCS[0.00.0.0.0.0] BM[0000..10.00..00.11..000..000...0.0.0..0..0...0.0010...1..0000.0...11.000...010.001.000]

    7210: !(FREE)
    GETIT762A:
          P1,     BA_SR,                                  !BA <- (177546), BITS<17:16> FORCED TO "11" ON IO-PAGE ADDRESS
          P2-T,   D_CSPB(B15),                            !(000300) INTO D  ** NOTE:  BIT<1:0> = 00 FOR BA LOAD **
          P3,     DATO,                                   !WRITE IT OUT
          NEXT,   GOTO-PAGE(4),                           !XFER FOR DCS XTN BITS
                  J/ZAPD762A                              !
  (7210) DCS[0.00.0.0.0.0] BM[1010..11.10..00.00..000..100...0.1.0..1..0...1.0010...0..0000.0...11.100...011.001.101]

    4315: !(FREE)
    ZAPD762A:
          P3-T,   D_ZERO, D[C]_ALU15,                     !ZERO D, D[C] FOR LOOP; MUST DO AFTER P3-T
          NEXT,   J/NEXTD762A                             !ENTER AT 2ND WORD OF LOOP; LET D SETTLE
  (4315) DCS[0.00.0.0.0.0] BM[0011..00.00..00.00..000..100...1.1.0..0..0...0.0000...0..0000.0...11.000...100.110.111]

    !***     THE FOLLOWING TWO WORDS NOW GO INTO A COUNT LOOP TO WAIT FOR THE LINE CLOCK TO INTERRUPT
    !***     THE WAIT WILL BE A MAXIMUM DELAY, DEPENDING UPON THE PROCESSOR UP3-UP3 CYCLE TIME:
    !***
    !***               PROCESSOR        TIME DELAY
    !***               CYCLE TIME       (MILLISEC)
    !***               (NANOSEC)
    !***               ----------       ----------
    !***                  150              19.7
    !***                  160              21.0
    !***                * 170 *          * 22.3 *        <NOMINAL VALUE>
    !***                  180              23.6
    !***                  190              24.9
    !***

    !***     NOTE THAT THE ABOVE LOOP TIME IS A MAXIMUM VALUE; WE WILL EXIT EARLY IF THE INTERRUPT COMES
    !***     THROUGH BEFORE WE OVERFLOW THE COUNTER.  IF NO INTERRUPT COMES THROUGH BY THE TIME THE COUNT
    !***     HAS OVERFLOWN, IT WILL BE CONSIDERED AN ERROR.
    !***

    !* ENTER HERE FOR ANOTHER LOOP *
```

```
17884    4551;
17885    BUMPD762A:
17886            P3-T,   D_D-PLUS-1, D[C]_COUT15,                ;BUMP D, SAVE CARRYOUT
17887            NEXT,   BUTR(BG-SERVCE-L),                      ;NEGATED:  "NEXTD762A"
17888                    J/SETPR6-762A                           ;ASSERTED: "SETPR6-762A"
     (4551)  DCS[0.00.0.0.0.0] BM[1001..01.11..01.01..000..110...1.1.0..0..0...0.0000...0..0000.0...01.100...100.110.011]
17889
17890    4467;
17891    NEXTD762A:
17892            P0,     DCS-CTR(C15.),                          ;STALL; NOTE: NO BUMP-VERIFIES IN THIS LOOP
17893            NEXT,   BUTR(D[C]-B),                           ;SET:   "TEST762A1"  D OVERFLOWN, ERROR
17894                    J/BUMPD762A                             ;CLEAR; "BUMPD762A"  GO FOR NEXT LOOP
     (4467)  DCS[0.00.1.0.0.0] BM[0000..00.00..00.00..000..000...0.0.0..0...0.0000...0..0000.0...10.011...101.101.001]
17895
17896
17897    ;* COME HERE IF D OVERFLOWN *
17898    4553;
17899    TEST762A1:
17900            P0,     LOAD-ERROR(TEST762A1),                  ;ERROR DIRECTORY KEY
17901                    DCS-CTR(C0.),                           ;SIGNAL ERROR NOW
17902            NEXT,   J/TEST762A                              ;FORCE A SCOPE LOOP
     (4553)  DCS[1.00.1.0.0.0] BM[1111..00.00..00.00..000..000...0.0.0..0...0.0000...0..0000.0...11.000...111.111.011]
17903
17904
17905    ;*** COME HERE IF EXIT LOOP OK:  D NOT OVERFLOWED, INTERRUPT PENDING ***
17906    4463;
17907    SETPP6-762A:
17908            P2-T,   D_CSPD(D15), D[C]_0,                    ;GET D<7:5>=(6), D<4>=(0)
17909            NEXT,   J/SETPRI762A                            ;
     (4463)  DCS[0.00.0.0.0.0] BM[1010..10.00..00.00..000..000...0.1.0..0..0...0.0010...0..0000.0...11.000...100.001.011]
17910
17911    4413;  ;(FREE)
17912    SETPRI762A:
17913            P0,     BUSDIN_EMIT-[I],                        ;KEEP IT ON
17914            P2,     PS[3-0]_D[3-0]-[I],                     ;FOR USE IN TEST763A, PS[CC]="0000" HERE
17915            P3,     PS[7-4]_D[7-4]-[I],                     ;PRIO=6, T-BIT=0
17916            NEXT,   J/TEST762B                              ;NOTE:  THE BR6 PENDING INTR SHOULD NOW HIDE UNDER PROCESSOR PRIO(6)
     (4413)  DCS[0.00.0.0.0.0] BM[1000..00.00..00.01..010..000...0.0.0..0...0.0...1.1011...0..0000.0...11.000...111.101.001]
17917
17918
17919    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17920
17921    ;TEST 762B CHECKS THAT BG-SERVICE(0)H=BR>PS-L IS HIGH WHEN THE PROCESSOR PRIORITY(=6) IS AS HIGH
17922    ;AS THE ONLY DEVICE WISHING TO REQUEST AN INTERRUPT (AT BR6).
17923    4751;
17924    TEST762B:
17925            P0,     LOAD-ENUA(ZTARGET407),                  ;BIT<02> SET  (ACTIVE LOW)
17926                    LOAD-ERROR(TEST762B),                   ;ERROR DIRECTORY KEY
17927                    DCS-CTR(C3.),                           ;COMPARE AT TARGET
17928                    BUMP-VERIFY,                            ;
17929            NEXT,   J/GOBUT762B                             ;
     (4751)  DCS[1.00.1.0.0.1] BM[1100..00.11..11.00..000..111...0.0.0..0...0.0000...0..0000.0...11.000...111.110.010]
17930
17931    4762;
```



```
17932    GOBUT762B:
17933            SETUP,  RETURN/TEST762C,                        ;RETURN TO START OF NEXT SUBTEST
17934            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
17935                    J/BUTBGSERVL                            ;BG-SERVICE[0]H IN BIT<02>
     (4762)  DCS[0.00.0.0.0.0] BM[0100..00.11..11.00..000..111...0.0.0..0...0.0000...0..0000.0...11.100...011.001.110]
17936
17937
17938
17939
17940
17941    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17942
17943    ;TEST 762C CHECKS THAT BG-SERVICE[0]H=BR>PS-L IS LOW WHEN A BR6 DEVICE (DL11-W) IS REQUESTING AN INTR,
17944    ;AND THE PROCESSOR PRIORITY(=5) IS < THE BR LEVEL(=6).  NO OTHER DEVICES PRESENT.
17945    4740;
17946    TEST762C:
17947            P0,     LOAD-ENUA(ZTARGET403),                  ;BIT<02> CLEAR  (ACTIVE LOW)
17948                    LOAD-ERROR(TEST762C),                   ;ERROR DIRECTORY KEY
17949                    DCS-CTR(C7.),                           ;COMPARE AT TARGET
17950            NEXT,   J/FILL762C                              ;
     (4740)  DCS[1.00.1.0.0.0] BM[1000..00.11..11.00..000..011...0.0.0..0...0.0000...0..0000.0...11.000...100.001.100]
17951
17952    4414;  ;(FREE)
17953    FILL762C:
17954            P2-T,   D_ASPHI(C125252), D[C]_ALU00,           ;BIT<7:5>="101"=(5), BIT<4>=0
17955            NEXT,   J/DELAY762C                             ;
     (4414)  DCS[0.00.0.0.0.0] BM[1111..00.00..11.01..110..010...0.1.0..0..0...0.0000...0..0000.0...11.000...100.001.101]
17956
17957    4415;  ;(FREE)
17958    DELAY762C:
17959            SETUP,  RETURN/SETPRI762C,                      ;EXEC 3, UWORDS AFTER SETTING PRIO, FOR DELAY
17960            P2,     PS[3-0]_D[3-0],                         ;FOR USE IN TEST763A, PS[CC]="1010"
17961            P3,     PS[7-4]_D[7-4],                         ;SET PRIO=(5), AT P3-T OF THIS UWORD
17962            NEXT,   GOTO-PAGE(7),                           ;GO DO A JUMP, AND A BUTA(RETURN)
17963                    J/BUTD-IS-ZERO                          ;DON'T REALLY CARE ABOUT THE RESULT OF THIS
     (4415)  DCS[0.00.0.0.0.0] BM[0111..00.01..00.00..110..111...0.0.0..0...1.1010...0..0000.0...11.100...011.100.001]
17964
17965    7206;  ;(FREE)
17966    SETPRI762C:
17967                                                            ;BG-SERVICE(0)H SHOULD BE ASSERTED BY NOW
17968            SETUP,  RETURN/TEST762D,                        ;RETURN TO START OF NEXT SUBTEST
17969            NEXT,   GOTO-PAGE(7),                           ;BUT TABLE
17970                    J/BUTBGSERVL                            ;BG-SERVICE[0]H IN BIT<02>
     (7206)  DCS[0.00.0.0.0.0] BM[0100..00.11..11.00..001..111...0.0.0..0...0.0000...0..0000.0...11.100...011.001.110]
17971
17972


17973
17974
17975

17976    ; - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
17977
17978    ;TEST 762D CHECKS THAT BG-SERVICE[1]H+FLTPT-SERVICE-H IS HIGH, WHEN BG-SERVICE[1]H IS SET
```

```
        4741:
        TEST762D:
                P0,     LOAD-ENUA(ZTARGET417),                  !BIT<03> SET
                        LOAD-ERROR(TEST762D),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE AT TARGET
                NEXT,   J/GOBUT762D                             !
    (4741)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..001..111...0.0.0..0..0...0.0000...0..0000.0...11.000...100.001.110]

        4416:  !(FREE)
        GOBUT762D:
                SETUP,  RETURN/TEST762E,                        !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                        J/BUTBGFPSERV                           !BG-SERVICE[1]H+FLTPT-SERVICE-H IN BIT<03>
    (4416)  DCS[0.00.0.0.0.0]  BM[0100..00.11..10.11..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.000.111]






        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST 762E NOW READS THE "SERVICE" PORT OF THE STATUS MUX TO SEE:
        !SERVICE<15:00>H = "0 100 011 111 100 000"
        !
        !       IMPORTANT BITS ARE:
        !       B15 = DATI(1)H = 0              B14 = BG-SERVICE(1)H = 1        B11 = DATOB(1)H = 0
        !       B10 = DATO(1)H = 1              B09 = PBA<17>H = 1              B08 = PBA<16>H = 1
        !
        4730:
        TEST762E:
                P0,     LOAD-ENUA(ZTARGET402),                  !SETUP FOR D=ZERO TEST
                        LOAD-ERROR(TEST762E),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C10.),                          !COMPARE AT TARGET
                NEXT,   J/EXPEC762E                             !
    (4730)  DCS[1.00.1.0.0.0]  BM[0101..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...100.001.111]

        4417:  !(FREE)
        EXPEC762E:
                P3,     CSPD[02]_EMIT,                          !EXPECTED VALUE OUT OF SERVICE PORT:
                        EMIT/043740,                            !"0100 0111 1110 0000"
                NEXT,   J/GOGET762E                             !
    (4417)  DCS[0.00.0.0.0.0]  BM[0100..10.01..11.11..100..000...0.0.0..0..0...0.1101...1..0000.0...11.000...100.010.000]

        4420:  !(FREE)
        GOGET762E:
                P0,     BUMP-VERIFY,                            !
                SETUP,  RETURN/TEST762F,                        !GO TO SUBR WHICH:
                NEXT,   CALL[SERVICETOD]                        !CSP(02),XOR,SERVICE -> D, BUT(D=ZERO)
    (4420)  DCS[0.00.0.0.0.1]  BM[0100..00.11..10.01..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...010.101.000]
```



```
        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST 762F CHECKS THAT SERVICE-H=NOT(INTR-HIGH-H*FLAG7(0)H*BG-SERVICE(0)H) IS HIGH,
        !  WHEN INTR-HIGH-H=HIGH, FLAG7(0)H=HIGH, AND BG-SERVICE(0)H=LOW
        4711:
        TEST762F:
                P0,     LOAD-ENUA(ZTARGET403),                  !BIT<00> SET
                        LOAD-ERROR(TEST762F),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C3.),                           !COMPARE AT TARGET
                NEXT,   J/GOBUT762F                             !
    (4711)  DCS[1.00.1.0.0.0]  BM[1100..00.11..11.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...100.010.001]

        4421:  !(FREE)
        GOBUT762F:
                SETUP,  RETURN/TEST763A,                        !RETURN TO START OF NEXT SUBTEST
                NEXT,   GOTO-PAGE(7),                           !BUT TABLE
                        J/BUTSERVICE                            !SERVICE-H IN BIT<00>
    (4421)  DCS[0.00.0.0.0.0]  BM[0100..00.11..11.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.101]






        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !THIS NEXT SEQUENCE OF TWO TESTS RESPONDS TO THE BUS INTERRUPT REQUEST BY:
        !(1) ASSERTING "ALLOW-BG[1]H", THUS ALLOWING THE BUS GRANT TO THE DL11-W, SO THAT
        !(2) "VECTOR-LOAD[1]H" WILL BE ASSERTED, INDICATING THAT THE DEVICE HAS PUT ITS
        !       VECTOR ON UNIBUS DATA<8:0>L, AND THEN
        !(3) ACTUALLY READING THE VECTOR FOR THE DL11-W (100)(8), AND VALIDATING ITS CORRECTNESS.



        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !TEST 763A CHECKS THAT AFTER "ALLOW-BG[1]H" IS GIVEN TO THE INTERRUPTING DEVICE,
        !THEN "VECTOR-LOAD[1]H" IS ASSERTED
        4761:
        TEST763A:
                P0,     LOAD-ENUA(VECTLOAD763A),                !COMPARE AT "VECTOR-LOAD[1]H" IN BIT<01> SET
                        LOAD-ERROR(TEST763A),                   !ERROR DIRECTORY KEY
                        DCS-CTR(C5.),                           !COMPARE AT TARGET
                NEXT,   J/EXPEC763A                             !
    (4761)  DCS[1.00.1.0.0.0]  BM[1010..00.10..01.11..011..011...0.0.0..0..0...0.0000...0..0000.0...11.000...100.010.010]

        4422:  !(FREE)

        EXPEC763A:
                P0,     BUMP-VERIFY,                            !COUNT
                P3,     CSPD[01]_EMIT, EMIT/100,                !DL11-W VECTOR IS (100)8
                NEXT,   J/ALLOW763A                             !
    (4422)  DCS[0.00.0.0.0.1]  BM[0000..10.00..00.01..000..000...0.0.0..0..0...0.1110...1..0000.0...11.000...111.011.001]

        4731:                                                   !*** *** *01
```

```
18075    ALLOW763A:
18076            P0,     BUSDIN_PS-[I],                  !NOISE BITS ON BUSDIN TO IMPEDE READING VECTOR
18077                                                    !AT THIS POINT PS=(000252)
18078            P2,     ALLOW-BG[1]H-[I],               !GIVE BUS GRANT TO PENDING INTERRUPT
18079            NEXT,   J/READVECT763A                  !
     (4731)  DCS[0,00,0,0,0,0]  BM[0100..00.01..10.01..000..000...0.0.0..0..0...1.1011...0..0000.0...11.000...100.010.011]
18080
18081    4423:  !(FREE)
18082    READVECT763A:
18083            P3,     CSPD[07]_BUSDIN,                !MUST READ BUSDIN=VECTOR RITE HERE, OR
18084                                                    !WE WILL LOSE IT
18085                    EMIT/052525,                    !NOISE ON EMIT
18086            NEXT,   J/TESTVECT763A                  !
     (4423)  DCS[0,00,0,0,0,0]  BM[0101..10.01..01.01..010..101...0.0.0..0..0...0.1000...1..0000.0...11.000...100.010.100]
18087
18088    4424:  !(FREE)
18089    TESTVECT763A:
18090            P2=T,   SR_CSPD(D01),                   !SR=(000100), EXPECTED VECTOR
18091            NEXT,   BUTR(VECTOR-LOAD),              !IF SET, "VECTLOAD763A",  THIS IS EXPECTED
18092                    J/ALLOW763A                     !IF CLR, "ALLOW763A", VECTOR-LOAD[1]H NOT SET, ERROR
     (4424)  DCS[0,00,0,0,0,0]  BM[1010..10.00..00.00..000..000...0.0.1..0..0...0.1110...0..0000.0...10.001...111.011.001]
18093
18094
18095
18096
18097    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
18098
18099    !IF VECTOR-LOAD[1]H="1", COME TO HERE.
18100    !
18101    !TEST 763B NOW CHECKS THAT THE CORRECT VECTOR FOR THE DL11-W = 100(8) WAS READ
18102    4733:                                           !*** *** *11
18103    VECTLOAD763A:
18104            P2=T,   D_SR-XOR-CSPD(D07),             !COMPARE EXPECTED VECTOR;RECEIVED VECTOR
18105            NEXT,   J/TEST763B                      !
     (4733)  DCS[0,00,0,0,0,0]  BM[0110..10.00..00.00..000..000...0.1.0..0..0...0.1000...0..0000.0...11.000...111.010.000]
18106
18107    4720:
18108    TEST763B:
18109            P0,     LOAD-ENUA(ZTARGET402),          !SETUP FOR D=ZERO TEST
18110                    LOAD-ERROR(TEST763B),           !ERROR DIRECTORY KEY
18111                    DCS-CTR(C3,),                   !COMPARE AT TARGET
18112            NEXT,   J/GOBUT763B                     !
     (4720)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...100.010.101]
18113
18114    4425:  !(FREE)
18115    GOBUT763B:
18116            SETUP,  RETURN/TEST763C,                !RETURN TO START OF NEXT SUBTEST
18117            NEXT,   GOTO-PAGE(7),                   !BUT TABLE
18118                    J/BUTD-IS-ZERO                  !CHECK EQUALITY
     (4425)  DCS[0,00,0,0,0,0]  BM[0100..00.11..10.10..001..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.001]
18119
18120
18121
```



```
18122
18123
18124    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
18125
18126    !TEST 763C CHECKS THAT VECTOR-LOAD[1]H=-(UNIBUS-INTR-L) IS AGAIN LOW
18127    4721:
18128    TEST763C:
18129            P0,     LOAD-ENUA(ZTARGET401),          !BIT<01> CLEAR
18130                    LOAD-ERROR(TEST763C),           !ERROR DIRECTORY KEY
18131                    DCS-CTR(C3,),                   !COMPARE AT TARGET
18132                    BUMP-VERIFY,                    !COUNT
18133            NEXT,   J/GOBUT763C                     !
     (4721)  DCS[1,00,1,0,0,1]  BM[1100..00.11..11.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11.000...100.010.110]
18134
18135    4426:  !(FREE)
18136    GOBUT763C:
18137            SETUP,  RETURN/TEST763D,                !RETURN TO START OF NEXT SUBTEST
18138            NEXT,   GOTO-PAGE(7),                   !BUT TABLE
18139                    J/BUTVECTLOAD                   !VECTOR-LOAD[1]H IN BIT<01>
     (4426)  DCS[0,00,0,0,0,0]  BM[0100..00.11..10.01..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.100.110]
18140
18141
18142
18143
18144    ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
18145
18146    !TEST 763D CHECKS THAT BG-SERVICE(0)H=BR>PS-L IS HIGH WHEN UNIBUS INTR REQUEST HAS BEEN SATISFIED
18147    4710:
18148    TEST763D:
18149            P0,     LOAD-ENUA(ZTARGET407),          !BIT<02> SET  (ACTIVE LOW)
18150                    LOAD-ERROR(TEST763D),           !ERROR DIRECTORY KEY
18151                    DCS-CTR(C3,),                   !COMPARE AT TARGET
18152            NEXT,   J/GOBUT763D                     !
     (4710)  DCS[1,00,1,0,0,0]  BM[1100..00.11..11.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...100.010.111]
18153
18154    4427:  !(FREE)
18155    GOBUT763D:
18156            SETUP,  RETURN/SCOPE763,                !RETURN TO SCOPE LOOP TEST WORD
18157            NEXT,   GOTO-PAGE(7),                   !BUT TABLE
18158                    J/BUTBGSERVL                    !BG-SERVICE[0]H IN BIT<02>
     (4427)  DCS[0,00,0,0,0,0]  BM[0100..00.10..00.11..000..111...0.0.0..0..0...0.0000...0..0000.0...11.100...011.001.110]
18159
18160
18161
18162    4430:  !(FREE)
18163    SCOPE763:

18164            P0,     BUSDIN_EMIT-[I],                !RESET PROC UCON FOR EMIT
18165            P2,     PS_D-[I],                       !ZAP THE PS TO ZERO
18166            NEXT,   BUTD[SCOPE],                    !NO ERROR:  "KILL764A"  (+1, WORDS)
18167                    J/KILL764A                      !   ERROR:  "EXPEC763A"  (-11, WORDS)
     (4430)  DCS[0,00,0,1,0,0]  BM[1000..00.00..00.01..010..010...0.0.0..0..0...1.1011...0..0000.0...11.000...111.110.011]
18168
```

```
        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        !***  ALL DONE WITH LINE CLOCK, DISABLE IT FROM FURTHER INTERRUPTS BEFORE LEAVING FOR EOP  ***

        4763:
        KILL764A:
                P2-T,   D_ZERO, D[C]_ALU00,                     !NOW MUST GO KILL THE LINE CLOCK
                P3,     DATO,                                   !BA=(177546), DL11-W CSR
                        BUTA(CLR-FLAG-RES-UCON),                !ZAP UCON, RES-CONTROL FOR EOP ROUTINE (MUST BE DONE)
                NEXT,   J/EOP001                                !
    (4763)  DCS[0,00,0,0,0,0]  BM[0011..00,00..00,00..000..010...0,1,0..0..0...1,0010...0..0000,0...11,010...100,011,001]







        !.PAGE=========================================================================================================


        .TOC    *   END OF PASS CODE

        !*********************************************************************************
        !
        !       FINAL ENTRY HERE TO TEST FOR MULTIPLE PASSES, VERIFY MODE, ET AL
        !
        !
        !       *** INDICATIONS ON CONSOLE DISPLAY ***
        !
        !               0,0,0,0,0,0,    DCS IS RUNNING; REQUIRES APPROX 8, SECONDS/64, PASSES
        !                               "RUN"    "PROC"    "USER"    "CONSOLE"    "BATTERY"
        !                               (ON)     (BLINK)   (BLINK)   (OFF)        (OFF)
        !
        !               0 0 0 0 0 0     ERROR DETECTED / PASS=1 / SCOPE LOOPING
        !       OR      2 1 2 1 2 1
        !
        !               0,0,0,0,0,0,    ERROR DETECTED / 1<PASS<64, / SCOPE LOOPING
        !       OR      2,1,2,1,2,1,
        !
        !               1,2,3,3,2,1,    SUCCESSFUL 64, PASSES COMPLETED
        !
        !
        !       AT END OF PASS, THE GENERAL REGISTERS (BASE MACHINE R0-R7)
        !         CONTAIN THE FOLLOWING INFORMATION:
        !
        !               R0  =  (NU)
        !               R1  =  (NU)
        !               R2  =  (NU)
        !               R3  =  (NU)
        !               R4  =  (NU)
        !               R5  =  REVISION NUMBER OF DCS MICROCODE, WITH
```



```
        !                       BIT15 SET TO INDICATE END OF PASS
        !               R6  =  (NU)
        !               R7  =  (123321), END OF PASS INDICATION CONSTANT
        !
        !*********************************************************************************


       4431:  !(FREE)
       EOP001:
                P0,     DCS-CTR(C15,),                          !HOLD UP ERROR COMPARE
                NEXT,   GOTO-PAGE(6),                           !XFER
                        J/EOP002                                !
    (4431)  DCS[0,00,1,0,0,0]  BM[0000..00,00..00,00..000..110...0,0,0..0..0...0,0000...0..0000,0...11,100...100,101,010]


       6452:  !(FREE)
       EOP002:
                P3,     CSPD[01]_EMIT, EMIT/123321,             !SETUP SUCCESSFUL END OF PASS CONSTANT
                NEXT,   J/EOP003                                !
    (6452)  DCS[0,00,0,0,0,0]  BM[1010..10,01..10,11..010..001...0,0,0..0..0...0,1110...1..0000,0...11,000...101,001,000]


       6510:  !(FREE)
       EOP003:
                P2-T,   D_CSPD(D01), D[C]_0,                    !GET EOP CONSTANT INTO
                P3,     PC_D,                                   !  GPR PC, ON BOTH SP SIDES
                NEXT,   J/EOP004                                !  FOR DISPLAY FROM "CONSOLE HALT" ROUTINE
    (6510)  DCS[0,00,0,0,0,0]  BM[1010..10,00..10,01..111..000...0,1,0..0..0...0,1110...0..0011,0...11,000...101,001,001]


       6511:  !(FREE)
       EOP004:
                SETUP,  RETURN/EOP005,                          !GO TO DISPLAY-D-IN-LIGHTS ROUTINE
                NEXT,   CALL[DISPLAY]                           !  WHICH SHOULD PUT (212121) INTO DISPLAY
    (6511)  DCS[0,00,0,0,0,0]  BM[0111..00,01..00,01..001..111...0,0,0..0..0...0,0000...0..0000,0...11,100...010,010,001]
                                                                !  FOR INTERMEDIATE EOP INDICATION

       7211:  !(FREE)
       EOP005:
                P0,     SIGNAL-EOP,                             !TRY TO SIGNAL EOP
                P2-T,   SR_ALL-ONES,                            !SET SR TO ALL ONES, FOR FULL BASE MACHINE INIT
                NEXT,   GOTO-PAGE(6),                           !XFER TO 6
                        BUTD[VERIFY-MODE],                      !IF TRUE,   "VFY001"  (NEXT PAGE FOLLOWING)
                        J/EOP006                                !IF FALSE,  "EOP006"  (NEXT MICROWORD)
    (7211)  DCS[0,00,0,0,1,0]  BM[1111..00,00..11,01..101..110...0,0,1..0..0...0,0000...0..0000,0...11,100...111,111,110]


       6776:
       EOP006:
                P0,     DCS-CTR(C11,),                          !HOLD UP ERROR COMPARE
                P3-U,   SET-CONSOLE-DP-LEDS,                    !UCON SET DP LEDS, INDICATING >=1 SUCCESSFUL PASSES
```

```
18268            NEXT,   BUTD(EOP=OVERFLOW),                     !IF TRUE,  "EOP007" FOLLOWING, DONE 64, PASSES
18269                    J/EOP007                                !IF FALSE, "TEST001", GO FOR NEXT PASS AT (4000)
     (6776)  DCS[0,00,1,0,0,0]  BM[0100..00.00..00.00..110..001...0.0.0...0...1.1011...0..0000.0...11.000...101,001,010]
18270                                                            !BEGIN COUNTDOWN
18271                                                            !  3 ... 2 ... 1 .
18272
18273
18274    6512:  !(FREE)
18275    EOP007:
18276            SETUP,  RETURN/EOP010,                          !GO TO $UBR THAT PUTS REV-NUMBER, WITH
18277            NEXT,   GOTO-PAGE(7),                           !  B<15>=(1), INTO B.M. GPR "R5"
18278                    J/INSERTEOPREVNO                        !
     (6512)  DCS[0,00,0,0,0,0]  BM[0111..00.01..00.01..010..111...0.0.0...0..0...0.0000...0..0000.0...11.100...010,001,100]
18279
18280
18281    7212:  !(FREE)
18282    EOP010:
18283            SETUP,  RETURN/CON99,                           !RETURN TO "FORCE CONSOLE-MODE HALT" ROUTINE IN BASE MACHINE
18284            NEXT,   GOTO-PAGE(3),                           !GOTO "INIT---" ROUTINE FOR FULL BASE MACHINE
18285                    J/INIT01                                !  MICROCODE INITIALIZATION, BUTA(RETURN) AT END TO "CON99"
     (7212)  DCS[0,00,0,0,0,0]  BM[0001..00.00..01.00..000..011...0.0.0...0..0...0.0000...0..0000.0...11.100...100,001,010]
18286
18287
18288
18289
18290
18291    !.PAGE=============================================================================================================
18292
18293
18294    .TOC    *   VERIFY MODE CODE
18295
18296    !
18297    !       VERIFY MODE ENTERS HERE:
18298    !
18299
18300    6774:
18301    VFY001:
18302            P0,     DCS-CTR(C4,);                           !LOAD COUNTER FOR COMPARE IN 4, MICROWORDS
18303            NEXT,   GOTO-PAGE(4),                           !XFER
18304                    J/VFY002                                !
     (6774)  DCS[0,00,1,0,0,0]  BM[1011..00.00..00.00..000..100...0.0.0...0..0...0.0000...0..0000.0...11.100...100,001,010]
18305
18306
18307    4412:  !(FREE)
18308    VFY002:
18309            P3,     CLEAR-CONSOLE-LED,                      !MAKE "CONSOLE" LED BLINK, JUST FOR FUN
18310            NEXT,   J/VFY003                                !
     (4412)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..010..001...0.0.0...0..0...1.1011...0..0000.0...11.000...010,101,101]
18311
18312    4255:
```



```
18313    VFY003:
18314            P0,     LOAD-ENUA(ZTARGET523),                  !ERROR CODE = [4255], ENUA = [7523]
18315                    LOAD-ERROR(VFY003),                     !ERROR DIRECTORY KEY
18316                    BUMP-VERIFY,                            !GIVE A VERIFY PULSE
18317            NEXT,   J/VFY004                                !
     (4255)  DCS[1,00,0,0,0,1]  BM[0000..00.11..11.01..010..011...0.0.0...0..0...0.0000...0..0000.0...11.000...100,011,011]
18318
18319
18320    4433:  !(FREE)
18321    VFY004:
18322            SETUP,  RETURN/VFY005,                          !RETURN TO INLINE
18323            NEXT,   GOTO-PAGE(7),                           !BUT'S ARE ON PAGE 7
18324                    J/ZTARGET522                            !TNUA = [7522], NOT EQUAL TO ENUA
     (4433)  DCS[0,00,0,0,0,0]  BM[0111..00.01..11.11..101..111...0.0.0...0..0...0.0000...0..0000.0...11.100...101,010,010]
18325
18326
18327    !       NEXT MICROWORD COMES FROM ZTARGET522, AT WHICH THE ENABLED COMPARE
18328    !       TAKES PLACE.  ENUA WAS SETUP NOT EQUAL TO TNUA, SO ERROR SHOULD BE SIGNALED
18329
18330
18331
18332    7375:
18333    VFY005:
18334            P3,     SET-CONSOLE-LED,                        !THE OTHER HALF OF MAKING IT BLINK
18335            NEXT,   BUTD(SCOPE),                            !NO ERROR:  "VFY005"  (SELF LOOP, SHOULDN'T HAPPEN)
18336                    J/VFY005                                !   ERROR:  "VFY006"  (SHOULD HAPPEN)
     (7375)  DCS[0,00,0,1,0,0]  BM[0100..00.00..00.00..100..001...0.0.0...0..0...1.1011...0..0000.0...11.000...011,111,101]
18337
18338
18339    7374:
18340    VFY006:
18341            P0,     SIGNAL-EOP,                             !GIVE AN EOP PULSE, AFTER ERROR SIGNALED
18342            NEXT,   GOTO-PAGE(6),                           !LOOP BACK
18343                    J/VFY001                                !  ON CONTINUOUS VERIFY
     (7374)  DCS[0,00,0,0,1,0]  BM[0000..00.00..00.00..000..110...0.0.0...0..0...0.0000...0..0000.0...11.100...111,111,100]
18344
18345
18346
18347
18348
18349    !.PAGE=============================================================================================================
18350
18351
18352    .TOC    *   DCS MICROCODE REVISION NUMBER
18353
18354    !       THE FOLLOWING ROUTINE WILL PUT THE CURRENT DCS MICROCODE REVISION NUMBER
18355    !       INTO B.M. GPR "R5", FROM THE EMIT FIELD OF THE MICROWORD.
18356    !
18357    !       THE ENTRY "INSERTREVNO" IS USED, EXCEPT AT END OF PASS; IE B<15>=(0)
18358    !       THE ENTRY "INSERTEOPREVNO" IS USED ONLY AT END OF PASS; IE, B<15>=(1)
18359
18360
```

```
18361    7214:  !(FREE)
18362    INSERTEOPREVNO:
18363            P0,     BUSDIN_EMIT-[I],                    !SELECT EMIT
18364            NEXT,   J/INSERT02                          !
      (7214)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.01..000..000...0.0.0..0..0...1.1001...0..0000.0...11.000...010.001.101]
18365
18366    7215:  !(FREE)
18367    INSERT02:
18368            P3,     CSPD[17]_EMIT, EMIT/REV-NUMBER-AND-B15, !DCS REVISION NUMBER, B15 SET
18369            NEXT,   J/INSERT04                          !
      (7215)  DCS[0,00,0,0,0,0]  BM[1000..10.00..00.01..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...010.010.000]
18370
18371
18372    7216:  !(FREE)
18373    INSERTREVNO:
18374            P0,     BUSDIN_EMIT-[I],                    !SELECT EMIT
18375            NEXT,   J/INSERT03                          !
      (7216)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.01..000..000...0.0.0..0..0...1.1001...0..0000.0...11.000...010.001.111]
18376
18377    7217:  !(FREE)
18378    INSERT03:
18379            P3,     CSPD[17]_EMIT, EMIT/REV-NUMBER,     !DCS REVISION NUMBER, B15 CLEAR
18380            NEXT,   J/INSERT04                          !
      (7217)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.01..000..001...0.0.0..0..0...0.0000...1..0000.0...11.000...010.010.000]
18381
18382
18383    7220:  !(FREE)
18384    INSERT04:
18385            P2-T,   D_CSPD(D17), D[C]_0,                !GET IT
18386            P3,     RS_D,                               !  AND STUFF IT
18387            NEXT,   J/RESETUCONP                        !    AND RETURN
      (7220)  DCS[0,00,0,0,0,0]  BM[1010..10.00..10.01..110..000...0.1.0..0..0...0.0000...0..0011.0...11.000...010.111.001]
18388
18389
18390
18391    !.PAGE=========================================================================================================
18392
18393
18394    .TOC    *   COMMON SUBROUTINES
18395
18396    .TOC    *     CONSOLE DISPLAY SUBROUTINE
18397
18398    !
18399    !       DISPLAYS NUMBER REPRESENTED BY D<05:00>@D<05:00>@D<05:00>
18400    !       AS SIX OCTAL DIGITS IN CONSOLE 7 SEGMENT DISPLAY
18401    !
18402
18403    7221:  !(FREE)
18404    DISPLAY:
18405            P3-U,   CLEAR-CONSOLE-COUNTER,              !POINT TO DIGITS ....XX
18406            NEXT,   J/DISP002                           !
      (7221)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..010..000...0.0.0..0..0...1.1011...0..0000.0...11.000...010.010.010]
18407
18408
```



```
18409    7222:  !(FREE)
18410    DISP002:
18411            P3-U,   STROBE-CONSOLE-DISPLAY,             !WRITE OUT DIGITS ....XX
18412            NEXT,   J/DISP003                           !
      (7222)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..000..001...0.0.0..0..0...1.1011...0..0000.0...11.000...010.010.011]
18413
18414
18415    7223:  !(FREE)
18416    DISP003:
18417            P3-U,   INCREMENT-CONSOLE-COUNTER,          !POINT TO DIGITS ..XX..
18418            NEXT,   J/DISP004                           !
      (7223)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..100..000...0.0.0..0..0...1.1011...0..0000.0...11.000...010.010.100]
18419
18420
18421    7224:  !(FREE)
18422    DISP004:
18423            P3-U,   STROBE-CONSOLE-DISPLAY,             !WRITE OUT DIGITS ..XX..
18424            NEXT,   J/DISP005                           !
      (7224)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..000..001...0.0.0..0..0...1.1011...0..0000.0...11.000...010.010.101]
18425
18426
18427    7225:  !(FREF)
18428    DISP005:
18429            P3-U,   INCREMENT-CONSOLE-COUNTER,          !POINT TO DIGITS XX....
18430            NEXT,   J/DISP006                           !
      (7225)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..100..000...0.0.0..0..0...1.1011...0..0000.0...11.000...010.010.110]
18431
18432
18433    7226:  !(FREE)
18434    DISP006:
18435            P3-U,   STROBE-CONSOLE-DISPLAY,             !WRITE OUT DIGITS XX....
18436            NEXT,   J/RESETUCONP                        !GO RESET PROC UCON/EMIT, DO A (RETURN)
      (7226)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00.00..000..001...0.0.0..0..0...1.1011...0..0000.0...11.000...010.111.001]
18437
18438
18439
18440
18441
18442    !.PAGE=========================================================================================================
18443
18444
18445    .TOC    *     CLEAR I-O / BUS CONTROL / SERVICE AREA STATUS LATCHES SUBR
18446
18447
18448    !
18449    !       THIS SUBR CLEARS OUT, VIA I-O UCON COMMANDS, THOSE STATUS LATCHES
18450    !       CONCERNED WITH SERVICE CONDITIONS, UNIBUS ERROR CONDITIONS, ETC.
18451    !
18452
18453    7227:  !(FREE)
18454    CLEAR-I-O-A:
18455            P3,     BUS-INIT-UCON-[I],                  !DO A 10 MILLISEC UNIBUS INIT
18456            NEXT,   J/CLEAR-I-O-B                       !
      (7227)  DCS[0,00,0,0,0,0]  BM[0100..00.01..11.00..000..000...0.0.0..0..0...1.1011...0..0000.0...11.000...010.011.000]
```

```
18457
18458    7230:  !(FREE)
18459    CLEAR-I-O-B:
18460            P3,     CLR-JAM-ERRORS-[I],                     !RESET CACHE ERROR STATUS
18461            NEXT,   J/CLEARI002                             !
     (7230)  DCS[0,00,0,0,0,0]  BM[0100..00,00..10,00..000..000...0,0,0...0..0...1,1011...0..0000,0...11,000..010,011,001]
18462
18463    7231:  !(FREE)
18464    CLEARI002:
18465            P3,     CLEAR-CONSOLE-SERVICE,                  !CLEAR OUT CONSOLE SRVC(1)H
18466            P3,     CLR-NPR-TIMEOUT-[I],                    !RESET NPR/SACK TIME OUT STATUS
18467            NEXT,   J/CLEARI004                             !
     (7231)  DCS[0,00,0,0,0,0]  BM[0100..00,00..11,00..110..000...0,0,0...0..0...1,1011...0..0000,0...11,000..010,011,010]
18468
18469    7232:  !(FREE)
18470    CLEARI004:
18471            P3,     CLEAR-CONSOLE-LED,                      !SETUP FOR 16. BIT ADDRESS MODE ON UNIBUS
18472            P3,     CLR-PWR-FAIL-[I],                       !RESET POWER FAIL STATUS
18473            NEXT,   J/CLEARI005                             !
     (7232)  DCS[0,00,0,0,0,0]  BM[0100..00,01..00,00..010..001...0,0,0...0..0...1,1011...0..0000,0...11,000..010,011,011]
18474
18475    7233:  !(FREE)
18476    CLEARI005:
18477            P3,     CLR-YELLOW-ZONE-[I],                    !RESET YELLOW ZONE STATUS
18478            NEXT,   J/RESETUCONP                            !
     (7233)  DCS[0,00,0,0,0,0]  BM[0100..00,01..01,00..000..000...0,0,0...0..0...1,1011...0..0000,0...11,000..010,111,001]
18479
18480    !"RESETUCONP" IS AT END OF "DINTOIR" SUBROUTINE
18481    !THIS WORD  (1) ENABLES BUSDIN_EMIT,  (2) ENABLES PROC EN-CLK-IR,
18482    !AND EXITS WITH A BUTA(RETURN)
18483
18484
18485
18486
18487
18488    !.PAGE=============================================================================================================
18489
18490
18491    .TOC   *      SUBR FOR PUTTING SELECTED PORTIONS OF D[15-00] INTO IR
18492
18493    !
18494    !       THESE SUBR(S) ARE USED IN TESTING THE ALU/LOGIC FUNCTIONS.
18495    !
18496    !       NOTE:  ENTRY POINTS "D[15-12]", "D[11-06]", "D[05-00]" EXPECT THAT:
18497    !               (1) 'IR_DBUF', 'DBUF_D' FUNCTIONS ARE ALREADY ENABLED
18498    !               (2) THE FOLLOWING CONSTANTS ARE IN CSP(17:14):
18499    !                       CSP(17) = (007700);     CSP(16) = (170000);
18500    !                       CSP(15) = (000077);     CSP(14) = (000100);
18501    !
18502    !       FURTHERMORE:
18503    !               (1) ENTRY POINT "DZERO" SETS UP THE UCONS:
18504    !                       'IR_DBUF', 'DBUF_D'
18505    !               (2) ENTRY POINT "D[15-12]" COPIES THE ORIGINAL PATTERN, LEFT IN
18506    !                       D, INTO ASPHI[17] FOR SAFEKEEPING, AND REUSE LATER
```



```
18507    !
18508
18509
18510    7234:  !(FREE)
18511    D[15-12]:
18512            P2-U,   IR_DBUF,                                !JUST HAPPENS, DONT CARE NOW
18513            P3,     DBUF_D,                                 !PATTERN IN D -> DBUF
18514                    A#BSPHI[17]_D,                          !SAVE IN ASPHI, TOO
18515            NEXT,   J/D1512A                                !
     (7234)  DCS[0,00,0,0,0,0]  BM[0000..00,11..00,01..011..000...0,0,0...0..0...1,1010...0..1011,0...11,000..010,011,101]
18516
18517    7235:  !(FREE)
18518    D1512A:
18519            P2-U,   IR_DBUF,                                !SEND DBUF -> IR
18520            P3,     DBUF_D,                                 !JUST HAPPENS, DONT CARE NOW
18521            NEXT,   J/BUTIR15-12                            !IR<15:12>N IN BIT<03:00> "BUT"
     (7235)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0...0..0...1,1010...0..0000,0...11,000..011,000,000]
18522
18523    7236:  !(FREE)
18524    D[11-06]:
18525            P2-T,   SR_ASPHI[17]-AND-007700,                !MASK ALL BITS EXCEPT D<11:06> TO ZEROES
18526            NEXT,   J/D1106A                                !
     (7236)  DCS[0,00,0,0,0,0]  BM[1011..11,00..11,01..011..000...0,0,1...0..0...0,0000...0..0000,0...11,000...010,011,111]
18527
18528    7237:  !(FREE)
18529    D1106A:
18530            P2-T,   D_SR-IOR-170000, SAVE-D[C],             !FORCE BITS D<15:12> TO ONES
18531                                                            !THIS MANUVER SHOULD FORCE INSTRS DIAGNOSTIC (E78)
18532                                                            !ROM ADDRESSES (752), (725) WHEN PATTERN GOES INTO IR
18533            P2-U,   IR_DBUF,                                !JUST HAPPENS, DONT CARE NOW
18534            P3,     DBUF_D,                                 !PUT PATTERN JUST SET IN D INTO DBUF
18535            NEXT,   J/DTOIRB                                !
     (7237)  DCS[0,00,0,0,0,0]  BM[1110..11,01..00,00..000..111...0,1,0...0..0...1,1010...0..0000,0...11,000...010,100,011]
18536
18537    7240:  !(FREE)
18538    D[05-00]:
18539            P2-T,   SR_ASPHI[17]-AND-000077,                !MASK ALL BITS EXCEPT D<05:00> TO ZEROES
18540            NEXT,   J/D0500A                                !
     (7240)  DCS[0,00,0,0,0,0]  BM[1011..11,10..11,01..011..000...0,0,1...0..0...0,0000...0..0000,0...11,000...010,100,001]
18541
18542    7241:  !(FREE)
18543    D0500A:
18544            P2-T,   D_SR-IOR-000100, SAVE-D[C],             !FORCE BIT D<06> TO A ONE
18545                                                            !THIS MANUVER SHOULD FORCE INSTRS DIAGNOSTIC (E88)
18546                                                            !ROM ADDRESSES (152), (125) WHEN PATTERN GOES INTO IR
18547            P2-U,   IR_DBUF,                                !JUST HAPPENS, DONT CARE NOW

18548            P3,     DBUF_D,                                 !PUT PATTERN JUST SET IN D INTO DBUF
18549            NEXT,   J/DTOIRB                                !
     (7241)  DCS[0,00,0,0,0,0]  BM[1110..11,11..00,00..000..111...0,1,0...0..0...1,1010...0..0000,0...11,000...010,100,011]
18550
18551    7242:  !(FREE)
18552    DZERO:
18553            P2-U,   IR_DBUF-[I],                            !JUST HAPPENS, DONT CARE
18554            P3,     DBUF_D-[I],                             !COPY PATTERN IN D TO DBUF
```

```
18555            NEXT,   J/DTOIRB                                    ;
      (7242)  DCS[0,00,0,0,0,0]  BM[0100..00.00..00,01..000..100...0,0,0..0..0...1,1011...0..0000,0...11,000...010,100,011]
18556
18557    7243:  ;(FREE)
18558    DTOIRB:
18559            P2=U,   IR_DBUF,                                    ;NOW COPY PATTERN IN DBUF TO IR
18560            P3,     DBUF_D,                                     ;JUST HAPPENS, DONT CARE
18561            NEXT,   J/BUTINSTRS                                 ;GO DO INSTRS "BUT" ON PATTERN IN IR
      (7243)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00,00,,000..000...0,0,0..0..0...1,1010...0..0000,0...11,000...011,000,001]
18562
18563
18564
18565
18566
18567    ;.PAGE*************************************************************************************************************
18568
18569
18570    .TOC    *       UCON SUBROUTINES (FLAGS, PS, FPS, CUA, SERVICE, JAM, PBA)
18571
18572    ;
18573    ;       THESE SUBROUTINES MANIPULATE THE PROCESSOR UCONS, AND VARIOUS OTHER BUSDIN DRIVERS
18574    ;
18575    ;               ASPLO(17) = A TEMPORARY LOCATION, DESTROYED
18576    ;
18577    ;               CSP(02) = VALUE EXPECTED TO BE READ
18578    ;               CSP(03) = ACTUAL VALUE READ
18579    ;               CSP(04) = MASK VALUE
18580    ;
18581    ;               AT RETURN, D = (BUSDINSELECT.AND.MASKVALUE).XOR.EXPECTEDVALUE
18582    ;
18583
18584    7244:  ;(FREE)
18585    CLRSERVICETOD:
18586            P3,     CSPD[02]_EMIT, EMIT/000340,                 ;SERVICE PORT OF STATUS:  ALL BITS RESET
18587            NEXT,   J/CJESERVICETOD                             ;
      (7244)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.11..100..000...0,0,0..0..0...0,1101...1..0000,0...11,000...010,100,111]
18588
18589    7245:  ;(FREE)
18590    DATISERVICETOD:
18591            P3,     CSPD[02]_EMIT, EMIT/100340,                 ;SERVICE PORT OF STATUS:  ONLY DATI[1]H SET
18592            NEXT,   J/CJESERVICETOD                             ;
      (7245)  DCS[0,00,0,0,0,0]  BM[1000..10.00..00.11..100..000...0,0,0..0..0...0,1101...1..0000,0...11,000...010,100,111]
18593
18594    7246:  ;(FREE)
18595    DATOSERVICETOD:
18596            P3,     CSPD[02]_EMIT, EMIT/002340,                 ;SERVICE PORT OF STATUS:  ONLY DATO[1]H SET
18597            NEXT,   J/CJESERVICETOD                             ;
      (7246)  DCS[0,00,0,0,0,0]  BM[0000..10.01..00.11..100..000...0,0,0..0..0...0,1101...1..0000,0...11,000...010,100,111]
18598
18599    7247:  ;(FREE)
18600    CJESERVICETOD:
18601            P3,     CLR-JAM-ERRORS-[I],                         ;SPECIAL ENTRY POINT TO CLEAR OUT JAM
18602            NEXT,   J/SERVICETOD                                ;  PORT OF STATUS MUX, BEFORE READ SERVICE
      (7247)  DCS[0,00,0,0,0,0]  BM[0100..00.00..10.00..000..000...0,0,0..0..0...1,1011...0..0000,0...11,000...010,101,000]
```



```
18603
18604    7250:  ;(FREE)
18605    SERVICETOD:
18606            P0,     BUSDIN_SERVICE-[I],                         ;SERVICE (PORT 1) OF STATUS MUX
18607            NEXT,   J/GETPROCDAT                                ;
      (7250)  DCS[0,00,0,0,0,0]  BM[0100..01.00..00.00..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18608
18609    ;       -       -       -       -       -       -       -       -       -       -       -
18610
18611    7251:  ;(FREE)
18612    PBATOD:
18613            P0,     BUSDIN_PBA-[I],                             ;PBA (PORT 3) OF STATUS MUX
18614            NEXT,   J/GETPROCDAT                                ;
      (7251)  DCS[0,00,0,0,0,0]  BM[1100..01.00..00.00..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18615
18616    ;       -       -       -       -       -       -       -       -       -       -       -
18617
18618    7252:  ;(FREE)
18619    FLAGFPSTOD:
18620            P0,     BUSDIN_FLAGS#FPS-[I],                       ;PUT FLAGS, FPS ON BUSDIN
18621            NEXT,   J/GETPROCDAT                                ;
      (7252)  DCS[0,00,0,0,0,0]  BM[0000..00.00..11.01..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18622
18623    ;       -       -       -       -       -       -       -       -       -       -       -
18624
18625    7253:  ;(FREE)
18626    PSTOD:
18627            P0,     BUSDIN_PS-[I],                              ;PUT PS ON BUSDIN
18628            NEXT,   J/GETPROCDAT                                ;
      (7253)  DCS[0,00,0,0,0,0]  BM[0000..00.00..10.01..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18629
18630    ;       -       -       -       -       -       -       -       -       -       -       -
18631
18632    7254:  ;(FREE)
18633    ODDJAMTOD:
18634            P3,     CSPD[02]_EMIT, EMIT/101004,                 ;JAM PORT OF STATUS:  ONLY ODD-ADDR[1]H SET
18635            NEXT,   J/JAMTOD                                    ;
      (7254)  DCS[0,00,0,0,0,0]  BM[1000..10.00..10.00..000..100...0,0,0..0..0...0,1101...1..0000,0...11,000...010,101,110]
18636
18637    7255:  ;(FREE)
18638    CLRJAMTOD:
18639            P3,     CSPD[02]_EMIT, EMIT/001000,                 ;JAM PORT OF STATUS:  ALL BITS RESET
18640            NEXT,   J/JAMTOD                                    ;
      (7255)  DCS[0,00,0,0,0,0]  BM[0000..10.00..10.00..000..000...0,0,0..0..0...0,1101...1..0000,0...11,000...010,101,110]
18641
18642    7256:  ;(FREE)

18643    JAMTOD:
18644            P0,     BUSDIN_JAM-[I],                             ;PUT JAM REG (STATUS MUX PORT 2)
18645            NEXT,   J/GETPROCDAT                                ;ONTO BUSDIN
      (7256)  DCS[0,00,0,0,0,0]  BM[1100..00.00..00.00..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18646
18647    ;       -       -       -       -       -       -       -       -       -       -       -
18648
18649    7257:  ;(FREE)
```

```
18650    CUATOD:
18651            P0,     BUSDIN_CUA=[I],                         ;PUT CUA REG (HBMUX PORT 2)
18652            NEXT,   J/GETPROCDAT                            ;ONTO BUSDIN
     (7257)  DCS[0,00,0,0,0,0]  BM[0000..00,00..01,01..000..000...0,0,0..0..0...1,1001...0..0000,0...11,000...011,111,011]
18653
18654    !       -       -       -       -       -       -       -       -       -       -       -       -
18655
18656    7373:
18657    GETPROCDAT:
18658            P3,     CSPD[03]_BUSDIN,                        ;GET PREVIOUSLY ENABLED PROC DATA
18659            NEXT,   J/GETMSKPROCDAT                         !
     (7373)  DCS[0,00,0,0,0,0]  BM[0000..10,00..00,00..000..000...0,0,0..0..0...0,1100...1..0000,0...11,000...010,110,000]
18660
18661    7260:  !(FREE)
18662    GETMSKPROCDAT:
18663            P2=T,   D_CSPD(D04), D[C]_0,                    ;GET MASK VALUE
18664            P3,     ASPLO[17]_D,                            ;INTO A-SIDE
18665            NEXT,   J/MSKPROCDAT                            !
     (7260)  DCS[0,00,0,0,0,0]  BM[1010..10,00..00,01..011..000...0,1,0..0..0...0,1011...0..0001,0...11,000...010,110,001]
18666
18667    7261:  !(FREE)
18668    MSKPROCDAT:
18669            P2=T,   D_ASPLO[17]-AND-CSPD(D03), SAVE-D[C],   ;MASK OUT UNWANTED BITS
18670            P3,     ASPLO[17]_D,                            ;AND WRITE BACK
18671            NEXT,   J/CMPPROCDAT                            !
     (7261)  DCS[0,00,0,0,0,0]  BM[1011..10,00..10,01..011..111...0,1,0..0..0...0,1100...0..0001,0...11,000...010,110,010]
18672
18673    7262:  !(FREE)
18674    CMPPROCDAT:
18675            P2=T,   D_ASPLO[17]-XOR-CSPD(D02), SAVE-D[C],   ;COMPARE OBTAINED, EXPECTED BITWISE
18676            NEXT,   J/RESETPROCDAT                          !
     (7262)  DCS[0,00,0,0,0,0]  BM[0110..10,00..10,01..011..111...0,1,0..0..0...0,1101...0..0000,0...11,000...010,110,011]
18677
18678    7263:  !(FREE)
18679    RESETPROCDAT:
18680            P0,     BUSDIN_EMIT=[I],                        ;RESET PROC UCON
18681                    EN-CLK-IR[1$=00],                       !
18682            NEXT,   J/BUTD-IS-ZERO                          ;AND GO TEST D<15:00>
     (7263)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,01..000..100...0,0,0..0..0...1,1001...0..0000,0...11,000...011,100,001]
18683
18684
18685
18686
18687
18688    !.PAGE=============================================================================================================
18689
18690
18691    .TOC    *       SUBR FOR LOADING FPS<3:0> (VIA BUTA(DIAGNOSE))
18692
18693    !
18694    !       THIS SUBROUTINE LOADS CSP(16)<3:0> -> FPS<3:0> VIA THE BUTA(DIAGNOSE) FUNCTION.
18695    !
18696    !       REQUIREMENTS FOR ENTRY:
18697    !
```



```
18698    !               (1)  LOADING SR MUST BE SETUP
18699    !               (2)  CSP(16) SETUP WITH BITS TO LOAD
18700    !               (3)  CSP(00) CONTAINS RETURN MICROADDRESS IN BITS<14:03>
18701    !
18702
18703    7264:  !(FREE)
18704    LOADFPSCC:
18705            P2=T,   SR_ALL-ONES,                            ;SET BIT<00> FOR JAMUPP EXPECTED
18706            P3,     BUTA(DIAGNOSE),                         ;START THE XFR TO BM SEQUENCE
18707            NEXT,   J/LOADFPSCC02                           !
     (7264)  DCS[0,00,0,0,0,0]  BM[1111..00,00..11,01..101..000...0,0,1..0..0...0,0000...0..0000,0...11,011...010,110,101]
18708
18709    7265:  !(FREE)
18710    LOADFPSCC02:
18711            NEXT,   XFR-TO-BM[LOADNZW4]                     ;LOAD PAGE, POINT UPF AT BM CODE
     (7265)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..100...0,0,0..0..0...0,0000...0..0000,0...11,100...011,011,000]
18712
18713    !LOADNZW4:                                              ;(THIS WORD ACTUALLY COMES OUT OF BM ROMS)
18714    !       P2=T,   D_CSPB(16),                             ;PUT "MD" @ CSP(16) INTO D
18715    !       NEXT,   J/LOADNZW5                              !
18716    !
18717    !LOADNZW5:
18718    !       P2,     FPS[CC]_D[3=0],                         ;LOAD FPS<3:0>
18719    !       P3,     BUTA(DIAGNOSE),                         ;BEGIN XFR SEQUENCE BACK TO DCS ROMS
18720    !       NEXT,   J/NZERO2                                !
18721    !
18722    !NZERO2:
18723    !       NEXT,   GOTO-PAGE(4),                           !
18724    !               J/XXXXXX                                !
18725    !
18726    !(CONTROL NOW RETURNS TO DCS AT "JAMUPP001" WORD)
18727    !4777:
18728    !JAMUPP001:
18729    !       *** SEE FLOWS ON SUBSEQUENT PAGE ***
18730
18731
18732
18733
18734
18735    !.PAGE=============================================================================================================
18736
18737
18738    .TOC    *       SUBR TO COPY D-REGISTER TO DBUF TO IR
18739
18740    !
18741    !       SUBROUTINE TO COPY D-REGISTER TO DBUF TO IR
18742    !               AND LEAVE PROCESSOR UCON "CLK IR" AND "BUSDIN_EMIT" ACTIVE
18743    !
18744
18745
18746    7266:  !(FREE)
18747    SPINTOIR:
18748            P2=T,   D_SR, SAVE-D[C],                        ;COPY SP TO D
```

```
                NEXT,   J/DINTOIR                                       !
     (7266)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,110,111]

        7267:  !(FREE)
        DINTOIR:
                P2-U,   IR_DBUF-[I],                                    !JUST HAPPENS - DON'T CARE
                P3-U,   DBUF_D-[I],                                     !TRANSFER D => DBUF
                NEXT,   J/DBUFINTOIR                                    !
     (7267)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,010,111,000]

        7270:  !(FREE)
        DBUFINTOIR:
                EMITC,  EMIT/125200,                                    !JUNK ON EMIT:  INSTRS/E88/405 PATTERN
                P2-U,   IR_DBUF,                                        !TRANSFER DBUF => BUSDIN => IR
                P3-U,   DBUF_D,                                         !JUST HAPPENS - DON'T CARE
                NEXT,   J/RESETUCONP                                    !
     (7270)  DCS[0,00,0,0,0,0]  BM[1010,,00,10,,10,10,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,010,111,001]

        7271:  !(FREE)
        RESETUCONP:
                SELECT, UCON-PROC,                                      !RESET TO PROCESSOR UCON:
                ENABLE, EN-CLK-IR[15-00],                               !  ENABLE CLOCKING IR
                        BUSDIN_EMIT[15-00],                             !  PUT EMIT ONTO BUSDIN
                P0,     SET-UCON-CONTROL,                               !WRITE CONTROLS
                NEXT,   BUTA(RETURN),                                   !RETURN TO CALLER
                        J/BUTERROR7                                     !FATAL ERROR IF GO HERE
     (7271)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,111,,,011,111,110]


        ! - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

        7272:  !(FREE)
        SRINTOIR5:
                P2-T,   D_SR, SAVE-D[C],                                !COPY SR TO D
                NEXT,   J/DINTOIR5                                      !
     (7272)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,000,,,010,111,011]

        7273:  !(FREE)
        DINTOIR5:
                P2-U,   IR_DBUF-[I],                                    !JUST HAPPENS - DON'T CARE
                P3-U,   DBUF_D-[I],                                     !TRANSFER D => DBUF
                NEXT,   J/DBUFINTOIR5                                   !
     (7273)  DCS[0,00,0,0,0,0]  BM[0100,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1011,,,0,,0000,0,,,11,000,,,010,111,100]

        7274:  !(FREE)
        DBUFINTOIR5:
                EMITC,  EMIT/125200,                                    !JUNK ON EMIT:  INSTRS/E88/405 PATTERN
                P2-U,   IR_DBUF,                                        !TRANSFER DBUF => BUSDIN => IR
                P3-U,   DBUF_D,                                         !JUST HAPPENS - DON'T CARE
                NEXT,   J/RESETUCONP5                                   !
     (7274)  DCS[0,00,0,0,0,0]  BM[1010,,00,10,,10,10,,000,,000,,,0,0,0,,0,,0,,,1,1010,,,0,,0000,0,,,11,000,,,010,111,101]

        7275:  !(FREE)
        RESETUCONP5:
```



```
                SELECT, UCON-PROC,                                      !RESET TO PROCESSOR UCON:
                ENABLE, EN-CLK-IR[15-00],                               !  ENABLE CLOCKING IR
                        BUSDIN_EMIT[15-00],                             !  PUT EMIT ONTO BUSDIN
                P0,     SET-UCON-CONTROL,                               !WRITE CONTROLS
                NEXT,   J/BUTINSTR5                                     !AND EXIT TO DO INSTR-5 BUT INTO TARGET AREA
     (7275)  DCS[0,00,0,0,0,0]  BM[0000,,00,00,,00,01,,000,,100,,,0,0,0,,0,,0,,,1,1001,,,0,,0000,0,,,11,000,,,011,000,001]






        !.PAGE==========================================================================================

        .TOC    *       JAM UPP SERVICE SUBROUTINE

        !
        !       IF A JAMUPP TO 0777/4777 OCCURS, ACTION DEPENDS UPON SR<00> CONTENTS:
        !
        !               SR<00>=1 => RESET SR TO (000000), DO A BUTA[RETURN] TO ADDRESS IN CSP(00)
        !
        !               SR<00>=0 => SIGNAL ERROR, LOG STATUS, RETURN VIA "CUA" CONTENTS
        !                       ERROR-CODE ::= INDICATES LAST TEST EXECUTED
        !

        4777:
        JAMUPP001:
                P3-T,   SR_D,                                           !SAVE CURRENT D CONTENTS IN SR
                NEXT,   BUTR(SR00),                                     !TEST SR<00> FLAG  (PREV SR00 CONTENTS)
                        !IF SR<00>=1, EXPECTED JAM, GOTO "JAMUPP002B"
                        !IF SR<00>=0, NO JAM WAS EXPECTED, FORCE ERROR AT "JAMUPP003"
                        J/JAMUPP003                                     !
     (4777)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,01,01,,000,,000,,,1,0,1,,0,,0,,,0,0000,,,0,,0000,0,,,00,000,,,111,101,110]

        4757:
        JAMUPP002B:
                P2-T,   D_CSPD(D00), SAVE-D[C],                         !GET RETURN ADDRESS
                NEXT,   J/JAMUPP002C                                    !
     (4757)  DCS[0,00,0,0,0,0]  BM[1010,,10,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,1111,,,0,,0000,0,,,11,000,,,100,011,100]

        4434:  !(FREE)
        JAMUPP002C:
                P0,     RETURN_D[14-03], PAGE(7),                       !PUT RETURN ADDRESS INTO REG
                P2-T,   D_SR, SAVE-D[C],                                !RESTORE OLD D
                NEXT,   J/JAMUPP002D                                    !

     (4434)  DCS[0,00,0,0,0,0]  BM[1111,,00,00,,00,00,,000,,111,,,0,1,0,,0,,0,,,0,0000,,,0,,0000,0,,,11,101,,,010,001,011]

        7213:  !(FREE)
        JAMUPP002D:
                P2-T,   SR_ZERO,                                        !ZERO OUT SR FOR RETURN
                NEXT,   BUTA(RETURN),                                   !NOW RETURN
                        J/BUTERROR7                                     !ERROR IF GO HERE
```

```
      (7213)  DCS[0,00,0,0,0,0]  BM[0011..00.00..00.00..000..000...0.0.1..0..0...0.0000...0..0000.0...11.111...011.111.110]
18845
18846     4756:
18847     JAMUPP003:
18848             SELECT, BUSDIN_CUA=[I],                         ;ENABLE READ JAMUPP MICROADDR
18849             NEXT,   BUTD[ERROR],                            ;WAS ERROR PREVIOUSLY SET ?
18850                     J/JAMUPP005                             ;  YES/JAMUPP004, NO/JAMUPP005
      (4756)  DCS[0,00,0,1,0,0]  BM[0000..00.00..01.01..000..000...0.0.0..0..0...1.1001...0..0000.0...11,000...111,100,111]
18851
18852     ;* ENTER HERE IF "ERROR" WAS PREVIOUSLY SET (INHIBIT LOG)
18853     4746:
18854     JAMUPP004:
18855             P3,     CSPD[00]_LOG=CUA,                       ;GET RETURN LOC <- SAVED CUA
18856             P3=T,   BUTA(CUA=TRACK),                        ;START CUA GOING AGAIN
18857             NEXT,   J/JAMUPP0028                            ;INHIBIT LOG IF PREV ERROR
      (4746)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.00..000..000...1.0.0..0..0...0.1111...1..0000.0...11,001...111,101,111]
18858
18859     ;* ENTER HERE IF "ERROR" NOT YET SET (LOG FIRST MODE)
18860     4747:
18861     JAMUPP005:
18862             P0,     DCS-CTR(C0,);                           ;FORCE ERROR WITH PREV ERROR-CODE/ENUA, TNUA=(4747)
18863             P3,     CSPD[00]_LOG=CUA,                       ;RETURN LOC <- RETURN ADDR FROM CUA
18864             NEXT,   J/JAMUPP006                             ;AND GO LOG REGISTERS THIS TIME
      (4747)  DCS[0,00,1,0,0,0]  BM[1111..10.00..00.00..000..000...0.0.0..0..0...0.1111...1..0000.0...11,000...100,011,101]
18865
18866     4435:  ;(FREE)
18867     JAMUPP006:
18868             SELECT, BUSDIN_SERVICE=[I],                     ;SERVICE REGISTER
18869             NEXT,   J/JAMUPP007                             ;
      (4435)  DCS[0,00,0,0,0,0]  BM[0100..01.00..00.00..000..000...0.0.0..0..0...1.1001...0..0000.0...11,000...100,011,110]
18870
18871     4436:  ;(FREE)
18872     JAMUPP007:
18873             P3,     CSPD[01]_LOG=SERVICE,                   ;LOG SERVICE INFO REGISTER
18874             NEXT,   J/JAMUPP010                             ;
      (4436)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.00..000..000...0.0.0..0..0...0.1110...1..0000.0...11,000...100,011,111]
18875
18876     4437:  ;(FREE)
18877     JAMUPP010:
18878             SELECT, BUSDIN_JAM=[I],                         ;JAM REGISTER
18879             NEXT,   J/JAMUPP011                             ;
      (4437)  DCS[0,00,0,0,0,0]  BM[1100..00.00..00.00..000..000...0.0.0..0..0...1.1001...0..0000.0...11,000...100,100,000]
18880
18881     4440:  ;(FREE)
18882     JAMUPP011:
18883             P3,     CSPD[02]_LOG=JAM,                       ;LOG JAMUPP CAUSE INFO
18884                     BUTA(CUA=TRACK),                        ;RESET CUA TO TRACK, IN CASE ANOTHER JAM COMES
18885             NEXT,   J/JAMUPP0028                            ;GO TO TOP OF THIS PAGE, AND RETURN INLINE
      (4440)  DCS[0,00,0,0,0,0]  BM[0000..10.00..00.00..000..000...0.0.0..0..0...0.1101...1..0000.0...11,001...111,101,111]
18886
18887
18888
18889
18890
```



```
18891     ;.PAGE*************************************************************************************************************
18892
18893
18894     .TOC    *   MICROBRANCH (BUT) TAKEOFF WORDS
18895
18896     ;*****************************************************************************
18897     ;*                                                                           *
18898     ;*                                                UWORDS: 000 + 056          *
18899     ;*                                                                           *
18900     ;*     FUNCTION:       THESE WORDS ARE THE INACTIVE-"BUT" (BRANCHING TYPE)   *
18901     ;*                     "TAKEOFF", OR SUBROUTINE MICROWORDS.  ANY TEST WHICH  *
18902     ;*                     REQUIRES A SPECIFIC "BUT" CONDITION TO BE TESTED WILL USE *
18903     ;*                     ONE OF THESE MICROWORDS AS A TAKEOFF POINT INTO THE "BUT  *
18904     ;*                     TARGET TABLE" (DESCRIBED NEXT), WHERE AN ENUA:TNUA    *
18905     ;*                     COMPARISON WILL HAVE BEEN PREVIOUSLY ENABLED (VIA SET-    *
18906     ;*                     TING THE DIAGNOSTIC COUNTER TO THE APPROPRIATE VALUE.     *
18907     ;*                                                                           *
18908     ;*****************************************************************************
18909
18910
18911
18912
18913     ;*** BUT 00 ***
18914     ;FULL WIDTH IS BUT[SR<3:0>]
18915     7276:  ;(FREE)
18916     BUTSR3=0:
18917             NEXT,   BUT(SR3=0),                             ;TO (400)-(417), W4
18918                     J/ZTARGET400                            ;NO MASK
      (7276)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...00,000...100,000,000]
18919
18920
18921     ;*** BUT 01 ***
18922     ;FULL WIDTH IS BUT[IR<15:12>]
18923     7300:  ;(FREE)
18924     BUTIR15-12:
18925             NEXT,   BUT(IR15-12),                           ;TO (400)-(417), W4
18926                     J/ZTARGET400                            ;NO MASK
      (7300)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...00,001...100,000,000]
18927
18928
18929     ;*** BUT 02 ***
18930     ;FULL WIDTH IS BUT[INSTR 5]
18931     7301:  ;(FREE)
18932     BUTINSTR5:
18933             NEXT,   BUT(INSTR5),                            ;TO (400)-(437), W5
18934                     J/ZTARGET400                            ;NO MASK

      (7301)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...00,010...100,000,000]
18935
18936
18937     ;*** BUT 03 ***
18938     ;FULL WIDTH IS BUT[IR11&FLTPT<3:0>]
18939     7302:  ;(FREE)
18940     BUTIR11FLTPT3-0:
18941             NEXT,   BUT(IR11&FLTPT3-0),                     ;TO (400)-(437), W5
```

```
18942                   J/ZTARGET400                            ;NO MASK
     (7302)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.011...100.000.000]
18943
18944
18945     ;*** BUT 04 ***
18946     ;FULL WIDTH IS BUT[IR<9:6>]
18947     7304:  1(FREE)
18948     BUTIR9-6:
18949             NEXT,   BUT(IR9-6),                             ;TO (400)-(417), W4
18950                     J/ZTARGET400                            ;NO MASK
     (7304)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.100...100.000.000]
18951
18952
18953     ;*** BUT 05 ***
18954     ;FULL WIDTH IS BUT[MOV-DR7#IR<5:3>]
18955     7305:  1(FREE)
18956     BUTMOVDR7IR5-3:
18957             NEXT,   BUT(MOV-DR7#IR5-3),                     ;TO (400)-(417), W4
18958                     J/ZTARGET400                            ;NO MASK
     (7305)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.101...100.000.000]
18959
18960
18961     ;*** BUT 06 ***
18962     ;FULL WIDTH IS BUT[INSTR 1]            *** N.B.:  THIS BUT IS ALSO ACTIVE ***
18963     7306:  1(FREE)
18964     BUTINSTR1:
18965             NEXT,   BUTA(INSTR1),                           ;TO (400)-(777), W8
18966                     J/ZTARGET400                            ;NO MASK
     (7306)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.110...100.000.000]
18967
18968
18969     ;*** BUT 07 ***
18970     ;FULL WIDTH IS BUT[BG-SERV-H+FP-SERV-H#D[C]#FPRET<1:0>]
18971     7307:  1(FREE)
18972     BUTBGFPSERV:
18973             NEXT,   BUT(BGSERV-FPSERV#D[C]#FPRET),          ;TO (407),(417), W1
18974                     J/ZTARGET407                            ;MASK OUT D[C], FPRET<1:0>
     (7307)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.111...100.000.111]
18975
18976     7310:  1(FREE)
18977     BUTD[C]C:
18978             NEXT,   BUT(BGSERV-FPSERV#D[C]#FPRET),          ;TO (413),(417), W1
18979                     J/ZTARGET413                            ;MASK OUT BG-SERV-H+FP-SERV-H, FPRET<1:0>
     (7310)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...00.111...100.001.011]
18980
18981
18982     ;*** BUT10 ***
18983     ;FULL WIDTH IS BUT[COUT07#DOUT07#FPS05]
18984     7311:  1(FREE)
18985     BUTCOUT7DOUT7:
18986             NEXT,   BUT(COUT07#DOUT07#FPS05),               ;TO (401),(403),(405),(407), W2
18987                     J/ZTARGET401                            ;MASK OUT FPS05
     (7311)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.000...100.000.001]
18988
```



```
18989     7312:  1(FREE)
18990     BUTFPS05:
18991             NEXT,   BUT(COUT07#DOUT07#FPS05),               ;TO (406),(407), W1
18992                     J/ZTARGET406                            ;MASK OUT COUT7, DOUT7
     (7312)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.000...100.000.110]
18993
18994
18995     ;*** BUT 11 ***
18996     ;FULL WIDTH IS BUT[DM0#SM0#BYTE]
18997     7313:  1(FREE)
18998     BUTDMSMBYTE:
18999             NEXT,   BUT(DM0#SM0#BYTE),                      ;TO (400)-(407), W3
19000                     J/ZTARGET400                            ;NO MASK
     (7313)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.001...100.000.000]
19001
19002
19003     ;*** BUT 12 ***
19004     ;FULL WIDTH IS BUT[GD<3:2>]
19005     7314:  1(FREE)
19006     BUTGD3-2:
19007             NEXT,   BUT(GD3-2),                             ;TO (400)-(403), W2
19008                     J/ZTARGET400                            ;NO MASK
     (7314)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.010...100.000.000]
19009
19010
19011     ;*** BUT 13 ***
19012     ;FULL WIDTH IS BUT[SR<1:0>#COUNT-IS-377]                *** N.B.:  THIS BUT IS ALSO ACTIVE  ***
19013     7315:  1(FREE)
19014     BUTSR1-0:
19015             NEXT,   BUTA(SR1-0#COUNT-IS-377),               ;TO (401),(403),(405),(407), W2
19016                     J/ZTARGET401                            ;MASK OUT COUNT-IS-377
     (7315)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.011...100.000.001]
19017
19018
19019     ;*** BUT 14 ***
19020     ;FULL WIDTH IS BUT[BG-SERVCE-L#MFSS#MULTIPLE]
19021     7316:  1(FREE)
19022     BUTBGSERVL:
19023             NEXT,   BUT(BG-SERVCE-L#MFSS#MULTIPLE),         ;TO (403),(407), W1
19024                     J/ZTARGET403                            ;MASK OUT MFSS, MULTIPLE
     (7316)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.100...100.000.011]
19025
19026     7317:  1(FREE)
19027     BUTMMASKPS[T]:
19028             SETUP,  TEST(MASKED-PS[T]),                     ;SELECT MULTIPLE BUT
19029             NEXT,   J/BUTMNXT000                            ;NEXT

     (7317)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...11.000...011.010.000]
19030
19031     7320:  1(FREE)
19032     BUTMNXT000:
19033             SETUP,  TEST(MASKED-PS[T]),                     ;SELECT MULTIPLE BUT
19034             NEXT,   BUT(BG-SERVCE-L#MFSS#MULTIPLE),         ;TO (406),(407), W1
19035                     J/ZTARGET406                            ;MASK OUT BG-SERVCE-L, MFSS
     (7320)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0.0...0.0000...0..0000.0...01.100...100.000.110]
```

```
19036
19037    7321:  !(FREE)
19038    BUTMD00:
19039           SETUP,  TEST(D00),                          !SELECT MULTIPLE BUT
19040           NEXT,   J/BUTMNXT001                        !NEXT
     (7321)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..001...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.010]
19041
19042    7322:  !(FREE)
19043    BUTMNXT001:
19044           SETUP,  TEST(D00),                          !SELECT MULTIPLE BUT
19045           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19046                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7322)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..001...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19047
19048    7323:  !(FREE)
19049    BUTMPS[N]:
19050           SETUP,  TEST(PS[N]),                        !SELECT MULTIPLE BUT
19051           NEXT,   J/BUTMNXT002                        !NEXT
     (7323)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..010...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.100]
19052
19053    7324:  !(FREE)
19054    BUTMNXT002:
19055           SETUP,  TEST(PS[N]),                        !SELECT MULTIPLE BUT
19056           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19057                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7324)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..010...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19058
19059    7325:  !(FREE)
19060    BUTMFLAG7:
19061           SETUP,  TEST(FLAG7),                        !SELECT MULTIPLE BUT
19062           NEXT,   J/BUTMNXT003                        !NEXT
     (7325)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..011...0.0.0..0..0...0.0000...0..0000.0...11.000...011.010.110]
19063
19064    7326:  !(FREE)
19065    BUTMNXT003:
19066           SETUP,  TEST(FLAG7),                        !SELECT MULTIPLE BUT
19067           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19068                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7326)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..011...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19069
19070    7327:  !(FREE)
19071    BUTMEXFLAG1:
19072           SETUP,  TEST(EXFLAG1),                      !SELECT MULTIPLE BUT
19073           NEXT,   J/BUTMNXT004                        !NEXT
     (7327)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..100...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.000]
19074
19075    7330:  !(FREE)
19076    BUTMNXT004:
19077           SETUP,  TEST(EXFLAG1),                      !SELECT MULTIPLE BUT
19078           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19079                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7330)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..100...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19080
19081    7331:  !(FREE)
```



```
19082    BUTMFLTPTS:
19083           SETUP,  TEST(FLTPTS),                       !SELECT MULTIPLE BUT
19084           NEXT,   J/BUTMNXT005                        !NEXT
     (7331)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..101...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.010]
19085
19086    7332:  !(FREE)
19087    BUTMNXT005:
19088           SETUP,  TEST(FLTPTS),                       !SELECT MULTIPLE BUT
19089           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19090                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7332)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..101...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19091
19092    7333:  !(FREE)
19093    BUTMEXFLAG2:
19094           SETUP,  TEST(EXFLAG2),                      !SELECT MULTIPLE BUT
19095           NEXT,   J/BUTMNXT006                        !NEXT
     (7333)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..110...0.0.0..0..0...0.0000...0..0000.0...11.000...011.011.100]
19096
19097    7334:  !(FREE)
19098    BUTMNXT006:
19099           SETUP,  TEST(FXFLAG2),                      !SELECT MULTIPLE BUT
19100           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19101                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7334)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..110...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19102
19103
19104    7336:  !(FREE)
19105    BUTMINITJAM:
19106           SETUP,  TEST(INIT-JAM),                     !SELECT MULTIPLE BUT
19107           NEXT,   J/BUTMNXT007                        !NEXT
     (7336)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..111...0.0.0..0..0...0.0000...0..0000.0...11.000...011.100.000]
19108
19109    7340:  !(FREE)
19110    BUTMNXT007:
19111           SETUP,  TEST(INIT-JAM),                     !SELECT MULTIPLE BUT
19112           NEXT,   BUT(BG-SERVCE-L&MFSS&MULTIPLE),     !TO (406),(407), W1
19113                   J/ZTARGET406                        !MASK OUT BG-SERVCE-L, MFSS
     (7340)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..111...0.0.0..0..0...0.0000...0..0000.0...01.100...100.000.110]
19114
19115    !*** BUT 15 ***
19116    !FULL WIDTH IS BUT[D<14:00>=0&D15]
19117    7341:  !(FREE)
19118    BUTD-IS-ZERO:
19119           NEXT,   BUT(D14-00EQ0&D15),                 !TO (400)-(403),W2
19120                   J/ZTARGET400                        !NO MASK
     (7341)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...01.101...100.000.000]

19121
19122
19123    !*** BUT 16 ***
19124    !FULL WIDTH IS BUT[IR11&PS15]
19125    7342:  !(FREE)
19126    BUTIR11B:
19127           NEXT,   BUT(IR11&PS15),                     !TO (401),(403), W1
19128                   J/ZTARGET401                        !MASK OUT PS15
```

```
      (7342)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...01.110...100,000,001]
19129
19130     7343:  !(FREE)
19131     BUTPS15:
19132             NEXT,   BUT(JR11#PS15),                         !TO (402),(403), W1
19133                     J/ZTARGET402                            !MASK OUT IR11
      (7343)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...01.110...100,000,010]
19134
19135
19136     !*** BUT 17 ***
19137     !FULL WIDTH IS BUT[COUNT-IS-377#D[C]]          *** N.B.:  THIS BUT IS ALSO ACTIVE  ***
19138     7344:  !(FREE)
19139     BUTD[C]A:
19140             NEXT,   BUTA(COUNT-IS-377#D[C]),                !TO (402),(403), W1
19141                     J/ZTARGET402                            !MASK OUT COUNT-IS-377
      (7344)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...01.111...100,000,010]
19142
19143
19144     !*** BUT 20 ***
19145     !FULL WIDTH IS BUT[PREFETCH-L#SERVICE]         *** N.B.:  THIS BUT IS ALSO ACTIVE ***
19146     7345:  !(FREE)
19147     BUTSERVICE:
19148             NEXT,   BUTA(PREFETCH-L#SERVICE),               !TO (402),(403), W1
19149                     J/ZTARGET402                            !MASK OUT PREFETCH-L
      (7345)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.000...100,000,010]
19150
19151
19152     !*** BUT 21 ***
19153     !FULL WIDTH IS BUT[VECTOR-LOAD#DR6/7L]
19154     7346:  !(FREE)
19155     BUTVECTLOAD:
19156             NEXT,   BUT(VECTOR-LOAD#DR6-7L),                !TO (401), (403), W1
19157                     J/ZTARGET401                            !MASK OUT DR6/7-L
      (7346)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.001...100,000,001]
19158
19159     7347:  !(FREE)
19160     BUTDR6-7L:
19161             NEXT,   BUT(VECTOR-LOAD#DR6-7L),                !TO (402), (403), W1
19162                     J/ZTARGET402                            !MASK OUT VECTOR-LOAD
      (7347)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.001...100,000,010]
19163
19164
19165     !*** BUT 22 ***
19166     !THIS IS AN ACTIVE BUT - NO BRANCH MODIFICATION
19167     !(THIS BUT IS NOT USED WITH THE TARGET TABLE)
19168
19169
19170     !*** BUT 23 ***
19171     !FULL WIDTH IS BUT[D[C]#BA00]
19172     7350:  !(FREE)
19173     BUTD[C]B:
19174             NEXT,   BUT(D[C]#BA00),                         !TO (401),(403), W1
19175                     J/ZTARGET401                            !MASK OUT BA00
      (7350)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.011...100,000,001]
```



```
19176
19177     7351:  !(FREE)
19178     BUTBA00:
19179             NEXT,   BUT(D[C]#BA00),                         !TO (402),(403), W1
19180                     J/ZTARGET402                            !MASK OUT D[C]
      (7351)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.011...100,000,010]
19181
19182
19183     !*** BUT 24 ***
19184     !FULL WIDTH IS BUT[OTHER-JAM#FP-PROC]
19185     7352:  !(FREE)
19186     BUTOTHERJAM:
19187             NEXT,   BUT(OTHER-JAM#FP-PROC),                 !TO (401),(403), W1
19188                     J/ZTARGET401                            !MASK OUT FLTPT-PROC-H
      (7352)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.100...100,000,001]
19189
19190     7354:  !(FREE)
19191     BUTFPPROC:
19192             NEXT,   BUT(OTHER-JAM#FP-PROC),                 !TO (402),(403), W1
19193                     J/ZTARGET402                            !MASK OUT OTHER-JAM
      (7354)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.100...100,000,010]
19194
19195
19196     !*** BUT 25 ***
19197     !FULL WIDTH IS BUT[COUNT-IS-377]                *** N.B.:  THIS BUT IS ALSO ACTIVE ***
19198     !(THIS BUT IS NOT USED WITH THE TARGET TABLE)
19199
19200
19201     !*** BUT 26 ***
19202     !FULL WIDTH IS BUT[INTR-HIGH#INSTR-BRANCH-L]
19203     7355:  !(FREE)
19204     BUTINTRHIGH:
19205             NEXT,   BUT(INTR-HIGH#INSTR-BRANCH-L),          !TO (401),(403), W1
19206                     J/ZTARGET401                            !MASK OUT INSTR-BRANCH-L
      (7355)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.110...100,000,001]
19207
19208     7356:  !(FREE)
19209     BUTINSTRBRANCH:
19210             NEXT,   BUT(INTR-HIGH#INSTR-BRANCH-L),          !TO (402),(403), W1
19211                     J/ZTARGET402                            !MASK OUT INTR-HIGH-H
      (7356)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.110...100,000,010]
19212
19213
19214     !*** BUT 27 ***
19215     !FULL WIDTH IS BUT[PREFETCH-JAM#FP-FD]
19216     7360:  !(FREE)

19217     BUTPREFETCHJAM:
19218             NEXT,   BUT(PREFETCH-JAM#FP-FD),                !TO (401),(403), W1
19219                     J/ZTARGET401                            !MASK OUT FLTPT-FD-H
      (7360)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0,0000...0..0000.0...10.111...100,000,001]
19220
19221     7371:  !(FREE)
19222     BUTFPFD:
19223             NEXT,   BUT(PREFETCH-JAM#FP-FD),                !TO (402),(403), W1
```

```
19224                   J/ZTARGET402                    ;MASK OUT PREFETCH-JAM-H
      (7371)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...10,111...100,000,010]
19225
19226
19227
19228
19229
19230    ;.PAGE*****************************************************************************************************************
19231
19232
19233    .TOC   *   MICROBRANCH (BUT) TARGET WORDS
19234
19235    ;*************************************************************************************
19236    ;*                                                                                   *
19237    ;*                                                UWORDS: 000 + 400                  *
19238    ;*                                                                                   *
19239    ;*     FUNCTION:       TARGET BUT TABLE                                              *
19240    ;*                     ALL THE ABOVE BUTS TARGET INTO THIS TABLE OF MICROWORDS,       *
19241    ;*                     ALL OF WHICH DO A BUTA(RETURN).  IN THIS MANNER, ANY OF       *
19242    ;*                     THE ABOVE BRANCHES MAY BE EXECUTED, AND CONTROL WILL ALWAYS    *
19243    ;*                     RETURN TO WHERE THE "BUT TBS" SUBROUTINE WAS CALLED.          *
19244    ;*                                                                                   *
19245    ;*************************************************************************************
19246
19247
19248
19249    ;*** THE TARGET BUT TABLE ***
19250
19251    7400:
19252    ZTARGET400:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7400)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19253    7401:
19254    ZTARGET401:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7401)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19255    7402:
19256    ZTARGET402:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7402)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19257    7403:
19258    ZTARGET403:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7403)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19259    7404:
19260    ZTARGET404:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7404)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19261    7405:
19262    ZTARGET405:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7405)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19263    7406:
19264    ZTARGET406:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7406)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19265    7407:
19266    ZTARGET407:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7407)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19267    7410:
19268    ZTARGET410:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
```



```
      (7410)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19269    7411:
19270    ZTARGET411:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7411)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19271    7412:
19272    ZTARGET412:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7412)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19273    7413:
19274    ZTARGET413:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7413)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19275    7414:
19276    ZTARGET414:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7414)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19277    7415:
19278    ZTARGET415:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7415)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19279    7416:
19280    ZTARGET416:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7416)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19281    7417:
19282    ZTARGET417:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7417)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19283    7420:
19284    ZTARGET420:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7420)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19285    7421:
19286    ZTARGET421:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7421)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19287    7422:
19288    ZTARGET422:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7422)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19289    7423:
19290    ZTARGET423:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7423)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19291    7424:
19292    ZTARGET424:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7424)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19293    7425:
19294    ZTARGET425:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7425)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19295    7426:
19296    ZTARGET426:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7426)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19297    7427:
19298    ZTARGET427:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7427)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]

19299    7430:
19300    ZTARGET430:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7430)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19301    7431:
19302    ZTARGET431:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7431)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0...0...0.0000...0..0000.0...11,111...011,111,110]
19303    7432:
19304    ZTARGET432:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
```

```
      (7432)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19305     7433;
19306     ZTARGET433:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7433)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19307     7434;
19308     ZTARGET434:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7434)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19309     7435;
19310     ZTARGET435:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7435)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19311     7436;
19312     ZTARGET436:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7436)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19313     7437;
19314     ZTARGET437:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7437)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19315     7440;
19316     ZTARGET440:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7440)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19317     7441;
19318     ZTARGET441:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7441)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19319     7442;
19320     ZTARGET442:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7442)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19321     7443;
19322     ZTARGET443:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7443)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19323     7444;
19324     ZTARGET444:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7444)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19325     7445;
19326     ZTARGET445:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7445)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19327     7446;
19328     ZTARGET446:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7446)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19329     7447;
19330     ZTARGET447:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7447)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19331     7450;
19332     ZTARGET450:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7450)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19333     7451;
19334     ZTARGET451:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7451)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19335     7452;
19336     ZTARGET452:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7452)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19337     7453;
19338     ZTARGET453:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7453)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19339     7454;
19340     ZTARGET454:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
```



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      (7454)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19341     7455;
19342     ZTARGET455:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7455)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19343     7456;
19344     ZTARGET456:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7456)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19345     7457;
19346     ZTARGET457:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7457)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19347     7460;
19348     ZTARGET460:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7460)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19349     7461;
19350     ZTARGET461:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7461)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19351     7462;
19352     ZTARGET462:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7462)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19353     7463;
19354     ZTARGET463:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7463)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19355     7464;
19356     ZTARGET464:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7464)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19357     7465;
19358     ZTARGET465:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7465)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19359     7466;
19360     ZTARGET466:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7466)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19361     7467;
19362     ZTARGET467:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7467)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19363     7470;
19364     ZTARGET470:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7470)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19365     7471;
19366     ZTARGET471:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7471)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19367     7472;
19368     ZTARGET472:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7472)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19369     7473;
19370     ZTARGET473:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7473)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]

19371     7474;
19372     ZTARGET474:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7474)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19373     7475;
19374     ZTARGET475:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7475)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0...0,0...0,0000...0..0000,0...11,111...011,111,110]
19375     7476;
19376     ZTARGET476:    NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
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      (7476)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19377    7477;
19378    ZTARGET477:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7477)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19379    7500;
19380    ZTARGET500:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7500)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19381    7501;
19382    ZTARGET501:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7501)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19383    7502;
19384    ZTARGET502:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7502)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19385    7503;
19386    ZTARGET503:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7503)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19387    7504;
19388    ZTARGET504:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7504)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19389    7505;
19390    ZTARGET505:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7505)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19391    7506;
19392    ZTARGET506:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7506)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19393    7507;
19394    ZTARGET507:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7507)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19395    7510;
19396    ZTARGET510:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7510)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19397    7511;
19398    ZTARGET511:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7511)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19399    7512;
19400    ZTARGET512:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7512)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19401    7513;
19402    ZTARGET513:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7513)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19403    7514;
19404    ZTARGET514:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7514)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19405    7515;
19406    ZTARGET515:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7515)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19407    7516;
19408    ZTARGET516:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7516)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19409    7517;
19410    ZTARGET517:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7517)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19411    7520;
19412    ZTARGET520:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
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      (7520)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19413    7521;
19414    ZTARGET521:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7521)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19415    7522;
19416    ZTARGET522:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7522)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19417    7523;
19418    ZTARGET523:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7523)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19419    7524;
19420    ZTARGET524:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7524)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19421    7525;
19422    ZTARGET525:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7525)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19423    7526;
19424    ZTARGET526:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7526)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19425    7527;
19426    ZTARGET527:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7527)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19427    7530;
19428    ZTARGET530:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7530)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19429    7531;
19430    ZTARGET531:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7531)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19431    7532;
19432    ZTARGET532:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7532)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19433    7533;
19434    ZTARGET533:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7533)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19435    7534;
19436    ZTARGET534:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7534)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19437    7535;
19438    ZTARGET535:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7535)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19439    7536;
19440    ZTARGET536:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7536)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19441    7537;
19442    ZTARGET537:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7537)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]

19443    7540;
19444    ZTARGET540:    NEXT,    BUTA(RETURN), J/BUTERROP?        ;COMPARE MICROADDRESS, THEN RETURN
      (7540)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19445    7541;
19446    ZTARGET541:    NEXT,    BUTA(RETURN), J/BUTERROR?        ;COMPARE MICROADDRESS, THEN RETURN
      (7541)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111..011,111,110]
19447    7542;
19448    ZTARGET542:    NEXT,    BUTA(RETURN), J/BUTERROP?        ;COMPARE MICROADDRESS, THEN RETURN
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      (7542)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19449     7543;
19450     ZTARGET543:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7543)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19451     7544;
19452     ZTARGET544:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7544)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19453     7545;
19454     ZTARGET545:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7545)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19455     7546;
19456     ZTARGET546:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7546)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19457     7547;
19458     ZTARGET547:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7547)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19459     7550;
19460     ZTARGET550:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7550)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19461     7551;
19462     ZTARGET551:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7551)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19463     7552;
19464     ZTARGET552:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7552)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19465     7553;
19466     ZTARGET553:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7553)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19467     7554;
19468     ZTARGET554:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7554)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19469     7555;
19470     ZTARGET555:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7555)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19471     7556;
19472     ZTARGET556:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7556)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19473     7557;
19474     ZTARGET557:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7557)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19475     7560;
19476     ZTARGET560:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7560)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19477     7561;
19478     ZTARGET561:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7561)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19479     7562;
19480     ZTARGET562:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7562)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19481     7563;
19482     ZTARGET563:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7563)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19483     7564;
19484     ZTARGET564:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
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      (7564)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19485     7565;
19486     ZTARGET565:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7565)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19487     7566;
19488     ZTARGET566:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7566)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19489     7567;
19490     ZTARGET567:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7567)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19491     7570;
19492     ZTARGET570:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7570)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19493     7571;
19494     ZTARGET571:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7571)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19495     7572;
19496     ZTARGET572:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7572)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19497     7573;
19498     ZTARGET573:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7573)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19499     7574;
19500     ZTARGET574:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7574)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19501     7575;
19502     ZTARGET575:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7575)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19503     7576;
19504     ZTARGET576:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7576)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19505     7577;
19506     ZTARGET577:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7577)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19507     7600;
19508     ZTARGET600:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7600)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19509     7601;
19510     ZTARGET601:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7601)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19511     7602;
19512     ZTARGET602:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7602)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19513     7603;
19514     ZTARGET603:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7603)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]

19515     7604;
19516     ZTARGET604:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7604)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19517     7605;
19518     ZTARGET605:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7605)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19519     7606;
19520     ZTARGET606:     NEXT,   BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
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      (7606)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19521    7607:
19522    ZTARGET607:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7607)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19523    7610:
19524    ZTARGET610:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7610)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19525    7611:
19526    ZTARGET611:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7611)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19527    7612:
19528    ZTARGET612:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7612)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19529    7613:
19530    ZTARGET613:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7613)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19531    7614:
19532    ZTARGET614:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7614)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19533    7615:
19534    ZTARGET615:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7615)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19535    7616:
19536    ZTARGET616:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7616)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19537    7617:
19538    ZTARGET617:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7617)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19539    7620:
19540    ZTARGET620:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7620)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19541    7621:
19542    ZTARGET621:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7621)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19543    7622:
19544    ZTARGET622:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7622)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19545    7623:
19546    ZTARGET623:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7623)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19547    7624:
19548    ZTARGET624:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7624)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19549    7625:
19550    ZTARGET625:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7625)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19551    7626:
19552    ZTARGET626:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7626)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19553    7627:
19554    ZTARGET627:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7627)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19555    7630:
19556    ZTARGET630:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
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      (7630)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19557    7631:
19558    ZTARGET631:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7631)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19559    7632:
19560    ZTARGET632:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7632)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19561    7633:
19562    ZTARGET633:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7633)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19563    7634:
19564    ZTARGET634:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7634)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19565    7635:
19566    ZTARGET635:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7635)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19567    7636:
19568    ZTARGET636:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7636)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19569    7637:
19570    ZTARGET637:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7637)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19571    7640:
19572    ZTARGET640:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7640)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19573    7641:
19574    ZTARGET641:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7641)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19575    7642:
19576    ZTARGET642:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7642)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19577    7643:
19578    ZTARGET643:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7643)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19579    7644:
19580    ZTARGET644:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7644)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19581    7645:
19582    ZTARGET645:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7645)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19583    7646:
19584    ZTARGET646:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7646)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19585    7647:
19586    ZTARGET647:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7647)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19587    7650:
19588    ZTARGET650:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7650)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19589    7651:
19590    ZTARGET651:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
      (7651)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0.0...0.0000...0..0000.0...11,111...011,111,110]
19591    7652:
19592    ZTARGET652:    NEXT,    BUTA(RETURN), J/BUTERROR7        ;COMPARE MICROADDRESS, THEN RETURN
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      (7652)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19593     7653;
19594     ZTARGET653:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7653)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19595     7654;
19596     ZTARGET654:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7654)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19597     7655;
19598     ZTARGET655:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7655)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19599     7656;
19600     ZTARGET656:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7656)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19601     7657;
19602     ZTARGET657:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7657)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19603     7660;
19604     ZTARGET660:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7660)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19605     7661;
19606     ZTARGET661:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7661)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19607     7662;
19608     ZTARGET662:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7662)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19609     7663;
19610     ZTARGET663:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7663)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19611     7664;
19612     ZTARGET664:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7664)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19613     7665;
19614     ZTARGET665:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7665)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19615     7666;
19616     ZTARGET666:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7666)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19617     7667;
19618     ZTARGET667:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7667)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19619     7670;
19620     ZTARGET670:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7670)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19621     7671;
19622     ZTARGET671:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7671)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19623     7672;
19624     ZTARGET672:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7672)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19625     7673;
19626     ZTARGET673:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7673)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19627     7674;
19628     ZTARGET674:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
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      (7674)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19629     7675;
19630     ZTARGET675:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7675)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19631     7676;
19632     ZTARGET676:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7676)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19633     7677;
19634     ZTARGET677:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7677)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19635     7700;
19636     ZTARGET700:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7700)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19637     7701;
19638     ZTARGET701:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7701)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19639     7702;
19640     ZTARGET702:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7702)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19641     7703;
19642     ZTARGET703:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7703)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19643     7704;
19644     ZTARGET704:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7704)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19645     7705;
19646     ZTARGET705:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7705)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19647     7706;
19648     ZTARGET706:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7706)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19649     7707;
19650     ZTARGET707:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7707)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19651     7710;
19652     ZTARGET710:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7710)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19653     7711;
19654     ZTARGET711:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7711)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19655     7712;
19656     ZTARGET712:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7712)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19657     7713;
19658     ZTARGET713:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7713)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19659     7714;
19660     ZTARGET714:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7714)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19661     7715;
19662     ZTARGET715:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7715)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0...0...0....0.0000...0..0000.0...11.111...011.111.110]
19663     7716;
19664     ZTARGET716:     NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
```

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      (7716)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19665    7717:
19666    ZTARGET717:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7717)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19667    7720:
19668    ZTARGET720:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7720)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19669    7721:
19670    ZTARGET721:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7721)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19671    7722:
19672    ZTARGET722:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7722)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19673    7723:
19674    ZTARGET723:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7723)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19675    7724:
19676    ZTARGET724:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7724)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19677    7725:
19678    ZTARGET725:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7725)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19679    7726:
19680    ZTARGET726:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7726)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19681    7727:
19682    ZTARGET727:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7727)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19683    7730:
19684    ZTARGET730:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7730)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19685    7731:
19686    ZTARGET731:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7731)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19687    7732:
19688    ZTARGET732:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7732)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19689    7733:
19690    ZTARGET733:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7733)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19691    7734:
19692    ZTARGET734:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7734)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19693    7735:
19694    ZTARGET735:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7735)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19695    7736:
19696    ZTARGET736:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7736)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19697    7737:
19698    ZTARGET737:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7737)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19699    7740:
19700    ZTARGET740:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
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      (7740)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19701    7741:
19702    ZTARGET741:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7741)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19703    7742:
19704    ZTARGET742:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7742)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19705    7743:
19706    ZTARGET743:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7743)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19707    7744:
19708    ZTARGET744:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7744)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19709    7745:
19710    ZTARGET745:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7745)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19711    7746:
19712    ZTARGET746:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7746)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19713    7747:
19714    ZTARGET747:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7747)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19715    7750:
19716    ZTARGET750:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7750)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19717    7751:
19718    ZTARGET751:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7751)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19719    7752:
19720    ZTARGET752:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7752)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19721    7753:
19722    ZTARGET753:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7753)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19723    7754:
19724    ZTARGET754:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7754)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19725    7755:
19726    ZTARGET755:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7755)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19727    7756:
19728    ZTARGET756:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7756)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19729    7757:
19730    ZTARGET757:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7757)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]

19731    7760:
19732    ZTARGET760:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7760)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19733    7761:
19734    ZTARGET761:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
      (7761)  DCS[0,00,0,0,0,0]  BM[0000..00.00..00.00..000..000...0.0.0..0..0...0.0000...0..0000.0...11.111...011.111.110]
19735    7762:
19736    ZTARGET762:    NEXT,    BUTA(RETURN), J/BUTERROR?        !COMPARE MICROADDRESS, THEN RETURN
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      (7762)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19737    7763;
19738    ZTARGET763:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7763)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19739    7764;
19740    ZTARGET764:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7764)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19741    7765;
19742    ZTARGET765:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7765)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19743    7766;
19744    ZTARGET766:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7766)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19745    7767;
19746    ZTARGET767:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7767)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19747    7770;
19748    ZTARGET770:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7770)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19749    7771;
19750    ZTARGET771:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7771)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19751    7772;
19752    ZTARGET772:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7772)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19753    7773;
19754    ZTARGET773:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7773)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19755    7774;
19756    ZTARGET774:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7774)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19757    7775;
19758    ZTARGET775:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7775)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19759    7776;
19760    ZTARGET776:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7776)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19761    7777;
19762    ZTARGET777:    NEXT,   BUTA(RETURN), J/BUTERROR?       ;COMPARE MICROADDRESS, THEN RETURN
      (7777)  DCS[0,00,0,0,0,0]  BM[0000..00,00..00,00..000..000...0,0,0..0..0...0.0000...0..0000.0...11,111...011,111,110]
19763
19764
19765    ;*****************************************************************************************
19766    .TOC    * END OF KD11-K MICRODIAGNOSTIC CODE
19767    ;*****************************************************************************************
19768
19769    .END
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4000   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4040   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4100   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4140   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4200   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4240   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4300   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4340   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4400   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1
4440   1 0 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4500   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4540   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4600   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4640   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4700   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4740   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1
5000   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5040   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5100   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5140   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5200   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5240   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5300   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5340   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5400   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5440   1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5500   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5540   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5600   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5640   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5700   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
5740   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6000   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6040   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6100   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6140   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6200   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6240   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6300   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6340   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6400   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6440   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6500   1 1 1 1 1 1 1 0 1 1 1 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6540   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6600   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

6640   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6700   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
6740   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7000   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7040   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7100   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7140   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7200   1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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7240  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0
7300  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7340  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 0
7400  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7440  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7500  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7540  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7600  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7640  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7700  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
7740  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
8399	7025	AGAINBRD350	14400	7155	AL1-537A	10079	4731	ALLOW763A	5887	4003	ALU114A
5946	4610	ALU115A1	6028	4015	ALU115B1	6111	4622	ALU115C1	6171	4026	ALU115D1
6242	4634	ALU116A1	6333	4040	ALU116B	6366	4046	ALU116C1	6459	4050	ALU116D
6502	4666	ALU117A1	6577	4057	ALU117B1	6640	4063	ALU117C1	6692	4664	ALU120A1
6752	4072	ALU120B1	6839	4706	ALU121A1	6913	4107	ALU121B1	6994	4670	ALU121C1
7069	4121	ALU121D1	7155	4672	ALU122A1	8041	7007	ALUCARRY1	8050	7017	ALUCARRY1A
8058	7020	ALUCARRY2	8067	7021	ALUCARRY2A	14347	7145	AR11-537A	14298	6451	AR3-537A
14323	7141	AR7-537A	7290	4540	ARITH130A1	7341	4140	ARITH130B1	7399	4520	ARITH131A1
7450	4150	ARITH131B1	7509	4522	ARITH132A1	7554	4157	ARITH132B1	10856	6114	ASIDE410C
11048	6525	ASSERTFOV500	15612	5413	BC1FCN622A	15209	5070	BCERC620A	15641	5416	BCERC622B
17504	7204	BDX05	17492	7177	BDX12	14407	4148	BL1-537A	14353	7146	BR11-537A
14305	7134	BR3-537A	14329	7142	BR7-537A	17085	4051	BUMPD762A	16180	4313	BUSFCN710A
16342	4311	BUSFCN711A	16480	4316	BUSFCN712A	16600	7147	BUSFCN713A	16758	7176	BUSFCN720A
16863	7201	BUSFCN721A	16974	4324	BUSFCN722A	17201	4331	BUSFCN730A	17161	4337	BUSFCN730B
17257	4346	BUSFCN730D	17328	4764	BUSFCN731A	17330	4356	BUSFCN731B	17440	4364	BUSFCN731D
17563	4371	BUSFCN740A	17598	4373	BUSFCN740B	17027	4374	BUSFCN740C	17660	4401	BUSFCN740D
19178	7351	BUTBA00	18972	7307	BUTBGFPSERV	19032	7316	BUTBGSERVL	11873	6217	BUTCLR505A
14517	7136	BUTCOUNT-IS-377	18985	7311	BUTCOUTTDOUT7	19118	7141	BUTD-IS-ZERO	18998	7313	BUTDNBNBYTE
19160	7347	BUTDR6-7L	19139	7344	BUTD[C]A	19173	7360	BUTD[C]B	18977	7310	BUTD[C]C
2880	4376	BUTERROR4	2886	5376	BUTERROR5	2892	6376	BUTERROR6	2898	7376	BUTERROR7
19222	7371	BUTFPFD	19191	7354	BUTFPPRDC	18990	7312	BUTFPS05	19006	7314	BUTGD3-2
18964	7306	BUTINSTP1	18932	7301	BUTINSTR5	19209	7356	BUTINSTRBRANCH	19204	7355	BUTINTRHIGH
19126	7342	BUTIR11B	18940	7302	BUTIR11FLTPT3-0	18924	7300	BUTIR15-12	18948	7304	BUTIR9-6
19038	7321	BUTMD00	19071	7327	BUTMEXFLAG1	19093	7333	BUTMEXFLAG2	19060	7325	BUTMFLAG7
19082	7331	BUTMFLTPT8	19105	7336	BUTMINITJAM	19097	7317	BUTMNASKP8[T]	19032	7320	BUTMNXT000
19043	7322	BUTMNXT001	19054	7324	BUTMNXT002	19065	7326	BUTMNXT003	19076	7330	BUTMNXT004
19087	7332	BUTMNXT005	19098	7334	BUTMNXT006	19110	7340	BUTMNXT007	18956	7305	BUTMOVDR7IR5-3
19049	7323	BUTMPS[N]	19186	7352	BUTOTHERJAM	19217	7360	BUTPREFETCHJAM	19131	7343	BUTPS15
19147	7345	BUTSERVICE	19014	7315	BUTSR1=0	18916	7276	BUTSR3=0	19155	7346	BUTVECTLOAD
10540	7062	BYTE375A	10745	7070	BYTEFIRST410	10764	7367	BYTESECOND410	17509	7205	C17X05
17497	7203	C17X12	10547	7063	CHECK375A	10570	8300	CHECK375B	12293	6254	CIN507F
18600	7247	CJESERVICETOD	18454	7227	CLEAR-I=0=A	18459	7230	CLEAR-I=0=B	12106	6236	CLEAR506E
15878	7165	CLEAR624	16278	6470	CLEAR710D	17747	4404	CLEAR761A	18464	7231	CLEARIO02
18470	7232	CLEARIO04	18476	7233	CLEARIO05	18638	7265	CLRJAMTOD	18585	7244	CLRSERVICETOD
18674	7262	CMPPROCDAT	15618	5414	CNSTO622A	7299	4135	COMP130A1	7350	4141	COMP130B1
7408	4145	COMP131A1	7459	4151	COMP131B1	8424	4702	COMP350A	8451	4244	COMP350B
8479	4246	COMP350C	8506	4250	COMP350D	8576	4704	COMP351A	8598	4257	COMP351B
8620	4261	COMP351C	8641	4263	COMP351D	8677	4714	COMP352A	8699	4267	COMP352B
8721	4271	COMP352C	8742	4273	COMP352D	8860	6004	COMP361B	8943	6012	COMP362A
8976	6015	COMP362B	9051	6022	COMP363A	9174	6034	COMP365A	9242	6042	COMP366A
9302	6047	COMP366C	9386	6057	COMP370A	9447	6064	COMP370C	9517	6072	COMP371A
10797	6106	COMP410A	10827	6111	COMP410B	10861	6115	COMP410C	10893	6120	COMP410D
10925	6123	COMP410E	11078	6134	COMP500A	11114	6137	COMP500C	11143	6141	COMP500D
11178	6144	COMP500E	13548	6350	COMP533A	13589	6354	COMP533B	13630	6357	COMP534A
13664	6362	COMP534B	13704	6365	COMP534C	13738	6370	COMP534D	13785	6374	COMP534E
13824	6402	COMP534F	13906	6411	COMP535A	13946	6415	COMP535B	13999	6422	COMP536A
14039	6426	COMP536B	14082	6431	COMP536C	14129	6436	COMP536D	14175	6442	COMP536E
14215	6446	COMP536F	14422	4302	COMP537A	15580	5412	COMP621H	17116	4333	COMP730A
17342	4354	COMP731A	17409	4361	COMP731C	14579	4301	COUNTER01	14584	4310	COUNTER02
14592	4526	COUNTER03	14603	4545	COUNTER04	14612	4557	COUNTER05	14621	4534	COUNTER06
14631	4535	COUNTER07	14641	4536	COUNTER08	14652	4525	COUNTER09	14663	4527	COUNTER10
14670	4533	COUNTER10A	14676	4531	COUNTER10B	14683	4547	COUNTER11	14690	4555	COUNTER12

LINE	LOCN	SYMBOL
13851	6404	COUNTER534G
9574	7035	CSP16XORFLTTOIR5
9678	5555	CUA372B
18518	7235	D1512A
18788	7274	DBUFINTOIR5
18782	7273	DINTOIR5
18422	7224	DISP004
10718	6531	DNONZERO410
12009	7072	DOIT506A
14953	5336	DOIT610B2
15163	5363	DOIT610D2
7944	4212	DOPA136A1
10019	5237	DOWRITE374B2
10165	5256	DOWRITE374D2
10311	5274	DOWRITE374F2
18558	7243	DTOIRB
18538	7240	D[05-00]
18230	4431	EOP001
18256	7211	EOP005
14371	7151	ER3-537A
8853	6003	EXPEC361B
9295	6046	EXPEC366C
10133	5567	EXPEC374D1
10827	6110	EXPEC410B
11108	6136	EXPEC500C
11599	6175	EXPEC504A
12151	6602	EXPEC507A
14026	6424	EXPEC536B
15688	5421	EXPEC623
16052	5437	EXPEC702A
16381	6473	EXPEC711B
16697	6504	EXPEC713D
17953	4414	FILL762C
12571	7075	FLAGFPS02
18619	7252	FLAGFPSTOD
16474	4314	GENADR712A
15852	5431	GETCUA624C
8176	4227	GETDC320C
14907	5330	GETIT610B1
15133	5360	GETIT610D1
17376	4357	GETIT731B
15665	5420	GETJAM622C
9934	5226	GETTEM374A1
10080	5244	GETTEM374C1
10226	5263	GETTEM374E1
5894	4004	GETZEROES114A
3116	5006	GOBUT012D
3220	5013	GOBUT013A
3299	5017	GOBUT013E
3403	5024	GOBUT014B
3508	5031	GOBUT015B
3635	5037	GOBUT017B

LINE	LOCN	SYMBOL
14359	7147	CR11-537A
9568	7031	CSP16XORSRTOIR5
18650	7257	CUATOD
18590	7245	DATISERVICETOD
17958	4415	DELAY768C
8408	4563	DINTOIRA350
18428	7225	DISP005
11282	6153	DOFCC503A
14785	5313	DOIT610A1
15016	5344	DOIT610C1
7613	4163	DOPA133A1
9926	5225	DOWRITE374A1
10072	5243	DOWRITE374C1
10218	5262	DOWRITE374E1
14365	7150	DR11-537A
17836	4411	DW11L762A
18524	7236	D[11-06]
18237	6452	EOP002
18265	6776	EOP006
2827	6543	ERROR010
8969	6014	EXPEC362B
9914	5222	EXPEC374A1
10206	5515	EXPEC374E1
10851	6113	EXPEC410C
11171	6143	EXPEC500E
11723	6206	EXPEC504E
13893	6407	EXPEC535A
14116	6434	EXPEC536D
15846	5430	EXPEC624C
16096	6460	EXPEC702B
16411	6475	EXPEC711C
17156	4336	EXPEC730B
10526	7046	FIRST375A
12577	7076	FLAGFPS03
14382	7152	FR3-537A
5954	4010	GETALTH115A1
17109	4332	GETDBUF730A
8237	4234	GETDC320E
14962	5337	GETIT610B2
15172	5364	GETIT610D2
17853	7210	GETIT762A
18662	7260	GETMSKPROCDAT
9954	5231	GETTEM374A2
10100	5250	GETTEM374C2
10246	5266	GETTEM374E2
3056	5003	GOBUT012A
3135	5007	GOBUT012E
3242	5014	GOBUT013B
3320	5020	GOBUT013F
3422	5025	GOBUT014C
3527	5032	GOBUT015C
3677	5041	GOBUT017A

LINE	LOCN	SYMBOL
14311	7137	CR3-537A
15352	5372	CSP1L621A
18843	7241	DO500A
18595	7246	DATOSERVICETOD
10782	7267	DINTOIR
18410	7222	DISP002
18434	7226	DISP006
15611	6177	DOFCC504A
14838	5321	DOIT610A2
15067	5352	DOIT610C2
7725	4173	DOPA134A1
9946	5230	DOWRITE374A2
10092	5247	DOWRITE374C2
10238	5265	DOWRITE374E2
14327	7140	DR3-537A
18052	7242	DZERO
18611	7234	D[15-12]
18263	6610	EOP003
18275	6812	EOP007
15426	5615	ERROR621A
9167	6033	EXPEC365A
9987	5237	EXPEC374B1
10270	5527	EXPEC374F1
10986	6117	EXPEC410D
11268	6150	EXPEC503A
11860	6215	EXPEC505A
13934	6443	EXPEC535B
15502	5408	EXPEC621E
15989	7166	EXPEC701A
16243	6465	EXPEC710C
16562	6501	EXPEC712D
18013	4417	EXPEC762E
11056	6127	FIXPAT500
12582	7077	FLAGFPS04
11992	6231	FUDGEPS506A
15535	5410	GETCUA621F
17335	4353	GETDBUF731A
14704	5314	GETIT610A1
15025	5145	GETIT610C1
17189	4340	GETIT730B
15324	5371	GETJAM620C
5881	4600	GETONES114A
10007	5235	GETTEM374B1
10153	5314	GETTEM374D1
10299	5272	GETTEM374F1
3077	5004	GOBUT012B
3155	5010	GOBUT012F
3261	5015	GOBUT013C
3339	5021	GOBUT013G
3444	5026	GOBUT014D
3570	5034	GOBUT016A
3697	5042	GOBUT020B

LINE	LOCN	SYMBOL
14335	7143	CR7-537A
9627	6222	CUA372A
18529	7237	D1106A
14098	5327	DOIT610B1
15124	5357	DOIT610D1
8359	7383	DINTOIR350
18416	7223	DISP003
18404	7221	DISPLAY
10600	5440	DOIT376A
14098	5327	DOIT610B1
15124	5357	DOIT610D1
7838	4203	DOPA135A1
9999	5234	DOWRITE374B1
10145	5253	DOWRITE374D1
10291	5271	DOWRITE374F1
14341	7144	DR7-537A
10728	6533	DZERO410
12452	6270	ENFLAG510D
18250	6511	EOP004
18282	7212	EOP010
15803	6567	ERROR624A
9236	6041	EXPEC366A
10060	5557	EXPEC374C1
10705	7363	EXPEC410A
10918	6122	EXPEC410E
11414	6163	EXPEC503E
11959	6612	EXPEC506A
13986	6420	EXPEC536A
15528	5407	EXPEC621F
15988	6455	EXPEC701C
16272	6467	EXPEC710D
16648	5452	EXPEC713B
18069	4422	EXPEC763A
12446	6267	FLAG510D
12566	7073	FLAGFPSSEQLOD
12177	6244	FUDGEPS507A
15695	5422	GETCUA623
8118	4222	GETDC320A
14844	5322	GETIT610A2
15076	5353	GETIT610C2
17265	4347	GETIT730D
15508	5406	GETJAM621E
18657	7373	GETPROCDAT
10027	5240	GETTEM374B2
10173	5257	GETTEM374D2
10319	5275	GETTEM374F2
3097	5005	GOBUT012C
3177	5011	GOBUT012G
3280	5016	GOBUT013D
3382	5023	GOBUT014A
3488	5030	GOBUT015A
3613	5036	GOBUT017A
3719	5043	GOBUT020C

LINE	LOCN	SYMBOL
3762	5045	GOBUT021A
3892	5053	GOBUT023A
4045	5062	GOBUT026A
4174	5070	GOBUT030C
4304	5076	GOBUT032A
4457	5105	GOBUT035A
4611	5114	GOBUT040B
4739	5122	GOBUT042B
4893	5131	GOBUT045A
5027	5137	GOBUT047B
5626	5210	GOBUT105A1
5959	4011	GOBUT115A1
6036	4016	GOBUT115B1
6119	4023	GOBUT115C1
6194	4030	GOBUT115D2
6279	4035	GOBUT116A3
6374	4043	GOBUT116C1
6436	4047	GOBUT116C5
6542	4055	GOBUT117A3
6617	4062	GOBUT117B3
6715	4070	GOBUT120A2
6792	4075	GOBUT120B3
6878	4105	GOBUT121A3
6953	4112	GOBUT121B3
7033	4117	GOBUT121C3
7108	4124	GOBUT121D3
7195	4131	GOBUT122A3
7357	4142	GOBUT130B1
7466	4152	GOBUT131B1
7563	4160	GOBUT132B1
7750	4175	GOBUT134A2
7969	4214	GOBUT136A2
8184	4230	GOBUT320C
8429	4243	GOBUT350A
8581	4256	GOBUT351A
8687	4266	GOBUT352A
8880	6005	GOBUT361D
9017	6017	GOBUT362E
9131	6030	GOBUT364B
9391	6060	GOBUT370A
9522	6073	GOBUT371A
10575	5301	GOBUT375B
10930	6124	GOBUT410E
11184	6145	GOBUT500E
11393	6162	GOBUT503D
11482	6167	GOBUT503H
11636	6201	GOBUT504A
11749	6210	GOBUT504F
11899	6221	GOBUT505B
12062	6234	GOBUT506C
12208	6247	GOBUT507B
12328	6261	GOBUT507F

LINE	LOCN	SYMBOL
3783	5046	GOBUT021B
3936	5055	GOBUT024A
4089	5064	GOBUT027A
4197	5071	GOBUT030D
4325	5077	GOBUT032B
4502	5107	GOBUT036A
4654	5116	GOBUT041A
4783	5124	GOBUT043A
4935	5133	GOBUT046A
5047	5140	GOBUT047C
5674	5213	GOBUT109B1
5991	4013	GOBUT115A2
6068	4020	GOBUT115B2
6134	4024	GOBUT115C2
6211	4031	GOBUT115D3
6296	4036	GOBUT116A4
6389	4044	GOBUT116C2
6466	4051	GOBUT116D
6557	4056	GOBUT117A4
6647	4064	GOBUT117C1
6732	4071	GOBUT120A3
6807	4076	GOBUT120B4
6893	4106	GOBUT121A4
6968	4113	GOBUT121B4
7048	4120	GOBUT121C4
7123	4125	GOBUT121D4
7215	4133	GOBUT122A4
7372	4143	GOBUT130B2
7481	4153	GOBUT131B2
7579	4161	GOBUT132B2
7798	4200	GOBUT134B2
8017	4217	GOBUT136B2
8204	4231	GOBUT320D
8456	4245	GOBUT350B
8603	4260	GOBUT351B
8704	4270	GOBUT352B
8902	6006	GOBUT361E
9056	6023	GOBUT363A
9194	6035	GOBUT365B
9412	6061	GOBUT370B
9545	6074	GOBUT371B
10626	5303	GOBUT376A
11084	6135	GOBUT500A
11306	6155	GOBUT503A
11366	6160	GOBUT503DA
11502	6170	GOBUT503I
11654	6202	GOBUT504B
11770	6211	GOBUT504G
11919	6223	GOBUT505C
12083	6235	GOBUT506D
12229	6250	GOBUT507C
12381	6264	GOBUT510A

LINE	LOCN	SYMBOL
3808	5047	GOBUT021C
3957	5056	GOBUT024B
4112	5066	GOBUT030A
4240	5073	GOBUT031A
4376	5101	GOBUT033A
4546	5111	GOBUT037A
4676	5117	GOBUT041B
4804	5128	GOBUT043B
4958	5134	GOBUT046B
5093	5142	GOBUT050A
5699	4005	GOBUT114A
6008	4014	GOBUT115A3
6085	4021	GOBUT115B3
6151	4025	GOBUT115C3
6250	4033	GOBUT116A1
6312	4037	GOBUT116A5
6404	4045	GOBUT116C3
6510	4053	GOBUT117A1
6585	4060	GOBUT117B1
6662	4066	GOBUT117C2
6760	4073	GOBUT120B1
6847	4103	GOBUT121A1
6921	4110	GOBUT121B1
7002	4115	GOBUT121C1
7076	4122	GOBUT121D1
7163	4127	GOBUT122A1
7306	4136	GOBUT130A1
7415	4146	GOBUT131A1
7518	4155	GOBUT132A1
7638	4165	GOBUT133A2
7863	4208	GOBUT135A2
8125	4223	GOBUT320A
8244	4235	GOBUT320E
8484	4247	GOBUT350C
8628	4262	GOBUT351C
8726	4272	GOBUT352C
8949	6013	GOBUT362A
9076	6024	GOBUT363B
9263	6043	GOBUT366B
9452	6068	GOBUT370C
9821	6101	GOBUT373B
10866	6116	GOBUT410C
11121	6140	GOBUT500C
11325	6156	GOBUT503B
11440	6165	GOBUT503F
11520	6171	GOBUT503J
11675	6203	GOBUT504C
11791	6212	GOBUT504H
12022	7071	GOBUT506A
12112	6237	GOBUT506E
12250	6251	GOBUT507D
12403	6265	GOBUT510B

LINE	LOCN	SYMBOL
3848	5051	GOBUT022A
4001	5060	GOBUT025A
4155	5067	GOBUT030B
4261	5074	GOBUT031B
4414	5103	GOBUT034A
4589	5113	GOBUT040A
4718	5121	GOBUT042A
4848	5127	GOBUT044A
5004	5136	GOBUT047A
5122	5144	GOBUT050B
5913	4006	GOBUT114A2
5975	4012	GOBUT115A4
6052	4017	GOBUT115B4
6179	4027	GOBUT115D1
6264	4034	GOBUT116A2
6340	4041	GOBUT116B
6420	4046	GOBUT116C4
6525	4054	GOBUT117A2
6600	4061	GOBUT117B2
6700	4067	GOBUT120A1
6775	4074	GOBUT120B2
6862	4104	GOBUT121A2
6936	4111	GOBUT121B2
7017	4116	GOBUT121C2
7091	4123	GOBUT121D2
7179	4130	GOBUT122A2
7321	4137	GOBUT130A2
7430	4147	GOBUT131A2
7534	4156	GOBUT132A2
7685	4170	GOBUT133B2
7911	4210	GOBUT135B2
8146	4224	GOBUT320B
8263	4236	GOBUT320F
8512	4251	GOBUT350D
8647	4264	GOBUT351D
8748	4274	GOBUT352D
8996	6016	GOBUT362D
9104	6026	GOBUT364A
9345	6053	GOBUT367B
9474	6066	GOBUT370D
10552	7064	GOBUT375A
10898	6121	GOBUT410D
11149	6142	GOBUT500D
11346	6157	GOBUT503C
11461	6166	GOBUT503G
11539	6172	GOBUT503K
11702	6205	GOBUT504D
11811	6213	GOBUT504I
12041	6233	GOBUT506B
12189	6246	GOBUT507A
12273	6253	GOBUT507E
12425	6266	GOBUT510C

LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
12462	6272	GOBUT510D	12483	6273	GOBUT510DA	12509	6275	GOBUT510E	12538	6277	GOBUT510F
13555	6351	GOBUT533A	13595	6355	GOBUT533B	13636	6360	GOBUT534A	13671	6363	GOBUT534B
13711	6366	GOBUT534C	13745	6371	GOBUT534D	13791	6375	GOBUT534E	13831	6403	GOBUT534F
13856	6405	GOBUT534G	13912	6412	GOBUT535A	13952	6416	GOBUT535B	14005	6423	GOBUT536A
14046	6427	GOBUT536B	14089	6432	GOBUT536C	14135	6437	GOBUT536D	14182	6443	GOBUT536E
14222	6447	GOBUT536F	14428	4303	GOBUT537A	15275	5366	GOBUT620A	15293	5367	GOBUT620B
15447	5402	GOBUT621B	15465	5403	GOBUT621C	15483	5404	GOBUT621D	15557	5411	GOBUT621G
15586	7160	GOBUT621H	15623	5415	GOBUT622A	15646	5417	GOBUT622B	15671	5432	GOBUT624D
15969	5434	GOBUT701B	16018	5435	GOBUT701D	16327	6500	GOBUT712C	16671	6503	GOBUT713C
17127	4335	GOBUT730A	17175	4341	GOBUT730B	17198	4342	GOBUT730C	17219	4443	GOBUT730C1
17270	4350	GOBUT730D	17293	4351	GOBUT730E	17347	4165	GOBUT731A	17382	4360	GOBUT731B
17414	4362	GOBUT731C	17452	4366	GOBUT731D	17494	4367	GOBUT731E	17572	4776	GOBUT740A
17605	4766	GOBUT740B	17633	4375	GOBUT740C	17687	4767	GOBUT740D	17752	4405	GOBUT761A
17773	4406	GOBUT761B	17793	4407	GOBUT761C	17932	4762	GOBUT762B	17987	4416	GOBUT762D
18038	4421	GOBUT762F	18115	4425	GOBUT763B	18136	4426	GOBUT763C	18155	4427	GOBUT763D
10773	7361	GOFOR410	18019	4420	GOGET702E	10832	6112	GOPUT410B	11300	6154	GOPUT503A
11421	6164	GOPUT503E	11630	6200	GOPUT504A	11730	6207	GOPUT504E	11879	6220	GOPUT505A
5173	5147	GOTEST101A	5263	5156	GOTEST102A	5289	5160	GOTEST102B	5316	5162	GOTEST102C
5342	5164	GOTEST102D	5409	5173	GOTEST103A	5435	5176	GOTEST103B	5462	5177	GOTEST103C
5488	5201	GOTEST103D	5528	5203	GOTEST104A	5595	5205	GOTEST104B	5606	5207	GOTEST105A
5654	5212	GOTEST105B	5702	5215	GOTEST105C	5729	5217	GOTEST105D	5750	5220	GOTEST105E
7619	4164	GOTEST133A1	7669	4167	GOTEST133B1	7731	4174	GOTEST134A1	7781	4177	GOTEST134B1
7844	4204	GOTEST135A1	7894	4207	GOTEST135B1	7950	4213	GOTEST136A1	8000	4216	GOTEST136B1
9967	5232	GOTEST374A2	10040	5241	GOTEST374B2	10113	5251	GOTEST374C2	10186	5260	GOTEST374D2
10259	5267	GOTEST374E2	10332	5276	GOTEST374F2	12761	6550	GOTEST511A1	12772	7107	GOTEST511A2
12783	7111	GOTEST511A3	12794	7113	GOTEST511A4	12817	6554	GOTEST511B1	12828	7115	GOTEST511B2
12839	7117	GOTEST511B3	12850	7121	GOTEST511B4	13045	6311	GOTEST512A1	13060	6312	GOTEST512A2
13100	6315	GOTEST512B1	13115	6316	GOTEST512B2	13149	6321	GOTEST512C1	13164	6322	GOTEST512C2
13204	6325	GOTEST512D1	13219	6326	GOTEST512D2	13283	6331	GOTEST512E1	13268	6332	GOTEST512E2
13346	6335	GOTEST520A	13374	6337	GOTEST520B	13403	6341	GOTEST520C	13431	6343	GOTEST520D
13460	6345	GOTEST520E	14487	4564	GOTEST551A	14511	4560	GOTEST551B	14528	7157	GOTEST551B1
14552	5626	GOTEST551C	15949	7171	GOTEST701A	15998	6457	GOTEST701C	16074	5444	GOTEST702A
16113	6463	GOTEST702B	16219	6464	GOTEST710B	16348	6466	GOTEST710C	16284	6471	GOTEST710D
16301	6472	GOTEST710E	16387	6474	GOTEST711B	16416	6476	GOTEST711C	16435	6477	GOTEST711D
16519	5480	GOTEST712B	16567	6502	GOTEST712D	16653	5483	GOTEST713B	16702	6505	GOTEST713D
16796	6506	GOTEST720B	16820	4317	GOTEST720C	16901	4321	GOTEST721B	16925	4322	GOTEST721C
17012	4325	GOTEST722B	17036	4326	GOTEST722C	14388	7183	GR3-537A	14394	7154	HR3-537A
13535	6666	INIT533A	13576	6352	INIT533B	13987	6656	INIT535A	13980	6654	INIT536A
14110	6433	INIT536D	13542	6347	INITD533A	13582	6353	INITD533B	13623	6664	INITD534A
13658	6361	INITD534B	13698	6662	INITD534C	13732	6367	INITD534D	13778	6373	INITD534E
13817	6401	INITD534F	13899	6410	INITD535A	13960	6414	INITD535B	13993	6421	INITD536A
14033	6425	INITD536B	14075	6652	INITD536C	14122	6438	INITD536D	14168	6441	INITD536E
14209	6445	INITD536F	2931	6532	INITIALIZE01	2937	7001	INITIALIZE03	2942	7003	INITIALIZE04
2948	7004	INITIALIZE05	2953	7005	INITIALIZE06	2958	7006	INITIALIZE07	2965	4101	INITIALIZE10
2977	4102	INITIALIZE11	2988	4001	INITIALIZE12	14280	7131	INITSR537A	10367	7215	INSERT02
10378	7217	INSERT03	10384	7220	INSERT04	10362	7214	INSERTEOPREVNO	10373	7216	INSERTREVNO
10802	6107	INTOIP410A	10643	7256	JANTOD	10822	4777	JAMUPP001	10830	4757	JAMUPP002B
10835	4434	JAMUPP002C	10841	7213	JANUPP002D	10887	4786	JAMUPP003	10854	4746	JAMUPP004
10861	4747	JAMUPP005	10867	4435	JAMUPP006	10872	4436	JAMUPP007	10877	4437	JAMUPP010
10882	4440	JAMUPP011	10176	4763	KILL764A	12933	7114	KTSRCDST01	12938	7123	KTSRCDST02
12944	7124	KTSRCDST03	12951	7125	KTSRCDST04	12958	7126	KTSRCDST04B	12967	7335	KTSRCDST05
12973	7337	KTSRCDST06	12981	7127	KTSRCDST07	12987	7130	KTSRCDST08	5252	5154	LOAD00-102A

LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
5232	5530	LOAD01-102A	14758	5306	LOAD01-610A1	14819	5316	LOAD01-610A2	14882	5324	LOAD01-610B1
14937	5333	LOAD01-610B2	15000	5341	LOAD01-610C1	15061	5347	LOAD01-610C2	15108	5510	LOAD01-610D1
2809	4100	LOAD010	2854	5001	LOAD011	3049	5002	LOAD012A	3213	5744	LOAD013A
3376	5742	LOAD014A	14272	4300	LOAD01537A	3481	5740	LOAD015A	3563	5736	LOAD016A
3606	5732	LOAD017A	5237	5151	LOAD02-102A	3670	5724	LOAD020A	3754	5720	LOAD021A
3841	5716	LOAD022A	3885	5714	LOAD023A	3929	5706	LOAD024A	3994	5704	LOAD025A
4038	5702	LOAD026A	4082	5700	LOAD027A	4128	5676	LOAD030A	4232	5672	LOAD031A
4297	5666	LOAD032A	4363	5664	LOAD033A	4406	5662	LOAD034A	14266	4277	LOAD03537A
4450	5660	LOAD035A	4494	5656	LOAD036A	4539	5654	LOAD037A	5242	5152	LOAD04-102A
4582	5650	LOAD040A	4646	5644	LOAD041A	4711	5640	LOAD042A	4775	5634	LOAD043A
4841	5632	LOAD044A	4886	5630	LOAD045A	4930	5620	LOAD046A	4997	5550	LOAD047A
8548	4567	LOAD05-351	14764	5307	LOAD05-610A1	15045	5346	LOAD05-610C2	5086	5552	LOAD050A
5116	5143	LOAD050B	8554	4254	LOAD06-351	14769	5310	LOAD06-610A1	14813	5315	LOAD06-610A2
5393	5170	LOAD07-103A	14932	5332	LOAD07-610B2	5347	5153	LOAD10-102A	5388	5167	LOAD13-103A
14259	4276	LOAD14537A	5383	5166	LOAD15-103A	5377	5546	LOAD16-103A	14252	4574	LOAD16537A
5398	5171	LOAD17-103A	9633	6703	LOAD372A	9884	5903	LOAD372B	11854	6620	LOAD505A
16170	4307	LOADADR710A	15944	7170	LOADBA701A	15993	6486	LOADBA701C	16069	5443	LOADBA702A
16107	6462	LOADBA702B	5168	5520	LOADD101A	5258	5185	LOADD102A	5284	5157	LOADD102B
5311	5161	LOADD102C	5337	5163	LOADD103B	5404	5172	LOADD103A	5430	5174	LOADD103B
5457	5176	LOADD103C	5483	5200	LOADD103D	5523	5540	LOADD104A	5580	5204	LOADD104B
17096	4330	LOADDATA730A	17240	4343	LOADDATA730D	12015	6104	LOADDC8506A	12184	6245	LOADDC8507A
11276	6152	LOADFCC503A	11605	6176	LOADFCC804A	11246	6614	LOADFLAG503A	11585	6622	LOADFLAG804A
11255	6147	LOADFP8503A	11593	6174	LOADFP8804A	10704	7264	LOADFPSCC	10710	7265	LOADFPSCC02
8384	7357	LOADHI350	8393	7024	LOADHIA350	14476	4305	LOADIN551A	11017	6132	LOADIR500
11386	6161	LOADIP503D	11695	6204	LOADIR504D	14782	5532	LOADIR610A1	14876	5534	LOADIR610B1
14926	5331	LOADIR610B2	14994	5544	LOADIR610C1	16743	7172	LOADIR720A	17091	4754	LOADIR730A
17435	4363	LOADIR731D	17551	4765	LOADIR740A	17586	4372	LOADIR740B	17647	4400	LOADIR740D
12375	6263	LOADPRIO510A	8841	6001	LOADRE8361A	8937	6011	LOADRE8362A	9161	6032	LOADRE8365A
9224	6037	LOADRE8366A	9332	6051	LOADRE8367A	9375	6055	LOADRE8370A	9505	6070	LOADRE8371A
9907	6103	LOADRF8374	16164	5472	LOADRET710A	16335	5470	LOADRET711A	16467	5466	LOADRET712A
16602	5464	LOADRET713A	16737	5462	LOADRET720A	16847	4320	LOADRET721A	16958	5456	LOADRET722A
5600	5542	LOADSR105A	5649	5211	LOADSR105B	5697	5214	LOADSR105C	5723	5216	LOADSR105D
8848	6002	LOADSR361A	9340	6052	LOADSR367A	14162	6650	LOADSR536E	14203	6444	LOADSR536F
8350	4241	LOADSRD350	11999	7067	LOADUCON506A	15369	5374	LODBRK621A	15747	5425	LODBRK624A
13772	6660	LODCNTR534E	13812	6400	LODCNTR534F	15388	5400	LODFLG621A	15731	5562	LODIR624A
9613	6540	LOOP372A	17252	4345	MANGLED730D	17446	4368	MANGLED731D	11270	6151	MASK503A
15317	5370	MASK620C	15933	5476	MASK701A	16047	5474	MASK702A	17842	7202	MASK762A
12686	6232	MFS801	12692	6302	MFS802	12699	6303	MFS803	12706	6304	MFS804
12715	6552	MFS805	12725	6553	MFS806	12738	6546	MFS8EXPEC0	12742	6547	MFS8EXPEC1
10648	7261	MSKPROCDAT	14291	6643	NEWCTR537A	2767	7303	NEXT007	2833	5245	NEXT010
16193	4445	NEXT710A	16355	4446	NEXT711A	16492	4447	NEXT712A	16621	7365	NEXT713A
16769	7364	NEXT720A	16875	7362	NEXT721A	16985	4524	NEXT722A	17891	4467	NEXTD762A
8376	7023	NEXTPAT350	10737	7065	NEXTPAT410	11039	6377	NEXTPAT500	8536	4253	NEXTPATA350
18633	7254	ODDJAMTOD	7659	4166	OPA133B1	7712	4512	OPA134A1	7771	4176	OPA134B1
7825	4514	OPA135A1	7884	4206	OPA135B1	7990	4215	OPA136B1	7607	4510	OPB133A1
7719	4172	OPB134A1	7832	4202	OPB135A1	7938	4542	OPB136A1	9665	6100	PAGE372B
18612	7251	PRATOD	17847	7207	PRIO6762A	14774	5311	PSCC-DC610A1	14824	5317	PSCC-DC610A2
14887	5325	PSCC-DC610B1	14942	5334	PSCC-DC610B2	15005	5342	PSCC-DC610C1	15056	5350	PSCC-DC610C2
15113	5355	PSCC-DC610D1	15152	5361	PSCC-DC610D2	15212	7162	PSCCTOSR3=0	15217	7163	PSCCTOSR3=0AA
15227	7164	PSCCTOSR3=0BB	11977	6226	PSMI506A	12157	6241	PSMI507A	11985	6230	PSLO506A
12170	6243	PSLO507A	11979	6227	PSMID506A	12164	6242	PSMID507A	12596	7100	PSSEQLOD
12601	7101	PSSEQLOD02	12607	7102	PSSEQLOD03	12612	7103	PSSEQLOD04	12618	7104	PSSEQLOD05

LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
12623	7105	PSSEQLOD06	18626	7253	PSTOD	18082	4423	READVECT763A	8530	4703	RESETIR350
8435	7022	RESFTIR350A	8461	7026	RESETIR350B	8489	7027	RESETIR350C	18679	7263	RESETPROCDAT
18765	7271	RESETUCONP	18795	7275	RESETUCONP5	8769	4715	RESTORE01	8776	7030	RESTORE02
8782	7032	RESTORE03	8788	7033	RESTORE04	9745	6662	RETURN373A	3185	5012	SCOPE012
3347	5022	SCOPE013	3452	5027	SCOPE014	3533	5033	SCOPE015	3578	5035	SCOPE016
3642	5040	SCOPE017	3726	5044	SCOPE020	3812	5050	SCOPE021	3856	5052	SCOPE022
3899	5054	SCOPE023	3965	5057	SCOPE024	4008	5061	SCOPE025	4053	5063	SCOPE026
4095	5065	SCOPE027	4204	5072	SCOPE030	4268	5078	SCOPE031	4333	5100	SCOPE032
4378	5102	SCOPE033	4421	5104	SCOPE034	4469	5106	SCOPE035	4510	5110	SCOPE036
4554	5112	SCOPE037	4618	5115	SCOPE040	4689	5120	SCOPE041	4747	5123	SCOPE042
4811	5126	SCOPE043	4855	5130	SCOPE044	4900	5132	SCOPE045	4967	5135	SCOPE046
5056	5141	SCOPE047	5129	5145	SCOPE050	5180	5150	SCOPE101	5350	5165	SCOPE102
5496	5202	SCOPE103	5563	5206	SCOPE104	5758	5221	SCOPE105	5920	4007	SCOPE114A
6092	4022	SCOPE115B	6217	4032	SCOPE116D	6348	4042	SCOPE116C	6474	4052	SCOPE116D
6670	4066	SCOPE117C	6813	4077	SCOPE120B	6976	4114	SCOPE121C	7129	4126	SCOPE121D
7223	4134	SCOPE122A	7380	4144	SCOPE130B	7489	4154	SCOPE131B	7587	4162	SCOPE132B
7693	4171	SCOPE133B	7806	4201	SCOPE134B	7919	4211	SCOPE135B	8025	4220	SCOPE136B
8270	4237	SCOPE320	8520	4252	SCOPE350	8665	4268	SCOPE351	8756	4275	SCOPE352
9453	6075	SCOPE371	9700	5501	SCOPE372B	9828	6102	SCOPE373	9975	5233	SCOPE374A
10048	5242	SCOPE374B	10121	5252	SCOPE374C	10194	5261	SCOPE374D	10267	5270	SCOPE374E
10340	5277	SCOPE374F	10633	5304	SCOPE376	10937	6126	SCOPE410	11192	6146	SCOPE500F
11550	6173	SCOPE503	11820	6214	SCOPE504	11925	6224	SCOPE505	12121	6240	SCOPE506
12338	6262	SCOPE507	12548	6300	SCOPE510	12800	6301	SCOPE511A	12856	6305	SCOPE511B
13066	6313	SCOPE512A	13170	6323	SCOPE512C	13275	6333	SCOPE512E	13469	6346	SCOPE520
13601	6356	SCOPE533B	13677	6364	SCOPE534B	13752	6372	SCOPE534D	13866	6406	SCOPE534G
13959	6417	SCOPE535B	14052	6430	SCOPE538B	14141	6440	SCOPE536D	14228	6450	SCOPE536F
14434	4304	SCOPE537A	14559	5305	SCOPE551	14892	5323	SCOPE610A	14970	5340	SCOPE610B
15084	5354	SCOPE610C	15180	5365	SCOPE610D	15702	5423	SCOPE623	15884	5224	SCOPE624
16027	5436	SCOPE701	16120	5433	SCOPE702	16310	5445	SCOPE710	16443	5446	SCOPE711
16576	5447	SCOPE712	16711	5451	SCOPE713	16934	5454	SCOPE721	17045	4327	SCOPE722
17299	4352	SCOPE730	17481	4370	SCOPE731	17675	4402	SCOPE740	17801	4410	SCOPE761
18163	4430	SCOPE763	10533	7061	SECOND378A	18605	7250	SERVICETOD	16748	7174	SETADR720A
16853	7173	SETADR721A	16964	4470	SETADR722A	15361	5373	SETBRK621A	15738	5424	SETBRK624A
14780	5312	SETBUSA610A1	14830	5320	SETBUSA610A2	14893	5326	SETBUSA610B1	14948	5335	SETBUSA610B2
15011	5343	SETBUSA610C1	15062	5351	SETBUSA610C2	15119	5356	SETBUSA610D1	15158	5362	SETBUSA610D2
10673	6560	SETBYTER410	10680	7060	SETBYTER410	10685	7066	SETBYTED410	10691	6000	SETBYTEE410
10697	6105	SETBYTEG410	12320	6260	SETCIN507F	7210	4132	SETD122A4	8111	4221	SETD320A
8169	4226	SETD320C	8230	4233	SETD320E	15760	6306	SETD624A	9622	6076	SETDC372A
9671	5000	SETDC372B	8932	6010	SETDDC362A	9040	6020	SETDDC363A	9099	6025	SETDDC364A
9126	6027	SETDDC364B	9285	6044	SETDDC370C	9636	6062	SETDDC370C	14246	6651	SETENITS37A
10975	6676	SETFETCHR500	10982	6126	SETFETCHR500	10987	6137	SETFETCHE500	10992	6130	SETFETCHF500
10998	6131	SETFETCHG500	11867	6216	SETFLAG505A	12457	6271	SETFLAG510D	15382	5377	SETFLG621A
15765	6453	SETFLG624A	9751	7034	SETIR373A	10602	5302	SETIR376A	13033	6864	SETIR512A1
13088	6536	SETIR512B1	13137	6317	SETIR512C1	13192	6626	SETIR512D1	13241	6327	SETIR512E1
3039	5760	SETIRA	16175	4312	SETJAM710A	16783	7175	SETJAM720A	16858	7200	SETJAM721A
16969	4323	SETJAM722A	16062	5442	SETKT703A	16101	6481	SETKT702B	16057	5441	SETLED702A
8105	4700	SETONE320A	8164	4225	SETONE320C	8224	4232	SETONE320E	12370	6606	SETONE8510A
17007	4463	SETPR6-762A	17912	4413	SETPRI762A	17986	7286	SETPRI762C	12301	6256	SETPS507F
13039	6310	SETPSFLAG512A1	13094	6314	SETPSFLAG512B1	13143	6320	SETPSFLAG512C1	13198	6324	SETPSFLAG512D1
13247	6330	SETPSFLAG512E1	8834	6570	SETRES364A	8984	6607	SETRES362A	9153	6031	SETRES368A
9216	6036	SETRES366A	9324	6050	SETRES367A	9367	6064	SETRES370A	9497	6067	SETRES371A
14285	7135	SETRESA537A	14377	7370	SETRESB537A	15375	5375	SETRET621A	15784	5426	SETRET624A

LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
10519	5506	SETSP375A	9757	7037	SETSR373A	12310	6287	SETSR507F	14401	4306	SETSR551A
14506	4565	SETSR551B	14546	4561	SETSR551C	15395	5401	SETSR621A	15771	6454	SETSR624A
11965	6225	SETUCONS06A	13001	6555	SETUP512A	13007	6307	SETUP512B	13338	6334	SETUP520A
13367	6336	SETUP520B	13396	6340	SETUP520C	13474	6342	SETUP520D	13452	6344	SETUP520E
5862	7015	SETUPC8P00A	5852	7013	SETUPC8P05A	5857	7014	SETUPCSP07A	5847	7012	SETUPCSP12A
5842	7011	SETUPC8P14A	5837	7010	SETUPC8P15A	9932	7002	SETUPC8P16A	5826	5543	SETUPC8P17A
15197	7156	SETUPPSCC#DC	15202	7161	SETUPPSCC#DC02	17245	4344	SETXER730D	10415	5746	SFDFTO8R
10428	7047	SFDFTO8RA	10423	7040	SFDFTO8RAA	10434	7050	SFDFTO8RB	10440	7051	SFDFTO8RC
10446	7052	SFDFTO8RD	10452	7053	SFDFTO8RE	10458	7054	SFDFTO8RF	10464	7055	SFDFTO8RG
10470	7056	SFDFTO8RH	10476	7057	SFDFTO8RI	9045	6021	SHIFT363A	9230	6040	SHIFT366A
9290	6045	SHIFT366C	9381	6056	SHIFT370A	9442	6063	SHIFT370C	9511	6071	SHIFT371A
18747	7266	SPINTOIR	18777	7272	SPINTOIR8	4343	4240	START350	2816	7000	SUBR010
9639	6077	SUBRA372A	9689	5223	SUBRA372B	13482	7132	SUCBRTEST01	13487	7132	SUCBRTEST02
13492	7133	SUCBRTEST03	2633	4000	TEST001	2684	6262	TEST002	2673	6631	TEST003
2692	5525	TEST004	2711	5146	TEST005	2730	4474	TEST006	2749	4377	TEST007
2802	4775	TEST010	2847	5777	TEST011	3031	5775	TEST012A	3069	5773	TEST012B
3088	5771	TEST012C	3108	5767	TEST012D	3127	5768	TEST012E	3147	5764	TEST012F
3169	5763	TEST012G	3205	5761	TEST013A	3233	5757	TEST013B	3253	5755	TEST013C
3272	5753	TEST013D	3291	5751	TEST013E	3312	5750	TEST013F	3331	5747	TEST013G
3368	5745	TEST014A	3394	5752	TEST014B	3414	5762	TEST014C	3436	5710	TEST014D
3473	5743	TEST015A	3500	5772	TEST015B	3519	5722	TEST015C	3555	5741	TEST016A
3598	5737	TFST017A	3626	5735	TEST017B	3662	5733	TEST020A	3689	5731	TEST020B
3711	5727	TEST020C	3746	5725	TEST021A	3775	5723	TEST021B	3797	5774	TEST021C
3833	5721	TFST022A	3877	5717	TEST023A	3920	5715	TEST024A	3949	5711	TEST024B
3986	5707	TEST025A	4029	5705	TEST026A	4074	5703	TEST027A	4117	5701	TEST030A
4147	5712	TEST030B	4166	5713	TEST030C	4189	5734	TEST030D	4224	5677	TEST031A
4253	5675	TFST031B	4288	5673	TEST032A	4317	5671	TEST032B	4354	5667	TEST033A
4398	5665	TEST034A	4442	5663	TEST035A	4486	5661	TEST036A	4531	5657	TEST037A
4574	5655	TEST040A	4602	5653	TEST040B	4638	5651	TEST041A	4667	5647	TEST041B
4703	5645	TFST042A	4731	5643	TEST042B	4767	5641	TEST043A	4796	5637	TEST043B
4833	5635	TEST044A	4878	5633	TEST045A	4920	5631	TEST046A	4950	5770	TEST046B
4988	5561	TEST047A	5019	5670	TEST047B	5039	5730	TEST047C	5077	5551	TEST050A
5108	5726	TEST050B	5161	5553	TEST101A	5225	5521	TEST102A	5277	5574	TEST102B
5303	5564	TFST102C	5330	5554	TEST102D	5370	5531	TEST103A	5423	5572	TEST103B
5449	5576	TFST103C	5476	5674	TEST103D	5516	5547	TEST104A	5543	5646	TEST104B
5592	5541	TEST105A	5619	5610	TEST105A1	5642	5652	TEST105B	5666	5600	TEST105B1
5690	5642	TEST105C	5716	5636	TEST105D	5743	5620	TEST105E	5874	4607	TEST114A
5906	4603	TFST114A2	5939	4601	TEST115A1	5983	4616	TEST115A2	6000	4615	TEST115A3
5967	4604	TFST115A4	6021	4614	TEST115B1	6060	4613	TEST115B2	6077	4612	TEST115B3
6044	4602	TEST115B4	6104	4611	TEST115C1	6126	4617	TEST115C2	6143	4627	TEST115C3
6164	4626	TFST115D1	6186	4625	TEST115D2	6203	4624	TEST115D3	6235	4623	TEST116A1
6257	4621	TEST116A2	6271	4620	TEST116A3	6288	4637	TEST116A4	6305	4636	TEST116A5
6326	4606	TEST116B	6359	4638	TEST116C1	6381	4633	TEST116C2	6396	4632	TEST116C3
6413	4631	TFST116C4	6429	4630	TEST116C5	6452	4645	TEST117D	6498	4647	TEST117A1
6517	4644	TEST117A2	6534	4643	TEST117A3	6549	4642	TEST117A4	6570	4641	TEST117B1
6592	4640	TFST117B2	6609	4657	TEST117B3	6633	4656	TEST117C1	6655	4677	TEST117C2
6685	4667	TFST120A1	6707	4655	TEST120A2	6724	4654	TEST120A3	6745	4653	TEST120B1
6767	4652	TEST120B2	6784	4651	TEST120B3	6799	4650	TEST120B4	6832	4665	TEST121A1
6854	4676	TFST121A2	6871	4675	TEST121A3	6885	4674	TEST121A4	6906	4663	TEST121B1
6928	4662	TEST121B2	6945	4661	TEST121B3	6960	4660	TEST121B4	6987	4707	TEST121C1
7009	4605	TFST121C2	7025	4717	TEST121C3	7040	4716	TEST121C4	7061	4727	TEST121D1
7083	4726	TEST121D2	7100	4737	TEST121D3	7115	4736	TEST121D4	7148	4671	TEST122A1

LINE	LOCN	SYMBOL
7172	4570	TEST122A2
7314	4550	TEST130A2
7423	4544	TEST131A2
7527	4516	TEST132A2
7630	4500	TEST133A2
7742	4503	TEST134A2
7855	4506	TEST135A2
7961	4476	TEST136A2
8138	4552	TEST320B
8256	4556	TEST320F
8471	4742	TEST350C
8612	4723	TEST351C
8713	4724	TEST352C
8894	6767	TEST361E
9010	6755	TEST362E
9119	6745	TEST364B
9256	6735	TEST366B
9405	6723	TEST370B
9538	6713	TEST371B
9814	6572	TEST373B
10105	5524	TEST374C2
10512	5517	TEST375A
10666	5507	TEST410
10879	6727	TEST410D
11100	6726	TEST500C
11318	6630	TEST503B
11407	6700	TEST503E
11495	6742	TEST503I
11647	6730	TEST504B
11742	6672	TEST504F
11847	6623	TEST505A
12034	6754	TEST506B
12144	6613	TEST507A
12265	6674	TEST507E
12418	6616	TEST510C
12524	6610	TEST510F
12789	7112	TEST511A4
12845	7120	TEST511B4
13108	6546	TEST512B2
13212	6576	TEST512D2
13360	6764	TEST520B
13528	6625	TEST533A
13691	6665	TEST534C
13844	6752	TEST534G
14019	6640	TEST536B
14196	6642	TEST536F
14539	4566	TEST551C
14919	5612	TEST610B2
15145	5624	TEST610D2
15344	5617	TEST621A
15495	5605	TEST621E
15605	5601	TEST622A
7188	4734	TEST122A3
7334	4530	TEST130B1
7443	4546	TEST131B1
7547	4517	TEST132B1
7652	4501	TEST133B1
7764	4504	TEST134B1
7877	4507	TEST135B1
7983	4475	TEST136B1
8157	4562	TEST320C
8337	4701	TEST350
8499	4743	TEST350D
8634	4712	TEST351D
8735	4725	TEST352D
8917	6765	TEST362A
9033	6753	TEST363A
9146	6743	TEST365A
9278	6733	TEST366C
9429	6721	TEST370C
9606	6571	TEST372A
9898	6563	TEST374
10178	5500	TEST374D2
10563	5625	TEST378B
10790	6711	TEST410A
10911	6705	TEST410E
11136	6746	TEST500D
11338	6632	TEST503C
11433	6710	TEST503F
11513	6756	TEST503J
11667	6740	TEST504C
11762	6702	TEST504G
11891	6712	TEST505B
12054	6744	TEST506C
12201	6724	TEST507B
12286	6647	TEST507F
12438	6600	TEST510D
12755	6607	TEST511A
12812	6551	TEST511B1
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13130	6556	TEST512C1
13234	6577	TEST512E1
13388	6772	TEST520C
13569	6633	TEST533B
13725	6635	TEST534D
13879	6661	TEST535A
14067	6655	TEST536C
14413	4572	TEST537A
14744	5627	TEST610A1
14987	5535	TEST610C1
15262	5511	TEST620A
15440	5613	TEST621B
15521	5603	TEST621F
15634	5577	TEST622B
7202	4735	TEST122A4
7366	4532	TEST130B2
7474	4750	TEST131B2
7572	4472	TEST132B2
7670	4502	TEST133B2
7791	4505	TEST134B2
7904	4477	TEST135B2
8010	4473	TEST136B2
8197	4537	TEST320D
8417	4752	TEST350A
8569	4733	TEST351A
8670	4705	TEST352A
8827	6573	TEST361A
8962	6763	TEST362B
9069	6751	TEST363B
9187	6741	TEST365B
9317	6731	TEST367A
9467	6717	TEST370D
9658	6701	TEST372B
9959	6604	TEST374A2
10251	5502	TEST374E2
10598	5513	TEST376A
10814	6704	TEST410B
10968	6561	TEST500
11164	6736	TEST500E
11379	6670	TEST503D
11483	6720	TEST503G
11931	6646	TEST503K
11688	6750	TEST504D
11783	6706	TEST504H
11912	6722	TEST505C
12076	6734	TEST506D
12221	6611	TEST507C
12363	6603	TEST510A
12478	6617	TEST510DA
12707	7074	TEST511A2
12823	7106	TEST511B2
13083	6644	TEST512A2
13187	6546	TEST512C2
13261	6535	TEST512E2
13417	6762	TEST520D
13615	6667	TEST534A
13769	6663	TEST534E
13926	6637	TEST535B
14093	6641	TEST536D
14469	4575	TEST551A
14806	5622	TEST610A2
15088	5602	TEST610C2
15270	5623	TEST620B
15458	5611	TEST621C
15580	5566	TEST621G
15687	6575	TEST622C
7293	4673	TEST130A1
7392	4541	TEST131A1
7502	4521	TEST132A1
7600	4523	TEST133A1
7705	4511	TEST134A1
7818	4513	TEST135A1
7931	4515	TEST136A1
8098	4543	TEST320A
8217	4554	TEST320E
8444	4753	TEST350B
8591	4722	TEST351B
8692	4713	TEST352B
8873	6771	TEST361D
8989	6757	TEST362D
9091	6747	TEST364A
9209	6737	TEST366A
9360	6725	TEST370A
9490	6715	TEST371A
9738	6541	TEST373A
10032	5606	TEST374B2
10324	5504	TEST374F2
10619	5614	TEST376A1
10844	6707	TEST410C
11070	6673	TEST500A
11238	6677	TEST503A
11359	6601	TEST503DA
11474	6732	TEST503H
11578	6615	TEST504A
11716	6760	TEST504E
11804	6716	TEST504I
11952	6621	TEST506A
12099	6605	TEST506E
12243	6557	TEST507D
12396	6675	TEST510B
12497	6604	TEST510E
12778	7110	TEST511A3
12834	7116	TEST511B3
13081	6565	TEST512B1
13185	6537	TEST512D1
13322	6627	TEST520A
13445	6775	TEST520E
13650	6634	TEST534B
13805	6636	TEST534F
13973	6657	TEST536A
14154	6653	TEST536E
14498	4576	TEST551B
14869	5533	TEST610B1
15101	5545	TEST610D1
15309	5621	TEST620C
15476	5607	TEST621D
15572	5754	TEST621H
15680	5573	TEST623

LINE	LOCN	SYMBOL
15724	5571	TEST624A
15925	5563	TEST701A
16040	5477	TEST702A
16236	6645	TEST710C
16374	6534	TEST711B
16512	6505	TEST712B
16640	5616	TEST713B
16788	6520	TEST720B
16918	4577	TEST721C
17084	4471	TEST730A
17233	4461	TEST730D
17401	4456	TEST731C
17591	4453	TEST740B
17765	4771	TEST761B
17924	4751	TEST762B
18031	4711	TEST762F
18148	4710	TEST763D
11008	6671	TESTD500
15400	5522	UBRK621A
18301	6774	VFY001
18333	7375	VFY005
8371	7016	WRITE8F350
9941	5227	ZERO374A2
10087	5246	ZERO374C2
10233	5264	ZERO374E2
17734	4772	ZERODBR761A
10386	7044	ZERO8F
10375	7042	ZERO8FDF
19256	7402	ZTARGET402
19264	7406	ZTARGET406
19272	7412	ZTARGET412
19280	7416	ZTARGET416
19288	7422	ZTARGET422
19296	7426	ZTARGET426
19304	7432	ZTARGET432
19312	7436	ZTARGET436
19320	7442	ZTARGET442
19328	7446	ZTARGET446
19336	7452	ZTARGET452
19344	7456	ZTARGET456
19352	7462	ZTARGET462
19360	7466	ZTARGET466
19368	7472	ZTARGET472
19376	7476	ZTARGET476
19384	7502	ZTARGET502
19392	7506	ZTARGET506
19400	7512	ZTARGET512
19408	7516	ZTARGET516
19416	7522	ZTARGET522
19424	7526	ZTARGET526
19432	7532	ZTARGET532
19440	7536	ZTARGET536
15817	5565	TEST624B
15962	8523	TEST701B
16089	6761	TEST702B
16265	6574	TEST710D
16404	6530	TEST711C
16530	6524	TEST712C
16664	6522	TEST713C
16813	4760	TEST720C
16951	5463	TEST722A
17149	4466	TEST730B
17286	4462	TEST730E
17428	4455	TEST731D
17619	4452	TEST740C
17786	4774	TEST761C
17946	4740	TEST762C
18062	4761	TEST763A
11292	6714	TESTA503A
11031	6777	TESTINHASP500
15776	6255	UBRK624A
18308	4412	VFY002
18340	7374	VFY006
17861	4315	ZAPD762A
9992	5556	ZERO374B1
10138	5514	ZERO374D1
10284	5516	ZERO374F1
12931	6276	ZEROFLAG510E
10365	7036	ZEROSF02DF04
10381	7043	ZEROSFDFA
19258	7403	ZTARGET403
19266	7407	ZTARGET407
19274	7413	ZTARGET413
19282	7417	ZTARGET417
19290	7423	ZTARGET423
19298	7427	ZTARGET427
19306	7433	ZTARGET433
19314	7437	ZTARGET437
19322	7443	ZTARGET443
19330	7447	ZTARGET447
19338	7453	ZTARGET453
19346	7457	ZTARGET457
19354	7463	ZTARGET463
19362	7467	ZTARGET467
19370	7473	ZTARGET473
19378	7477	ZTARGET477
19386	7503	ZTARGET503
19394	7507	ZTARGET507
19402	7513	ZTARGET513
19410	7517	ZTARGET517
19418	7523	ZTARGET523
19426	7527	ZTARGET527
19434	7533	ZTARGET533
19442	7537	ZTARGET537
15839	5776	TEST624C
15981	6770	TEST701C
16157	5478	TEST710A
16294	6575	TEST710E
16427	6526	TEST711D
16569	6503	TEST712D
16689	6521	TEST713D
16840	4571	TEST721A
17004	4464	TEST722B
17188	4460	TEST730C
17321	4735	TEST731A
17467	4454	TEST731E
17683	4461	TEST740D
17829	4773	TEST762A
17980	4741	TEST762D
18108	4720	TEST763B
11621	6766	TESTA504A
11023	6133	TESTINHBSP500
13399	6624	UCON520A
18313	4258	VFY003
10755	7306	WORD410
17122	4314	ZAPDBUF730A
10014	5236	ZERO374B2
10160	5258	ZERO374D2
10306	5273	ZERO374F2
18824	5427	ZEROIR624B
10370	7041	ZEROSF04DF02
19252	7400	ZTARGET400
19260	7404	ZTARGET404
19268	7410	ZTARGET410
19276	7414	ZTARGET414
19284	7420	ZTARGET420
19292	7424	ZTARGET424
19300	7430	ZTARGET430
19308	7434	ZTARGET434
19316	7440	ZTARGET440
19324	7444	ZTARGET444
19332	7450	ZTARGET450
19340	7454	ZTARGET454
19348	7460	ZTARGET460
19356	7464	ZTARGET464
19364	7470	ZTARGET470
19372	7474	ZTARGET474
19380	7500	ZTARGET500
19388	7504	ZTARGET504
19396	7510	ZTARGET510
19404	7514	ZTARGET514
19412	7520	ZTARGET520
19420	7524	ZTARGET524
19428	7530	ZTARGET530
19436	7534	ZTARGET534
19444	7540	ZTARGET540
15864	5756	TEST624D
16011	5512	TEST701D
16212	6644	TEST710B
16328	5473	TEST711A
16460	5471	TEST712A
16594	5467	TEST713A
16730	5465	TEST720A
16894	4573	TEST721B
17029	4465	TEST722C
17211	4450	TEST730C1
17363	4457	TEST731B
17556	4744	TEST740A
17726	4745	TEST761A
17899	4553	TEST762A1
18006	4730	TEST762E
18128	4721	TEST763C
10707	6773	TESTD410
18089	4424	TESTVECT763A
18103	4733	VECTLOAD763A
18321	4433	VFY004
8364	4002	WRITEDF350
9919	5536	ZERO374A1
10065	5566	ZERO374C1
10211	5526	ZERO374E1
12504	6274	ZEROD510E
17739	4403	ZEROIT761A
10392	7045	ZERO8FA
19254	7401	ZTARGET401
19262	7405	ZTARGET405
19270	7411	ZTARGET411
19278	7415	ZTARGET415
19286	7421	ZTARGET421
19294	7425	ZTARGET425
19302	7431	ZTARGET431
19310	7435	ZTARGET435
19318	7441	ZTARGET441
19326	7445	ZTARGET445
19334	7451	ZTARGET451
19342	7455	ZTARGET455
19350	7461	ZTARGET461
19358	7465	ZTARGET465
19366	7471	ZTARGET471
19374	7475	ZTARGET475
19382	7501	ZTARGET501
19390	7505	ZTARGET505
19398	7511	ZTARGET511
19406	7515	ZTARGET515
19414	7521	ZTARGET521
19422	7525	ZTARGET525
19430	7531	ZTARGET531
19438	7535	ZTARGET535
19446	7541	ZTARGET541

LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL	LINE	LOCN	SYMBOL
19448	7542	ZTARGET542	19450	7543	ZTARGET543	19452	7544	ZTARGET544	19454	7545	ZTARGET545
19456	7546	ZTARGET546	19458	7547	ZTARGET547	19460	7550	ZTARGET550	19462	7551	ZTARGET551
19464	7552	ZTARGET552	19466	7553	ZTARGET553	19468	7554	ZTARGET554	19470	7555	ZTARGET555
19472	7556	ZTARGET556	19474	7557	ZTARGET557	19476	7560	ZTARGET560	19478	7561	ZTARGET561
19480	7562	ZTARGET562	19482	7563	ZTARGET563	19484	7564	ZTARGET564	19486	7565	ZTARGET565
19488	7566	ZTARGET566	19490	7567	ZTARGET567	19492	7570	ZTARGET570	19494	7571	ZTARGET571
19496	7572	ZTARGET572	19498	7573	ZTARGET573	19500	7574	ZTARGET574	19502	7575	ZTARGET575
19504	7576	ZTARGET576	19506	7577	ZTARGET577	19508	7600	ZTARGET600	19510	7601	ZTARGET601
19512	7602	ZTARGET602	19514	7603	ZTARGET603	19516	7604	ZTARGET604	19518	7605	ZTARGET605
19520	7606	ZTARGET606	19522	7607	ZTARGET607	19524	7610	ZTARGET610	19526	7611	ZTARGET611
19528	7612	ZTARGET612	19530	7613	ZTARGET613	19532	7614	ZTARGET614	19534	7615	ZTARGET615
19536	7616	ZTARGET616	19538	7617	ZTARGET617	19540	7620	ZTARGET620	19542	7621	ZTARGET621
19544	7622	ZTARGET622	19546	7623	ZTARGET623	19548	7624	ZTARGET624	19550	7625	ZTARGET625
19552	7626	ZTARGET626	19554	7627	ZTARGET627	19556	7630	ZTARGET630	19558	7631	ZTARGET631
19560	7632	ZTARGET632	19562	7633	ZTARGET633	19564	7634	ZTARGET634	19566	7635	ZTARGET635
19568	7636	ZTARGET636	19570	7637	ZTARGET637	19572	7640	ZTARGET640	19574	7641	ZTARGET641
19576	7642	ZTARGET642	19578	7643	ZTARGET643	19580	7644	ZTARGET644	19582	7645	ZTARGET645
19584	7646	ZTARGET646	19586	7647	ZTARGET647	19588	7650	ZTARGET650	19590	7651	ZTARGET651
19592	7652	ZTARGET652	19594	7653	ZTARGET653	19596	7654	ZTARGET654	19598	7655	ZTARGET655
19600	7656	ZTARGET656	19602	7657	ZTARGET657	19604	7660	ZTARGET660	19606	7661	ZTARGET661
19608	7662	ZTARGET662	19610	7663	ZTARGET663	19612	7664	ZTARGET664	19614	7665	ZTARGET665
19616	7666	ZTARGET666	19618	7667	ZTARGET667	19620	7670	ZTARGET670	19622	7671	ZTARGET671
19624	7672	ZTARGET672	19626	7673	ZTARGET673	19628	7674	ZTARGET674	19630	7675	ZTARGET675
19632	7676	ZTARGET676	19634	7677	ZTARGET677	19636	7700	ZTARGET700	19638	7701	ZTARGET701
19640	7702	ZTARGET702	19642	7703	ZTARGET703	19644	7704	ZTARGET704	19646	7705	ZTARGET705
19648	7706	ZTARGET706	19650	7707	ZTARGET707	19652	7710	ZTARGET710	19654	7711	ZTARGET711
19656	7712	ZTARGET712	19658	7713	ZTARGET713	19660	7714	ZTARGET714	19662	7715	ZTARGET715
19664	7716	ZTARGET716	19666	7717	ZTARGET717	19668	7720	ZTARGET720	19670	7721	ZTARGET721
19672	7722	ZTARGET722	19674	7723	ZTARGET723	19676	7724	ZTARGET724	19678	7725	ZTARGET725
19680	7726	ZTARGET726	19682	7727	ZTARGET727	19684	7730	ZTARGET730	19686	7731	ZTARGET731
19688	7732	ZTARGET732	19690	7733	ZTARGET733	19692	7734	ZTARGET734	19694	7735	ZTARGET735
19696	7736	ZTARGET736	19698	7737	ZTARGET737	19700	7740	ZTARGET740	19702	7741	ZTARGET741
19704	7742	ZTARGET742	19706	7743	ZTARGET743	19708	7744	ZTARGET744	19710	7745	ZTARGET745
19712	7746	ZTARGET746	19714	7747	ZTARGET747	19716	7750	ZTARGET750	19718	7751	ZTARGET751
19720	7752	ZTARGET752	19722	7753	ZTARGET753	19724	7754	ZTARGET754	19726	7755	ZTARGET755
19728	7756	ZTARGET756	19730	7757	ZTARGET757	19732	7760	ZTARGET760	19734	7761	ZTARGET761
19736	7762	ZTARGET762	19738	7763	ZTARGET763	19740	7764	ZTARGET764	19742	7765	ZTARGET765
19744	7766	ZTARGET766	19746	7767	ZTARGET767	19748	7770	ZTARGET770	19750	7771	ZTARGET771
19752	7772	ZTARGET772	19754	7773	ZTARGET773	19756	7774	ZTARGET774	19758	7775	ZTARGET775
19760	7776	ZTARGET776	19762	7777	ZTARGET777						

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4000	TEST001	INITIALIZE12	WRITEDF350	ALU116A	GETZEROES114A	GOBUT114A	GOBUT114A2	SCOPE114A
4010	GETALTN115A1	GOBUT115A1	GOBUT115A4	GOBUT115A2	GOBUT115A3	ALU115B1	GOBUT115B1	GOBUT115B4
4020	GOBUT115B2	GOBUT115B3	SCOPE115B	GOBUT115C1	GOBUT115C2	GOBUT115C3	ALU115D1	GOBUT115D1
4030	GOBUT115D2	GOBUT115D3	SCOPE115D	GOBUT116A1	GOBUT116A2	GOBUT116A3	GOBUT116A4	GOBUT116A5
4040	ALU116B	GOBUT116B	SCOPE116C	GOBUT116C1	GOBUT116C2	GOBUT116C3	GOBUT116C4	GOBUT116C5
4050	ALU116D	GOBUT116D	SCOPE116D	GOBUT117A1	GOBUT117A2	GOBUT117A3	GOBUT117A4	ALU117B1
4060	GOBUT117B1	GOBUT117B2	GOBUT117B3	ALU117C1	GOBUT117C2	GOBUT117C2	SCOPE117C	GOBUT120A1
4070	GOBUT120A2	GOBUT120A3	ALU120B1	GOBUT120B1	GOBUT120B2	GOBUT120B3	GOBUT120B4	SCOPE120B
4100	LOAD010	INITIALIZE10	INITIALIZE11	GOBUT121A1	GOBUT121A2	GOBUT121A3	GOBUT121A4	ALU121B1
4110	GOBUT121B1	GOBUT121B2	GOBUT121B3	GOBUT121B4	SCOPE121C	GOBUT121C1	GOBUT121C2	GOBUT121C3
4120	GOBUT121C4	ALU121D1	GOBUT121D1	GOBUT121D2	GOBUT121D3	GOBUT121D4	SCOPE121D	GOBUT122A1
4130	GOBUT122A2	GOBUT122A3	SETD122A4	GOBUT122A4	SCOPE122A	COMP130A1	GOBUT130A1	GOBUT130A2
4140	ARITH130B1	COMP130B1	GOBUT130B1	GOBUT130B2	SCOPE130B	COMP131A1	GOBUT131A1	GOBUT131A2
4150	ARITH131B1	COMP131B1	GOBUT131B1	GOBUT131B2	SCOPE131B	GOBUT132A1	GOBUT132A2	ARITH132B1
4160	GOBUT132B1	GOBUT132B2	SCOPE132B	DOPA133A1	GOTEST133A1	GOBUT133A2	OPA133B1	GOTEST133B1
4170	GOBUT133B2	SCOPE133B	OPB134A1	DOPA134A1	GOTEST134A1	GOBUT134A2	OPA134B1	GOTEST134B1
4200	GOBUT134B2	SCOPE134B	OPB135A1	DOPA135A1	GOTEST135A1	GOBUT135A2	OPA135B1	GOTEST135B1
4210	GOBUT135B2	SCOPE135B	DOPA136A1	GOTEST136A1	GOBUT136A2	OPA136B1	GOTEST136B1	GOBUT136B2
4220	SCOPE136B	SETD320A	GETDC320A	GOBUT320A	GOBUT320B	SETONE320C	SETD320C	GETDC320C
4230	GOBUT320C	GOBUT320D	SETONE320E	SETD320E	GETDC320E	GOBUT320E	GOBUT320F	SCOPE320
4240	START350	LOADSRD350	BL1-537A	GOBUT350A	COMP350B	GOBUT350B	COMP350C	GOBUT350C
4250	COMP350D	GOBUT350D	SCOPE350	NEXTPATA350	LOAD06-351	VFY003	GOBUT351A	COMP351B
4260	GOBUT351B	COMP351C	GOBUT351C	COMP351D	GOBUT351D	SCOPE351	GOBUT352A	COMP352B
4270	GOBUT352B	COMP352C	GOBUT352C	COMP352D	GOBUT352D	SCOPE352	LOAD14537A	LOAD03537A
4300	LOAD01537A	COUNTER01	COMP537A	GOBUT537A	SCOPE537A	LOADIN551A	SETSR551A	LOADADR710A
4310	COUNTER02	BUSFCN711A	SETJAM710A	BUSFCN710A	GENADR712A	ZAPD762A	BUSFCN712A	GOTEST720C
4320	LOADRET721A	GOTEST721B	GOTEST721C	SETJAM722A	BUSFCN722A	GOTEST722B	GOTEST722C	SCOPE722
4330	LOADDATA730A	BUSFCN730A	GETDBUF730A	COMP730A	ZAPDBUF730A	GOBUT730A	EXPEC730B	BUSFCN730B
4340	GETIT730B	GOBUT730B	GOBUT730C	LOADDATA730D	SETZER730D	MANGLED730D	BUSFCN730D	GETIT730D
4350	GOBUT730D	GOBUT730E	SCOPE730	GETDBUF731A	COMP731A	GOBUT731A	BUSFCN731B	GETIT731B
4360	GOBUT731B	COMP731C	GOBUT731C	LOADIR731D	BUSFCN731D	MANGLED731D	GOBUT731D	GOBUT731E
4370	SCOPE731	BUSFCN740A	LOADIR740B	BUSFCN740B	BUSFCN740C	GOBUT740C	BUTERROR4	TEST007
4400	LOADIR740D	BUSFCN740D	SCOPE740	ZEROIT761A	CLEAR761A	GOBUT761A	GOBUT761B	GOBUT761C
4410	SCOPE761	DW11L762A	VFY002	SETPRI762A	FILL762C	DELAY762C	GOBUT762D	EXPEC762E
4420	GOGET762E	GOBUT762F	EXPEC763A	READVECT763A	TESTVECT763A	GOBUT763B	GOBUT763C	GOBUT763D
4430	SCOPE763	EOP001	. . . .	VFY004	JAMUPP002C	JAMUPP006	JAMUPP007	JAMUPP010
4440	JAMUPP011	. . . .	. . . .	GOBUT730C1	. . . .	NEXT710A	NEXT711A	NEXT712A
4450	TEST730C1	TEST740D	TEST740C	TEST740B	TEST731E	TEST731D	TEST731C	TEST731B
4460	TEST730C	TEST730D	TEST730E	SETPR6-762A	TEST722B	TEST722C	TEST730B	NEXTD762A
4470	SETADR722A	TEST730A	TEST132B2	TEST136B2	TEST006	TEST136B1	TEST136A2	TEST135B2
4500	TEST133A2	TEST133B1	TEST133B2	TEST134A2	TEST134B1	TEST134B2	TEST135A2	TEST135B1
4510	OPR133A1	TEST134A1	OPA134A1	TEST135A1	OPA135A1	TEST136A1	TEST132A2	TEST132B1
4520	ARITH131A1	TEST132A1	ARITH132A1	TEST133A1	NEXT722A	COUNTER09	COUNTER03	COUNTER10
4530	TEST130B1	COUNTER10B	TEST130B2	COUNTER10A	COUNTER06	COUNTER07	COUNTER08	TEST320D
4540	ARITH130A1	TEST131A1	OPB136A1	TEST320A	TEST131A2	COUNTER04	TEST131B1	COUNTER11
4550	TEST130A2	RUMPD762A	TEST320B	TEST762A1	TEST320E	COUNTER12	TEST320F	COUNTER05
4560	GOTEST551B	SETSR551C	TEST320C	DINTOIRA350	GOTEST551A	SETSR551B	TEST551C	LOAD05-351
4570	TEST122A2	TEST721A	TEST537A	TEST721B	LOAD16537A	TEST551A	TEST551B	TEST721C
4600	GETONES114A	TEST115A1	TEST115B4	TEST114A2	TEST115A4	TEST121C2	TEST116B	TEST114A
4610	ALU115A1	TEST115C1	TEST115B3	TEST115B2	TEST115B1	TEST115A3	TEST115A2	TEST115C2
4620	TEST116A3	TEST116A2	ALU115C1	TEST116A1	TEST115D3	TEST115D2	TEST115D1	TEST115C3
4630	TEST116C5	TEST116C4	TEST116C3	TEST116C2	ALU116A1	TEST116C1	TEST116A5	TEST116A4

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4640	TEST117B2	TEST117B1	TEST117A4	TEST117A3	TEST117A2	TEST116D	ALU116C1	TEST117A1
4650	TEST120B4	TEST120B3	TEST120B2	TEST120B1	TEST120A3	TEST120A2	TEST117C1	TEST117B3
4660	TEST121B4	TEST121B3	TEST121B2	TEST121B1	ALU120A1	TEST121A1	ALU117A1	TEST120A1
4670	ALU121C1	TEST122A1	ALU122A1	TEST130A1	TEST121A4	TEST121A3	TEST121A2	TEST117C2
4700	SETONE320A	TEST350	COMP350A	RESETIR350	COMP381A	TEST392A	ALU121A1	TEST121C1
4710	TEST763D	TEST762F	TEST381D	TEST352B	COMP382A	RESTORE01	TEST121C4	TEST121C3
4720	TEST763B	TEST763C	TEST351B	TEST351C	TEST380C	TEST392D	TEST121D2	TEST121D1
4730	TEST762E	ALLOW763A	TEST351A	VECTLOAD763A	TEST122A3	TEST122A4	TEST121D4	TEST121D3
4740	TEST762C	TEST762D	TEST350C	TEST380D	TEST740A	TEST761A	JAMUPP004	JAMUPP005
4750	TEST131B2	TEST762B	TEST350A	TEST380B	LOADIR710A	TEST731A	JAMUPP003	JAMUPP002B
4760	TEST720C	TEST763A	GOBUT762B	KILL764A	BUSFCN731A	LOADIR740A	GOBUT740B	GOBUT740D
4770	. . . .	TEST761B	ZERODSR761A	TEST762A	TEST731C	TEST010	GOBUT740A	JAMUPP001

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5000	SETDC372B	LOAD011	LOAD012A	GOBUT012A	GOBUT012B	GOBUT012C	GOBUT012D	GOBUT012E
5010	GOBUT012F	GOBUT012G	SCOPE012	GOBUT013A	GOBUT013B	GOBUT013C	GOBUT013D	GOBUT013E
5020	GOBUT013F	GOBUT013G	SCOPE013	GOBUT014A	GOBUT014B	GOBUT014C	GOBUT014D	SCOPE014
5030	GOBUT015A	GOBUT015B	GOBUT015C	SCOPE015	GOBUT016A	SCOPE016	GOBUT017A	GOBUT017B
5040	SCOPE017	GOBUT020A	GOBUT020B	GOBUT020C	SCOPE020	GOBUT021A	GOBUT021B	GOBUT021C
5050	SCOPE021	GOBUT022A	SCOPE022	GOBUT023A	SCOPE023	GOBUT024A	GOBUT024B	SCOPE024
5060	GOBUT025A	SCOPE025	GOBUT026A	SCOPE026	GOBUT027A	SCOPE027	GOBUT030A	GOBUT030B
5070	GOBUT030C	GOBUT030D	SCOPE030	GOBUT031A	GOBUT031B	SCOPE031	GOBUT032A	GOBUT032B
5100	SCOPE032	GOBUT033A	SCOPE033	GOBUT034A	SCOPE034	GOBUT035A	SCOPE035	GOBUT036A
5110	SCOPE036	GOBUT037A	SCOPE037	GOBUT040A	GOBUT040B	SCOPE040	GOBUT041A	GOBUT041B
5120	SCOPE041	GOBUT042A	GOBUT042B	SCOPE042	GOBUT043A	GOBUT043B	SCOPE043	GOBUT044A
5130	SCOPE044	GOBUT045A	SCOPE045	GOBUT046A	GOBUT046B	SCOPE046	GOBUT047A	GOBUT047B
5140	GOBUT047C	SCOPE047	GOBUT050A	LOAD050B	GOBUT050B	SCOPE050	TEST005	GOTEST101A
5150	SCOPE101	LOAD02-102A	LOAD04-102A	LOAD10-102A	LOAD00-102A	LOADD102A	GOTEST102A	LOADD102B
5160	GOTEST102B	LOADD102C	GOTEST102C	LOADD102D	GOTEST102D	SCOPE102	LOAD15-103A	LOAD13-103A
5170	LOAD07-103A	LOAD17-103A	LOADD103A	GOTEST103A	LOADD103B	GOTEST103B	LOADD103C	GOTEST103C
5200	LOADD103D	GOTEST103D	SCOPE103	GOTEST104A	LOADD104B	GOTEST104B	SCOPE104	GOTEST105A
5210	GOBUT105A1	LOADSR105B	GOTEST105B	GOBUT105B1	LOADSR105C	GOTEST105C	LOADSR105D	GOTEST105D
5220	GOTEST105E	SCOPE105	EXPEC374A1	SUBRA372B	SCOPE624	DOWRITE374A1	GETTEM374A1	ZERO374A2
5230	DOWRITE374A2	GETTEM374A2	GOTEST374A2	SCOPE374A	DOWRITE374B1	GETTEM374B1	ZERO374B2	DOWRITE374B2
5240	GETTEM374B2	GOTEST374B2	SCOPE374B	DOWRITE374C1	GETTEM374C1	NEXT010	ZERO374C2	DOWRITE374C2
5250	GETTEM374C2	GOTEST374C2	SCOPE374C	DOWRITE374D1	GETTEM374D1	ZERO374D2	DOWRITE374D2	GETTEM374D2
5260	GOTEST374D2	SCOPE374D	DOWRITE374E1	GETTEM374E1	ZERO374E2	DOWRITE374E2	GETTEM374E2	GOTEST374E2
5270	SCOPE374E	DOWRITE374F1	GETTEM374F1	ZERO374F2	DOWRITE374F2	GETTEM374F2	GOTEST374F2	SCOPE374F
5300	CHECK375B	GOBUT375B	SETIR376A	GOBUT376A	SCOPE376	SCOPE551	LOAD01-610A1	LOAD05-610A1
5310	LOAD06-610A1	PSCC-DC610A1	SETBUSA610A1	DOIT610A1	GETIT610A1	LOAD06-610A2	LOAD01-610A2	PSCC-DC610A2
5320	SETBUSA610A2	DOIT610A2	GETIT610A2	SCOPE610A	LOAD01-610B1	PSCC-DC610B1	SETBUSA610B1	DOIT610B1
5330	GETIT610B1	LOADIR610B2	LOAD07-610B2	LOAD01-610B2	PSCC-DC610B2	SETBUSA610B2	DOIT610B2	GETIT610B2
5340	SCOPE610B	LOAD01-610C1	PSCC-DC610C1	SETBUSA610C1	DOIT610C1	GETIT610C1	LOAD05-610C2	LOAD01-610C2
5350	PSCC-DC610C2	SETBUSA610C2	DOIT610C2	GETIT610C2	SCOPE610C	PSCC-DC610D1	SETBUSA610D1	DOIT610D1
5360	GETIT610D1	PSCC-DC610D2	SETBUSA610D2	DOIT610D2	GETIT610D2	SCOPE610D	GOBUT620A	GOBUT620B
5370	MASK620C	GETJAM620C	CSP1L621A	SETBRK621A	LODBRK621A	SETRET621A	BUTERR0R5	SETFLG621A
5400	LODFLG621A	SETSR621A	GOBUT621B	GOBUT621C	GOBUT621D	EXPEC621E	GETJAM621E	EXPEC621F
5410	GETCUA621F	GOBUT621G	COMP621H	BC1FCN622A	CNBTO622A	GOBUT622A	BCERC622B	GOBUT622B
5420	GETJAM622C	EXPEC623	GETCUA623	SCOPE623	SETBRK624A	LODBRK624A	SETRET624A	ZEROIR624B
5430	EXPEC624C	GETCUA624C	GOBUT624D	SCOPE702	GOBUT701B	GOBUT701D	SCOPE701	EXPEC702A
5440	DOIT376A	SETLED702A	SETKT702A	LOADBA702A	GOTEST702A	SCOPE710	SCOPE711	SCOPE712
5450	GOTEST712B	SCOPE713	EXPEC713B	GOTEST713B	SCOPE721	. . . .	LOADRET722A	. . . .
5460	. . . .	. . . .	LOADRET720A	TEST722A	LOADRET713A	TEST720A	LOADRET712A	TEST713A
5470	LOADRET711A	TFST712A	LOADRET710A	TEST711A	MASK702A	TEST710A	MASK701A	TEST702A
5500	TEST374D2	SCOPE372B	TEST374E2	LOAD372B	TEST374F2	TEST712B	SETSP375A	TEST410
5510	LOAD01-610D1	TEST620A	TEST701D	TEST376A	ZERO374D1	EXPEC374E1	ZERO374F1	TEST375A
5520	LOADD101A	TEST102A	UBRK621A	TEST701B	TEST374C2	TEST004	ZERO374E1	EXPEC374F1
5530	LOAD01-102A	TEST103A	LOADIR610A1	TEST610B1	LOADIR610B1	TEST610C1	ZERO374A1	EXPEC374B1
5540	LOADD104A	TEST105A	LOADSR105A	SETUPCSP17A	LOADIR610C1	TEST610D1	LOAD16-103A	TEST104A
5550	LOAD047A	TEST050A	LOAD050A	TEST101A	TEST102D	CUA372B	ZERO374B1	EXPEC374C1
5560	LOAD046A	TEST047A	LODIR624A	TEST701A	TEST102C	TEST624B	ZERO374C1	EXPEC374D1
5570	BCERC620A	TFST624A	TEST103B	TEST623	TEST102B	TEST622C	TEST103C	TEST622B
5600	TEST105B1	TFST622A	TEST610C2	TEST621F	TEST374A2	TEST621E	TEST374B2	TEST621D
5610	TEST105A1	TEST621C	TEST610B2	TEST621B	TEST376A1	ERROR621A	TEST713B	TEST621A
5620	TEST105E	TFST620C	TEST610A2	TEST620B	TEST610D2	TEST375B	GOTEST551C	TEST610A1
5630	LOAD045A	TEST046A	LOAD044A	TEST045A	LOAD043A	TEST044A	TEST105D	TEST043B

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5640	LOAD042A	TEST043A	TEST105C	TEST042B	LOAD041A	TEST042A	TEST104B	TEST041B
5650	LOAD040A	TEST041A	TEST105B	TEST040B	LOAD039A	TEST040A	LOAD036A	TEST037A
5660	LOAD035A	TEST036A	LOAD034A	TEST035A	LOAD033A	TEST034A	LOAD032A	TEST033A
5670	TEST047B	TEST032B	LOAD031A	TEST032A	TEST103D	TEST031B	LOAD030A	TEST031A
5700	LOAD027A	TEST030A	LOAD026A	TEST027A	LOAD025A	TEST026A	LOAD024A	TEST025A
5710	TEST014D	TEST024B	TEST030B	TEST030C	LOAD023A	TEST024A	LOAD022A	TEST023A
5720	LOAD021A	TEST022A	TEST015C	TEST021B	LOAD020A	TEST021A	TEST058B	TEST020C
5730	TEST047C	TEST020B	LOAD017A	TEST020A	TEST030D	TEST017B	LOAD016A	TEST017A
5740	LOAD015A	TEST016A	LOAD014A	TEST015A	LOAD013A	TEST014A	SFDFT08R	TEST013G
5750	TEST013F	TEST013E	TEST014B	TEST013D	TEST621B	TEST013C	TEST624D	TEST013B
5760	SETIRA	TEST013A	TEST014C	TEST012G	TEST621F	TEST012E	TEST621G	TEST012D
5770	TEST046B	TEST012C	TEST015B	TEST012B	TEST621C	TEST012A	TEST624C	TEST011

LOCN	----0-----	----1-----	----2-----	----3-----	----4-----	----5-----	----6-----	----7-----
6000	SETBYTEE410	LOADRES361A	LOADSR361A	EXPEC361B	COMP361B	GOBUT361D	GOBUT361E	SETRES362A
6010	SETDDC362A	LOADRES362A	COMP362A	GOBUT362A	EXPEC362B	COMP362B	GOBUT362D	GOBUT362E
6020	SETDDC363A	SHIFT363A	COMP363A	GOBUT363A	GOBUT363B	SETDDC364A	GOBUT364A	SETDDC364B
6030	GOBUT364B	SETRES365A	LOADRES365A	EXPEC365A	COMP365A	GOBUT365B	SETRES366A	LOADRES366A
6040	SHIFT366A	EXPEC366A	COMP366A	GOBUT366B	SETDDC366C	SHIFT366C	EXPEC366C	COMP366C
6050	SETRES367A	LOADRES367A	LOADSR367A	GOBUT367B	SETRES370A	LOADRES370A	SHIFT370A	COMP370A
6060	GOBUT370A	GOBUT370B	SETDDC370C	SHIFT370C	COMP370C	GOBUT370C	GOBUT370D	SETRES371A
6070	LOADRES371A	SHIFT371A	COMP371A	GOBUT371A	GOBUT371B	SCOPE371	SETDC372A	SUBRA372A
6100	PAGE372B	GOBUT373B	SCOPE373	LOADRES374	LOADDC8506A	SETBYTEC410	COMP410A	INTOIR410A
6110	EXPEC410B	COMP410B	GOPUT410B	EXPEC410C	ASIDE410C	COMP410C	GOBUT410C	EXPEC410D
6120	COMP410D	GOBUT410D	EXPEC410E	COMP410E	GOBUT410E	SCOPE410	SETFETCHD500	SETFETCHE500
6130	SETFETCHF500	SETFETCHG500	LOADIR500	TESTINHBSP500	COMP500A	GOBUT500A	EXPEC500C	COMP500C
6140	GOBUT500C	COMP500D	GOBUT500D	EXPEC500E	COMP500E	GOBUT500E	SCOPE500F	LOADFP8503A
6150	EXPEC503A	MASK503A	LOADFCC503A	DOFCC803A	GOPUT503A	GOBUT503A	GOBUT503B	GOBUT503C
6160	GOBUT503DA	LOADIR503D	GOBUT503D	EXPEC503E	GOPUT503E	GOBUT503F	GOBUT503G	GOBUT503H
6170	GOBUT503I	GOBUT503J	GOBUT503K	SCOPE503	LOADFP8504A	EXPEC504A	LOADFCC804A	DOFCC504A
6200	GOPUT504A	GOBUT504A	GOBUT504B	GOBUT504C	LOADIR504D	GOBUT504D	EXPEC504E	GOPUT504E
6210	GOBUT504F	GOBUT504G	GOBUT504H	GOBUT504I	SCOPE504	EXPEC505A	SETFLAG505A	BUTCLR505A
6220	GOPUT505A	GOBUT505B	CUA372A	GOBUT505C	SCOPE805	SETUCON506A	PSHI506A	PSMID506A
6230	PSLO506A	FUNGFP8506A	MF8801	GOBUT506B	GOBUT506C	GOBUT506D	CLEAR506E	GOBUT506E
6240	SCOPE506	PSHI507A	PSMID507A	PSLO507A	FUDGEP8507A	LOADDC8507A	GOBUT507A	GOBUT507B
6250	GOBUT507C	GOBUT507D	TEST002	GOBUT507E	CIN507F	UBRK624A	SETP8507F	SETSR507F
6260	SETCIN507F	GOBUT507F	SCOPE507	LOADPRIO510A	GOBUT510A	GOBUT510B	GOBUT510C	FLAG510D
6270	ENFLAG510D	SETFLAG510D	GOBUT510D	GOBUT510DA	ZEROD510E	GOBUT510E	ZEROFLAG510E	GOBUT510F
6300	SCOPE510	SCOPE511A	MF8802	MF8803	MF8804	SCOPE511B	SETD624A	SETUP512B
6310	SETPSFLAG512A1	GOTEST512A1	GOTEST512A2	SCOPE512A	SETPSFLAG512B1	GOTEST512B1	GOTEST512B2	SETIR512C1
6320	SETPSFLAG512C1	GOTEST512C1	GOTEST512C2	SCOPE512C	SETPSFLAG512D1	GOTEST512D1	GOTEST512D2	SETIR512E1
6330	SETPSFLAG512E1	GOTEST512E1	GOTEST512E2	SCOPE512E	SETUP520A	GOTEST520A	SETUP520B	GOTEST520B
6340	SETUP520C	GOTEST520C	SETUP520D	GOTEST520D	SETUP520E	GOTEST520E	SCOPE520	INITD533A
6350	COMP533A	GOBUT533A	INIT533B	INITD533B	COMP533B	GOBUT533B	SCOPE533B	COMP534A
6360	GOBUT534A	INITD534B	COMP534B	GOBUT534B	SCOPE534B	COMP534C	GOBUT534C	INITD534D
6370	COMP534D	GOBUT534D	SCOPE534D	INITD534E	COMP534E	GOBUT534E	BUTERROR6	NEXTPAT500
6400	LODCNTR534F	INITD534F	COMP534F	GOBUT534F	COUNTER534G	GOBUT534G	SCOPE534G	EXPEC535A
6410	INITD535A	COMP535A	GOBUT535A	EXPEC535B	INITD535B	COMP535B	GOBUT535B	SCOPE535B
6420	EXPEC536A	INITD536A	COMP536A	GOBUT536A	EXPEC536B	INITD536B	COMP536B	GOBUT536B
6430	SCOPE536P	COMP536C	GOBUT536C	INIT536D	EXPEC536D	INITD536D	COMP536D	GOBUT536D
6440	SCOPE536D	INITD536E	COMP536E	GOBUT536E	LOADSR536F	INITD536F	COMP536F	GOBUT536F
6450	SCOPE536F	ARB=537A	EOP002	SETFLG624A	SETSR624A	EXPEC701C	LOADBA703C	GOTEST701C
6460	EXPEC702B	SETRT702B	LOADBA702B	GOTEST702B	GOTEST710B	EXPEC710C	GOTEST710C	EXPEC710D
6470	CLEAR710D	GOTEST710D	GOTEST710E	EXPEC711B	GOTEST711B	EXPEC711C	GOTEST711C	GOTEST711D
6500	GOBUT712C	EXPEC712D	GOTEST712D	GOBUT713C	EXPEC713D	GOTEST7136	GOTEST720B	. . . .
6510	EOP003	EOP004	EOP007	. . . .	. . . .	. . . .	. . . .	. . . .
6520	TEST720B	TEST713D	TEST713C	TEST712D	TEST712C	ASSERTFOV500	TEST711D	FIXPAT500
6530	TEST711C	DNONZERO410	INITIALIZE01	DZERO410	TEST711B	TEST512E2	SETIR512B1	TEST512D1
6540	LOOP372A	TEST373A	TEST512A1	ERROR010	TEST512A2	MF8BEXPEC0	TEST512B2	MF8BEXPEC1
6550	GOTEST511A1	TEST511B1	MF8805	MF8806	GOTEST511B1	SETUP512A	TEST512C1	TEST507D
6560	SETBYTEB410	TEST500	RETURN373A	TEST374	SETIR512A1	TEST512B1	TEST512C2	ERROR624A
6570	SETRES361A	TEST372A	TEST373B	TEST361A	TEST710D	TEST710F	TEST512D2	TEST512E1
6600	TEST510D	TEST503DA	EXPEC507A	TEST510A	TEST510E	TEST506E	SETOME8510A	TEST511A
6610	TEST510F	TEST507C	EXPEC506A	TEST507A	LOADFLAG503A	TEST504A	TEST510C	TEST5100A
6620	LOAD505A	TEST506A	LOADFLAG504A	TEST505A	UCON520A	TEST533A	SETIR512D1	TEST520A
6630	TEST503B	TEST003	TEST503C	TEST533B	TEST5348	TEST534D	TEST534F	TEST535B

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6640	TEST536R	TEST536D	TEST536F	NEWCTR537A	TEST710B	TEST710C	TEST503K	TEST507F
6650	LOADSR536E	SETEMIT537A	INITD536C	TEST536E	INITS36A	TEST536C	INITS35A	TEST536A
6660	LODCNTR534E	TEST535A	INITD534C	TEST534E	INITD534A	TEST534C	INITS33A	TEST534A
6670	TEST503D	TEST0500	TEST504F	TEST500A	TEST507E	TEST510B	SETFETCHB500	TEST503A
6700	TEST503E	TEST372B	TEST504G	LOAD372A	TEST410B	TEST410E	TEST504H	TEST410C
6710	TEST503F	TEST410A	TEST505B	TEST371B	TESTA503A	TEST371A	TEST500C	TEST410D
6720	TEST503G	TEST370C	TEST505C	TEST370B	TEST[illegible]B	TEST370A	TEST500E	TEST366A
6730	TEST504B	TEST367A	TEST503H	TEST366C	TEST[illegible]6D	TEST366B	TEST500D	TEST364A
6740	TEST504C	TEST365B	TEST503I	TEST365A	TEST[illegible]6C	TEST364B	TEST503J	TEST362D
6750	TEST504D	TEST363B	TEST534G	TEST363A	TEST[illegible]3B	TEST362E	TEST503J	TEST361E
6760	TEST504E	TEST702B	TEST520D	TEST[illegible]B	TEST[illegible]3B	TEST362A	TESTA504A	TESTINHA8P500
6770	TEST701C	TEST361D	TEST520C	TEST0410	VFY001	TEST520E	EOP006	

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7000	SUBR010	INITIALIZE03	SETUPCSP16A	INITIALIZE04	INITIALIZE05	INITIALIZE06	INITIALIZE07	ALUCARRY1
7010	SETUPCSP15A	SETUPCSP14A	SETUPCSP12A	SETUPCSP03A	SETUPCSP07A	SETUPCSP00A	WRITESF350	ALUCARRY1A
7020	ALUCARRY2	ALUCARRY2A	RESETIR350A	NEXTPAT350	LOADMIA350	AGAINSRD350	RESETIR350B	RESETIR350C
7030	RESTORE02	CSP16XORSRTOIR5	RESTORE03	RESTORE04	SETIR373A	CSP16XORFLTTOIR	ZEROSF02DF04	SETSR373A
7040	SFDFTOSRAA	ZEROSF04DF02	ZEROSFDF	ZEROSFDFA	ZEROSF	ZEROSFA	FIRST375A	SFDFTOSRA
7050	SFDFTOSRB	SFDFTOSRC	SFDFTOSRD	SFDFTOSRE	SFDFTOSRF	SFDFTOSRG	SFDFTOSRH	SFDFTOSRI
7060	SETBYTEC410	SECOND375A	BYTE375A	CHECK375A	GOBUT375A	NEXTPAT410	SETBYTED410	LOADUCON506A
7070	BYTEFIRST410	GOBUT506A	DOIT506A	FLAGFPSSEQLOD	TEST511A2	FLAGFPS02	FLAGFPS03	FLAGFPS04
7100	PSSEQLOD	PSSEQLOD02	PSSEQLOD03	PSSEQLOD04	PSSEQLOD05	PSSEQLOD06	TEST511B2	GOTEST511A2
7110	TEST511A3	GOTEST511A3	TEST511A4	GOTEST511A4	KTSRCDST01	GOTEST511B2	TEST511B3	GOTEST511B3
7120	TEST511B4	GOTEST511B4	SUCBRTEST01	KTSRCDST02	KTSRCDST03	KTSRCDST04	KTSRCDST04B	KTSRCDST07
7130	KTSRCDST08	INITSR537A	SUCBRTEST02	SUCBRTEST03	SR3=537A	SETRESA537A	BUTCOUNT=I8=377	CR3=537A
7140	DR3=537A	AR7=537A	BR7=537A	CR7=537A	DR7=537A	AR11=537A	BR11=537A	CR11=537A
7150	DR11=537A	ER3=537A	FR3=537A	GR3=537A	HR3=537A	ALI=537A	SETUPPSCC0DC	GOTEST551B1
7160	GOBUT621H	SETUPPSCC0DC02	PSCCTOSR3=0	PSCCTOSR3=0AA	PSCCTOSR3=0BB	CLEAR624	EXPEC701A	BUSFCN713A
7170	LOADBA701A	GOTEST701A	LOADIR720A	SETADR721A	SETADR720A	SETJAM720A	BUSFCN720A	BDX12
7200	SETJAM721A	BUSFCN721A	MASK762A	C17X12	BDX08	C17X05	SETPRI762C	PRI06762A
7210	GETIT762A	EOP005	EOP010	JAMUPP002D	INSERTEOPREVNO	INSERT02	INSERTREVNO	INSERT03
7220	INSERT04	DISPLAY	DISP002	DISP003	DISP004	DISP005	DISP006	CLEAR-I=0-A
7230	CLEAR-I=0-B	CLEARI002	CLEARI004	CLEARI005	D[15-12]	D1512A	D[11-06]	D1106A
7240	D[05-00]	D0500A	DZERO	DTOIRB	CLRSERVICETOD	DATISERVICETOD	DATOSERVICETOD	CJESERVICETOD
7250	SERVICETOD	PBATOD	FLAGFPSTOD	PSTOD	ODDJAMTOD	CLRJAMTOD	JAMTOD	CUATOD
7260	GETMSKPROCDAT	MSKPROCDAT	CMPPROCDAT	RESETPROCDAT	LOADFPSCC	LOADFPSCC02	SRINTOIR	DINTOIR
7270	DBUFINTOIR	RESETUCONP	SRINTOIR5	DINTOIR5	DBUFINTOIR8	RESETUCONP5	BUTSR3=0	. . . . .
7300	BUTIR15-12	BUTINSTR5	BUTIR11FLTPT3=0	NEXT007	BUTIR8=6	BUTMOVDR7IR5=3	BUTINSTR1	BUTBGFPSERV
7310	BUTD[C]C	BUTCOUT7DOUT7	BUTFP805	BUTDM8MBYTE	BUTGD3=2	BUTSR1=0	BUTBGSERVL	BUTMMASKPS[T]
7320	BUTMNXT000	BUTMD00	BUTMNXT001	BUTMPS[N]	BUTMNXT002	BUTMFLAG7	BUTMNXT003	BUTMEXFLAG1
7330	BUTMNXT004	BUTMFLTPTS	BUTMNXT005	BUTMEXFLAG2	BUTMNXT006	KTSRCDST05	BUTMINITJAM	KTSRCDST06
7340	BUTMNXT007	BUTD-IS-ZERO	BUTIR11B	BUTP815	BUTD[C]A	BUTSERVICE	BUTVECTLOAD	BUTDR6-7L
7350	BUTD[C]B	BUTBA00	BUTOTHERJAM	DINTOIR350	BUTFPPROC	BUTINTRHIGH	BUTINSTRBRANCH	LOADHI350
7360	BUTPREFETCHJAM	GOFOR410	NEXT721A	EXPEC410A	NEXT720A	NEXT713A	WORD410	BYTESECOND410
7370	SETRESB537A	BUTFPFD	. . . .	GETPROCDAT	VFY006	VFY005	BUTERROR7	. . . .
7400	ZTARGET400	ZTARGET401	ZTARGET402	ZTARGET403	ZTARGET404	ZTARGET405	ZTARGET406	ZTARGET407
7410	ZTARGET410	ZTARGET411	ZTARGET412	ZTARGET413	ZTARGET414	ZTARGET415	ZTARGET416	ZTARGET417
7420	ZTARGET420	ZTARGET421	ZTARGET422	ZTARGET423	ZTARGET424	ZTARGET425	ZTARGET426	ZTARGET427
7430	ZTARGET430	ZTARGET431	ZTARGET432	ZTARGET433	ZTARGET434	ZTARGET435	ZTARGET436	ZTARGET437
7440	ZTARGET440	ZTARGET441	ZTARGET442	ZTARGET443	ZTARGET444	ZTARGET445	ZTARGET446	ZTARGET447
7450	ZTARGET450	ZTARGET451	ZTARGET452	ZTARGET453	ZTARGET454	ZTARGET455	ZTARGET456	ZTARGET457
7460	ZTARGET460	ZTARGET461	ZTARGET462	ZTARGET463	ZTARGET464	ZTARGET465	ZTARGET466	ZTARGET467
7470	ZTARGET470	ZTARGET471	ZTARGET472	ZTARGET473	ZTARGET474	ZTARGET475	ZTARGET476	ZTARGET477
7500	ZTARGET500	ZTARGET501	ZTARGET502	ZTARGET503	ZTARGET504	ZTARGET505	ZTARGET506	ZTARGET507
7510	ZTARGET510	ZTARGET511	ZTARGET512	ZTARGET513	ZTARGET514	ZTARGET515	ZTARGET516	ZTARGET517
7520	ZTARGET520	ZTARGET521	ZTARGET522	ZTARGET523	ZTARGET524	ZTARGET525	ZTARGET526	ZTARGET527
7530	ZTARGET530	ZTARGET531	ZTARGET532	ZTARGET533	ZTARGET534	ZTARGET535	ZTARGET536	ZTARGET537
7540	ZTARGET540	ZTARGET541	ZTARGET542	ZTARGET543	ZTARGET544	ZTARGET545	ZTARGET546	ZTARGET547
7550	ZTARGET550	ZTARGET551	ZTARGET552	ZTARGET553	ZTARGET554	ZTARGET555	ZTARGET556	ZTARGET557
7560	ZTARGET560	ZTARGET561	ZTARGET562	ZTARGET563	ZTARGET564	ZTARGET565	ZTARGET566	ZTARGET567
7570	ZTARGET570	ZTARGET571	ZTARGET572	ZTARGET573	ZTARGET574	ZTARGET575	ZTARGET576	ZTARGET577
7600	ZTARGET600	ZTARGET601	ZTARGET602	ZTARGET603	ZTARGET604	ZTARGET605	ZTARGET606	ZTARGET607
7610	ZTARGET610	ZTARGET611	ZTARGET612	ZTARGET613	ZTARGET614	ZTARGET615	ZTARGET616	ZTARGET617
7620	ZTARGET620	ZTARGET621	ZTARGET622	ZTARGET623	ZTARGET624	ZTARGET625	ZTARGET626	ZTARGET627
7630	ZTARGET630	ZTARGET631	ZTARGET632	ZTARGET633	ZTARGET634	ZTARGET635	ZTARGET636	ZTARGET637

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7640	ZTARGET640	ZTARGET641	ZTARGET642	ZTARGET643	ZTARGET644	ZTARGET645	ZTARGET646	ZTARGET647
7650	ZTARGET650	ZTARGET651	ZTARGET652	ZTARGET653	ZTARGET654	ZTARGET655	ZTARGET656	ZTARGET657
7660	ZTARGET660	ZTARGET661	ZTARGET662	ZTARGET663	ZTARGET664	ZTARGET665	ZTARGET666	ZTARGET667
7670	ZTARGET670	ZTARGET671	ZTARGET672	ZTARGET673	ZTARGET674	ZTARGET675	ZTARGET676	ZTARGET677
7700	ZTARGET700	ZTARGET701	ZTARGET702	ZTARGET703	ZTARGET704	ZTARGET705	ZTARGET706	ZTARGET707
7710	ZTARGET710	ZTARGET711	ZTARGET712	ZTARGET713	ZTARGET714	ZTARGET715	ZTARGET716	ZTARGET717
7720	ZTARGET720	ZTARGET721	ZTARGET722	ZTARGET723	ZTARGET724	ZTARGET725	ZTARGET726	ZTARGET727
7730	ZTARGET730	ZTARGET731	ZTARGET732	ZTARGET733	ZTARGET734	ZTARGET735	ZTARGET736	ZTARGET737
7740	ZTARGET740	ZTARGET741	ZTARGET742	ZTARGET743	ZTARGET744	ZTARGET745	ZTARGET746	ZTARGET747
7750	ZTARGET750	ZTARGET751	ZTARGET752	ZTARGET753	ZTARGET754	ZTARGET755	ZTARGET756	ZTARGET757
7760	ZTARGET760	ZTARGET761	ZTARGET762	ZTARGET763	ZTARGET764	ZTARGET765	ZTARGET766	ZTARGET767
7770	ZTARGET770	ZTARGET771	ZTARGET772	ZTARGET773	ZTARGET774	ZTARGET775	ZTARGET776	ZTARGET777

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6	772/506	6/ 6
7	775/509	3/ 3
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