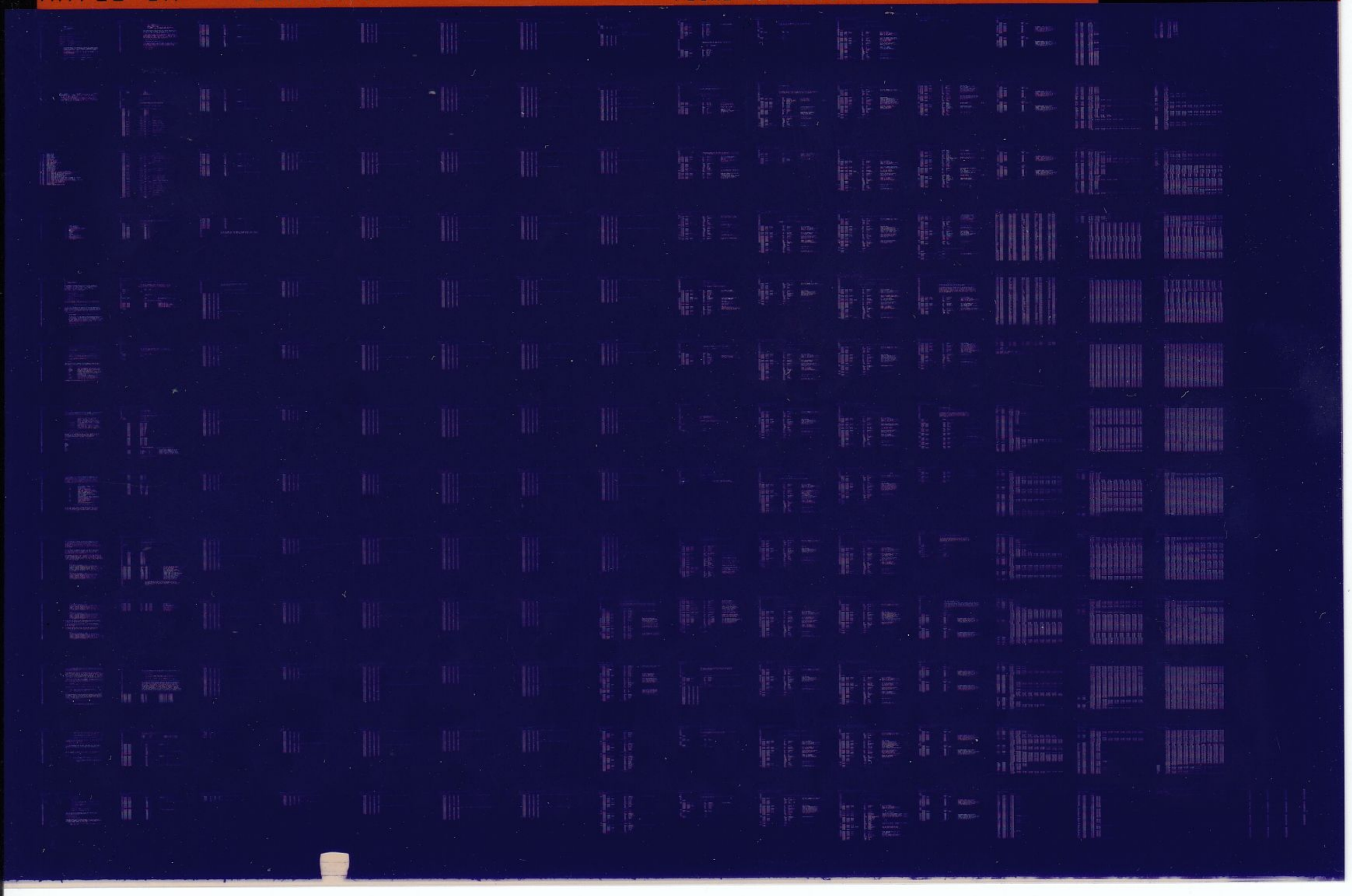
11/Z1+ KXT11-CA DIAGNOSTIC
KXT11-CA CNKTCA0

AH-T825A-MC
FICHE 01 OF 01

JUL 1984
digital
Made In USA



```
                        .ENABL  ABS,AMA
000000                  .=2000
002000                  .NLIST  CND,MD,MEB,ME
                .TITLE  USER DOCUMENTATION
                .SBTTL  IDENTIFICATION

                                                        .REM &

                        IDENTIFICATION
                        --------------

PRODUCT CODE:   AC-T824A-MC

PRODUCT NAME:   CNKTCAO KXT11-CA LSI-11 BUS DIAGNOSTIC

PRODUCT DATE:   APRIL 9,1984

MAINTAINER:     ISS DIAGNOSTIC SERVICES GROUP

AUTHOR:         JACK RICHARDSON

MODIFIED BY:    JAKI BERG       9-APR-1983

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IDENTIFICATION

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51
52                                  ***** MODIFICATION HISTORY *****
53
54  ORIGINAL RELEASE: REV 0      JACK RICHARDSON                    5-JUL-83
55
56
57  CZKTCA => CNKTCA                    JAKI BERG                   9-APR-84
58  CHANGES WERE MADE TO  CZKTCA  TO PRODUCE  CNKTCA  FOR  THE  FALCON-PLUS
59  PROJECT (SBC-11/21+).   CHANGES, MARKED BY  ";JB REV A-0", ARE:
60    - SET THE  ODT BREAK  VECTOR (LOCATION 140) TO THE STARTING ADDRESS OF
61      FALCON'S ODT ROM (170000-OCTAL).
62    - THE GENERAL OPERATING PRIORITY OF THE PROGRAM WAS LOWERED FROM LEVEL
63      7 TO LEVEL 6 TO ALLOW THE BREAK KEY TO INTERRUPT AND INVOKE ODT.
64    - VECTOR ADDRESSES  ARE ACCEPTED ONLY ON  BDAL <7:2>,  LIMITING VECTOR
65      ADDRESS SPACE TO 374.  THE INTERRUPT VECTOR ADDRESS 1770 WAS CHANGED
66      TO 370 TO ACCOMODATE THIS LIMITATION.
67
68  ------------------------------------------------------------------------
69
70
```

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IDENTIFICATION

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IDENTIFICATION

1.0 GENERAL INFORMATION
1.1 PROGRAM ABSTRACT

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

1.3 RELATED DOCUMENTS AND STANDARDS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

1.5 ASSUMPTIONS

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

STARTING THE XXDP+ SYSTEM

THE XXDP+ TEST SOFTWARE SYSTEM CONSISTS OF THE XXDP+ MONITOR WITH VARIOUS UTILITIY SOFTWARE, THE KXT11-CA IOP TEST SOFTWARE, AND THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR) ALL RESIDING ON A BOOTABLE MEDIUM. THE TEST SYSTEM REQUIRES DEDICATION OF THE ENTIRE HARDWARE SYSTEM, I.E., IT CANNOT SHARE WITH ANY OTHER OPERATING SYSTEM.

STARTING PROCEDURES:

1. SHUT OFF POWER TO THE SYSTEM; THIS INCLUDES ALL IOP AND ARBITER POWER.

2. FOR EACH KXT11-CA TO BE TESTED, PLACE THE BOOT/SELFTEST SWITCH TO POSITION 10. THE BOOT/SELFTEST SWITCH RESIDES ON EACH KXT11-CA MODULE. IF LESS THAN THE FULL COMPLEMENT OF KXT11-CA'S ARE TO BE TESTED WITH THIS SOFTWARE, IT IS SUFFICIENT TO CHANGE THE BOOT SWITCHES OF ONLY THE KXT11'S TO BE TESTED. IF THE THREE I/O PORTS ARE TO BE THOROUGHLY TESTED, THE DATA LOOPBACK CONNECTORS SHOULD BE INSTALLED AT THIS TIME.

3. RESTORE POWER TO THE SYSTEM.

4. PLACE THE XXDP+ STORAGE MEDIUM IN THE MAIN SYSTEM DEVICE.

5. BOOT THE SYSTEM.

IDENTIFICATION

6. ENTER THE DATE AND ANSWER THE LSI AND 50HZ QUESTIONS.

7. TYPE "R CNKTCA" TO LOAD THE KXT11-CA TEST SOFTWARE.

8. AFTER THE PROGRAM IS LOADED INTO ARBITER MEMORY, THE PROMPT "DS>" WILL APPEAR.

9. TYPE "START"

10. ANSWER THE QUESTION, "CHANGE HW(L)?" QUESTION WITH "Y".

11. ANSWER ALL THE HARDWARE QUESTIONS (SEE THE NEXT SECTION, 2.4, FOR VARIATIONS AND COMMANDS ASSOCIATED WITH THE DRS).

12. THE TEST SOFTWARE IS INVOKED IMMEDIATELY AFTER COMPLETING THE HARDWARE SPECIFICATION INPUT.

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
START	START THE DIAGNOSTIC FROM AN INITIAL STATE
RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
PROCEED	CONTINUE FROM AN ERROR HALT
EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE CONSIDERED TO BE ACTIVE AT START TIME
DROP	DEACTIVATE A UNIT
PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED BY THE DIAGNOSTIC - SECTION 4.0)
DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDDD".

SWITCH	EFFECT
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDDD	EXECUTE DDDDD PASSES (DDDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-14)

EXAMPLE OF SWITCH USAGE:

```
START/TESTS:1-5/PASS:1000/EOP:100
```

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES, AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
START	X	X	X	X	X
RESTART	X	X	X	X	X
CONTINUE		X	X	X	
PROCEED			X		
DROP					X
ADD					X
PRINT					
DISPLAY					X
FLAGS					
ZFLAGS					
EXIT					

2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

```
/FLAGS:LOE:IER:BOE
```

2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL, OR SECTION 2.5 BELOW). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED QUESTIONS FOR EACH UNIT.

WHEN YOU ANSWER THE HARDWARE QUESTIONS, YOU ARE BUILDING ENTRIES IN A TABLE THAT DESCRIBES THE DEVICES UNDER TEST. THE SIMPLEST WAY TO BUILD THIS TABLE IS TO ANSWER ALL QUESTIONS FOR EACH UNIT TO BE TESTED. THIS CAN BECOME TEDIOUS, HOWEVER, SINCE THE ANSWERS FOR EACH UNIT ARE REPETITIOUS.

TO ILLUSTRATE, YOU WISH TO TEST 4 KXT11-CA'S WITH THIS PROGRAM, AND THEIR SBC NUMBERS HAPPEN TO BE 2 THROUGH 5. THERE ARE 5 PARAMETERS THAT MAY VARY AMONG THE UNITS. THESE ARE THE BUS ADDRESS, THE THREE I/O PORT LOOPBACK CONNECTORS, AND WHETHER THE USER ROM TEST SHOULD OR SHOULDN'T BE INVOKED DURING TESTING. NOTE THAT A "UNIT" NUMBER IMPLIES A UNIT UNDER TEST AND DOES NOT HAVE TO HAVE A UNIT NUMBER CORRESPONDING TO A KXT11-CA SBC NUMBER.

```
                # UNITS (D) ?  4<CR>
UNIT 0
SBC ID SWITCH SETTING(D) ?  2<CR>
IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) N ? Y<CR>
CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
LOOP-BACK CONNECTOR ON PARALLEL PORT (L) N ? Y<CR>
IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>
TEST USER ROM (L) N ? Y<CR>

UNIT 1
SBC ID SWITCH SETTING(D) ?  2<CR>
IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? <CR>
CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? <CR>
IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>
TEST USER ROM (L) Y ? <CR>
```

```
                                        UNIT 2
                                        SBC ID SWITCH SETTING(D) ?  2<CR>
                                        IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
                                        LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? <CR>
                                        CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
                                        CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
                                        LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? <CR>
                                        IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>
                                        TEST USER ROM (L) Y ? N<CR>

                                        UNIT 3
                                        SBC ID SWITCH SETTING(D) ?  2<CR>
                                        IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y<CR>
                                        LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? N <CR>
                                        CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
                                        CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? Y<CR>
                                        LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y ? N<CR>
                                        IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?<CR>
                                        TEST USER ROM (L) N ? Y<CR>

                                NOTICE THAT THE DEFAULT VALUES CHANGE WHEN A NON-DEFAULT RESPONSE
                                IS GIVEN AS IN THE RESPONSES TO THE USER ROM QUESTION FOR UNITS 2 AND 3.
                                BE CAREFUL WHEN SPECIFYING MULTIPLE UNITS!

                                AS YOU CAN SEE FROM THE ABOVE EXAMPLE, THE HARDWARE PARAMETERS
                                DO NOT VARY SIGNIFICANTLY FROM UNIT TO UNIT.  THE PROCEDURE SHOWN IS
                                NOT VERY EFFICIENT.

                                THE RUNTIME SERVICES WILL ACCEPT MULTIPLE UNIT SPECIFICATIONS, HOWEVER.
                                LET'S BUILD THE SAME TABLE USING THE MULTIPLE SPECIFICATION
                                FEATURE AND ACCOMPLISH THE SAME IN ONE SINGLE UNIT ENTRY.

                                        # UNITS (D) ?  4<CR>

                                        UNIT 0
                                        SBC ID SWITCH SETTING(D) ?  2<CR>
                                        IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N) Y ? Y...<CR>
                                        LOOP-BACK CONNECTOR ON SERIAL PORT #1 (L) Y ? ...N<CR>
                                        CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? ...N<CR>
                                        CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2 (L) N ? ...N<CR>
                                        LOOP-BACK CONNECTOR ON PARALLEL PORT (L) Y? ...N<CR>
                                        IS SLU2 SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N) N ?...N<CR>
                                        TEST USER ROM (L) N ? Y,,N,Y<CR>
```

IDENTIFICATION

THE KEY TO REMEMBER HERE IS THAT EACH UNIT UNDER TEST MUST HAVE A CORRESPONDING RESPONSE ON EACH LINE. AS YOU CAN SEE FROM THIS EXAMPLE, NULL REPLIES (COMMAS ENCLOSING A NULL FIELD) TELL THE RUNTIME SERVICES TO REPEAT THE LAST REPLY.

THESE HARDWARE QUESTIONS MUST BE ANSWERED EACH TIME THE PROGRAM IS LOADED AND STARTED; HOWEVER, IF THE TEST CONFIGURATION RARELY OR NEVER DIFFERS FOR EACH STARTUP THE XXDP+ UTILITY "SETUP" MAY BE USED TO PERMANENTLY RETAIN THE ANSWERS TO THE HARDWARE QUESTIONS. THE USER WOULD THEN ANSWER "N" TO THE STARTUP QUESTION, "CHANGE HW?(L)". SETUP MAY BE USED TO REPLACE THE TEST PROGRAM ON THE XXDP+ MEDIUM, OR TO MAKE ADDITIONAL COPIES WITH DIFFERENT FILE NAMES AND HARDWARE CONFIGURATIONS.

TO RUN SETUP, USE THE XXDP+ "RUN" COMMAND. THE FIRST THING THAT SETUP WILL DO IS ASK FOR THE TYPE OF ENVIRONMENT YOU ARE GOING TO BE USING, XXDP+ OR ACT/SLIDE. FOR THIS TEST SOFTWARE, THE ANSWER WILL ALWAYS BE XXDP+. BELOW IS AN EXAMPLE OF STARTING SETUP:

```
.R SETUP
TARGET ENVIRONMENT:     XX(DP) OR AC(T)?  XX
*
```

SETUP IS NOW READY TO ACCEPT COMMANDS. THERE ARE ONLY THREE COMMANDS IN SETUP:

```
SETUP   BUILD TABLES FOR A SPECIFIED DIAGNOSTIC
LIST    PRINT A LIST OF DRS DIAGNOSTICS ON THE XXDP+ MEDIUM.
EXIT    RETURN CONTROL TO XXDP+
```

2.5 SETUP

THE SETUP COMMAND WILL CAUSE THE SPECIFIED DIAGNOSTIC TO BE LOADED INTO MEMORY. SETUP WILL THEN PROCESS THE TABLE BUILDING CODE IN THE TEST SOFTWARE MUCH THE SAME AS IF THE TEST SOFTWARE WERE LOADED AND STARTED. THE USER WILL GO THROUGH THE SAME PROCESS THAT WOULD OCCUR IF ACTUALLY RUNNING THE TEST SOFTWARE AND ISSUING A START COMMAND. THE FORMAT OF THE COMMAND IS:

```
SETUP   [DEVO:]OFILE=[DEVI:]IFILE
```

WHERE,

DEVO - DEVICE TO WHICH FILE IS TO BE WRITTEN; DEFAULT IS SYSTEM DEVICE; DEVICE MUST BE ON LINE.

```
                        OFILE - NAME OF THE OUTPUT FILE FOR THE TEST SOFTWARE THAT HAS
                                BEEN "SETUP" WITH .BIN OR .BIC EXTENSION.

                        DEVI - DEVICE FROM WHICH FILE IS TO BE READ; DEFAULT IS SYSTEM
                               DEVICE; DEVICE MUST BE ON LINE.

                        IFILE - NAME OF THE FILE FOR THE TEST SOFTWARE THAT IS TO BE
                                "SETUP".

THE OUTPUT FILE MAY BE GIVEN THE SAME NAME AS THE INPUT FILE; HOWEVER,
A WARNING MESSAGE WILL BE OUTPUT.  THIS IS TO AVOID ACCIDENTAL LOSS OF
THE ORIGINAL FILE.  FOR EXAMPLE:

        DELETE IFILE?   (Y/N/CR=Y)

IF "Y" OR NO ANSWER AT ALL IS TYPED, THE INPUT FILE "IFILE" WILL
BE DELETED AFTER THE SETUP PROCESS, AND THE NEW FILE WILL THEN BE
WRITTEN TO THE MEDIUM.  IF "N" IS TYPED, SETUP RETURNS TO PROMPT
MODE SO THAT A NEW COMMAND OR FILE NAME MAY BE SPECIFIED.

LIST
----

THE LIST COMMAND IS USED TO OBTAIN A LIST OF ALL DRS-COMPATIBLE
TEST SOFTWARE ON THE MEDIUM.  THE FORMAT OF THE COMMAND IS:

        LIST [DEV:][FILE.EXT]

WHERE,

DEV - DEVICE TO SEARCH FOR DRS-COMPATIBLE FILES; DEFAULT IS
      THE SYSTEM DEVICE.

FILE.EXT - FILE(S) TO SEARCH; EXTENSION MUST BE BIN OR BIC;
           WILDCARD SPECIFICATIONS ARE ACCEPTED; DEFAULT IS
           "*.BI?".
```

2.6 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE "R NAME", WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.4.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME  TYPE  NUMBER  ON UNIT NUMBER  TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

```
.WHERE: NAME = DIAGNOSTIC NAME
        TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
        NUMBER = ERROR NUMBER
        UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
        TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
        PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL
```

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE "EOP" SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

6.0 TEST SUMMARIES

IDENTIFICATION

```
                                        .MCALL  SVC
                                        SVC
                            000000      SVCINS=0
                            000000      SVCGBL=0
                            000000      SVCTAG=0
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL IDENTIFICATION


                                .SBTTL  PROGRAM HEADER.

002000                                  BGNMOD  MDHEDR
002000                          MDHEDR::

                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--

002000                                  POINTER BGNRPT,BGNAU,BGNDU,BGNSETUP


                                        HEADER  CNKTCA,A,0,120,0
002000                          L$NAME::                ;DIAGNOSTIC NAME
002000  103                             .ASCII /C/
002001  116                             .ASCII /N/
002002  113                             .ASCII /K/
002003  124                             .ASCII /T/
002004  103                             .ASCII /C/
002005  101                             .ASCII /A/
002006  000                             .BYTE   0
002007  000                             .BYTE   0
002010                          L$REV::                 ;REVISION LEVEL
002010  101                             .ASCII  /A/
002011                          L$DEPO::                ;0
002011  060                             .ASCII  /0/
002012                          L$UNIT::                ;NUMBER OF UNITS
002012  000016                          .WORD   T$PTHV
002014                          L$TIML::                ;LONGEST TEST TIME
002014  000120                          .WORD   120
002016                          L$HPCP::                ;POINTER TO H.W. QUES.
002016  024502                          .WORD   L$HARD
002020                          L$SPCP::                ;POINTER TO S.W. QUES.
002020  000000                          .WORD   0
002022                          L$HPTP::                ;PTR. TO DEF. H.W. PTABLE
002022  002162                          .WORD   L$HW
002024                          L$SPTP::                ;PTR. TO S.W. PTABLE
002024  000000                          .WORD   0
002026                          L$LADP::                ;DIAG. END ADDRESS
002026  024716                          .WORD   L$LAST
002030                          L$STA::                 ;RESERVED FOR APT STATS
002030  000000                          .WORD   0
002032                          L$CO::
002032  000000                          .WORD   0
002034                          L$DTYP::                ;DIAGNOSTIC TYPE
002034  000000                          .WORD   0
```

PROGRAM HEADER

```
002036                          L$APT::                 ;APT EXPANSION
002036  000000                          .WORD   0
002040                          L$DTP::                 ;PTR. TO DISPATCH TABLE
002040  002124                          .WORD   L$DISPATCH
002042                          L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
002042  000000                          .WORD   0
002044                          L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
002044  000000                          .WORD   0
002046                          L$EXP1::                ;EXPANSION WORD
002046  000000                          .WORD   0
002050                          L$MREV::                ;SVC REV AND EDIT #
002050     003                          .BYTE   C$REVISION
002051     003                          .BYTE   C$EDIT
002052                          L$EF::                  ;DIAG. EVENT FLAGS
002052  000000                          .WORD   0
002054  000000                          .WORD   0
002056                          L$SPC::
002056  000000                          .WORD   0
002060                          L$DEVP::                ; POINTER TO DEVICE TYPE LIST
002060  014422                          .WORD   L$DVTYP
002062                          L$REPP::                ;PTR. TO REPORT CODE
002062  017402                          .WORD   L$RPT
002064                          L$EXP4::
002064  000000                          .WORD   0
002066                          L$EXP5::
002066  000000                          .WORD   0
002070                          L$AUT::                 ;PTR. TO ADD UNIT CODE
002070  020076                          .WORD   L$AU
002072                          L$DUT::                 ;PTR. TO DROP UNIT CODE
002072  020042                          .WORD   L$DU
002074                          L$LUN::                 ;LUN FOR EXERCISERS TO FILL
002074  000000                          .WORD   0
002076                          L$DESP::                ;POINTER TO DIAG. DESCRIPTION
002076  014432                          .WORD   L$DESC
002100                          L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
002100  104035                          EMT     E$LOAD
002102                          L$ETP::                 ;POINTER TO ERRTBL
002102  000000                          .WORD   0
002104                          L$ICP::                 ;PTR. TO INIT CODE
002104  017412                          .WORD   L$INIT
002106                          L$CCP::                 ;PTR. TO CLEAN-UP CODE
002106  020034                          .WORD   L$CLEAN
002110                          L$ACP::                 ;PTR. TO AUTO CODE
002110  017710                          .WORD   L$AUTO
002112                          L$PRT::                 ;PTR. TO PROTECT TABLE
002112  017404                          .WORD   L$PROT
002114                          L$TEST::                ;TEST NUMBER
002114  000000                          .WORD   0
002116                          L$DLY::                 ;DELAY COUNT
002116  000000                          .WORD   0
002120                          L$HIME::                ;PTR. TO HIGH MEM
002120  000000                          .WORD   0
586 002122                              ENDMOD
587
```

```
                                .SBTTL  DISPATCH TABLE

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--
                                        BGNMOD  DSPCODE
                                DSPCODE::
                                        DISPATCH 14
002122  000016                          .WORD   14
                                L$DISPATCH::
002124  020104                          .WORD   T1
002126  020244                          .WORD   T2
002130  020446                          .WORD   T3
002132  020666                          .WORD   T4
002134  021122                          .WORD   T5
002136  021342                          .WORD   T6
002140  021566                          .WORD   T7
002142  022024                          .WORD   T8
002144  022304                          .WORD   T9
002146  022544                          .WORD   T10
002150  022776                          .WORD   T11
002152  023240                          .WORD   T12
002154  023522                          .WORD   T13
002156  024304                          .WORD   T14
002160                                  ENDMOD
```

DEFAULT HARDWARE P-TABLE

```
                        .SBTTL  DEFAULT HARDWARE P-TABLE

                        ;++
                        ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                        ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                        ; IS IDENTICAL TO THE STRUCTURE OF THE HARDWARE P-TABLES,
                        ; AND IS USED AS A "TEMPLATE" FOR BUILDING THE P-TABLES.
                        ;--

002160                          BGNHW   DFPTBL
002160  000010                  .WORD   L10000-L$HW/2
002162                  L$HW::
002162                  DFPTBL::

                                ;+
                                ; DUMMY HARDWARE P-TABLE.  THIS JUST LETS THE DRS KNOW WHAT FORMAT
                                ; WE WANT.
                                ; -

002162  000000                  .WORD   0               ; SBC ID SWITCH (2 TO 15.)
002164  000001                  .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)

                                ; FLAG FOR LOOP-BACK CONNECTORS.
                                ; 0 = NOT INSTALLED; 1 = INSTALLED

002166  000000                  .WORD   0               ; CONNECTOR FOR SLU1
002170  000000                  .WORD   0               ; CONNECTOR FOR SLU2, CHANNEL A
002172  000000                  .WORD   0               ; CONNECTOR FOR SLU2, CHANNEL B
002174  000000                  .WORD   0               ; CONNECTOR FOR PARALLEL I/O
002176  000000                  .WORD   0               ; SLU2 DMA CONFIGURATION
002200  000000                  .WORD   0               ; FLAG FOR USER ROM TESTS (0 = DON'T TEST)

002202                          ENDHW
002202                  L10000:
```

SOFTWARE P-TABLE

```
                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE TABLE CONTAINS VARIOUS DATA USED BY THE
                                ; PROGRAM AS OPERATIONAL PARAMETERS.  THESE PARAMETERS ARE
                                ; SET UP AT ASSEMBLY TIME AND MAY BE VARIED BY THE OPERATOR
                                ; AT RUN TIME.
                                ;--

002202                                  BGNSW   SFPTBL
002202  000000                         .WORD   L10001-L$SW/2
002204                          L$SW::
002204                          SFPTBL::


                                        ENDSW
002204                          L10001:
```

```
                                .TITLE GLOBAL AREAS
                                .SBTTL IDENTIFICATION

                                .SBTTL  GLOBAL EQUATES SECTION

                                ;++
                                ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                                ; ARE USED IN MORE THAN ONE TEST.
                                ;--
002204                                  BGNMOD  GLBEQAT
002204                          GLBEQAT::
002204                                  EQUALS
                                ;
                                ; BIT DIFINITIONS
                                ;
100000                          BIT15== 100000
040000                          BIT14== 40000
020000                          BIT13== 20000
010000                          BIT12== 10000
004000                          BIT11== 4000
002000                          BIT10== 2000
001000                          BIT09== 1000
000400                          BIT08== 400
000200                          BIT07== 200
000100                          BIT06== 100
000040                          BIT05== 40
000020                          BIT04== 20
000010                          BIT03== 10
000004                          BIT02== 4
000002                          BIT01== 2
000001                          BIT00== 1
                                ;
001000                          BIT9==  BIT09
000400                          BIT8==  BIT08
000200                          BIT7==  BIT07
000100                          BIT6==  BIT06
000040                          BIT5==  BIT05
000020                          BIT4==  BIT04
000010                          BIT3==  BIT03
000004                          BIT2==  BIT02
000002                          BIT1==  BIT01
000001                          BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;
                                ;                                       ; BIT POSITION IN SECOND STATUS WORD
000040                          EF.START==      32.                     ; (100000) START COMMAND WAS ISSUED
000037                          EF.RESTART==    31.                     ; (040000) RESTART COMMAND WAS ISSUED
000036                          EF.CONTINUE==   30.                     ; (020000) CONTINUE COMMAND WAS ISSUED
000035                          EF.NEW==        29.                     ; (010000) A NEW PASS HAS BEEN STARTED
000034                          EF.PWR==        28.                     ; (004000) A POWER-FAIL/POWER-UP OCCURRED
                                ;
                                ;
                                ; PRIORITY LEVEL DEFINITIONS
                                ;
000340                          PRI07== 340
```

GLOBAL EQUATES SECTION

```
                000300                  PRIO6== 300
                000240                  PRIO5== 240
                000200                  PRIO4== 200
                000140                  PRIO3== 140
                000100                  PRIO2== 100
                000040                  PRIO1== 40
                000000                  PRIO0== 0
                                        ;
                                        ;OPERATOR FLAG BITS
                                        ;
                000004                  EVL==        4
                000010                  LOT==       10
                000020                  ADR==       20
                000040                  IDU==       40
                000100                  ISR==      100
                000200                  UAM==      200
                000400                  BOE==      400
                001000                  PNT==     1000
                002000                  PRI==     2000
                004000                  IXE==     4000
                010000                  IBE==    10000
                020000                  IER==    20000
                040000                  LOE==    40000
                100000                  HOE==   100000

    692
    707 002204                                   ENDMOD
```

GLOBAL DATA SECTION

```
                                .SBTTL  GLOBAL DATA SECTION

                                ;++
                                ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                                ; IN MORE THAN ONE TEST.
                                ;--
002204                                  BGNMOD  GLBDAT
002204                          GLBDAT::

                                ; ++
                                ;
                                ;       TWO PORT RAM Q-BUS ADDRESS OFFSETS.
                                ;
                                ; --

000000                          DPR0==0
000002                          DPR1==2
000004                          DPR2==4
000006                          DPR3==6
000010                          DPR4==10
000012                          DPR5==12
000014                          DPR6==14
000016                          DPR7==16
000020                          DPR10==20
000022                          DPR11==22
000024                          DPR12==24
000026                          DPR13==26
000030                          DPR14==30
000032                          DPR15==32
000034                          DPR16==34
000036                          DPR17==36

002204  000000          SAVEC:  .WORD   0               ; TEMP SAVE FOR VECTOR CONTENTS
002206  000000          DROPUN: .WORD   0               ; IOP UNIT DROPPED FLAG (NON-0 = DROPPED)
002210  000000          LUN:    .WORD   0               ; LOGICAL UNIT NUMBER
002212  000000          IOPN:   .WORD   0               ; SBC ID SWITCH FROM P-TABLE
002214  000000          IOPNN:  .WORD   0               ; SBC ID SWITCH RIGHT JUSTIFIED
002216  000000          QBASE:  .WORD   0               ; Q-BUS BASE ADDRESS FROM P-TABLE
002220  000000          QIRVEC: .WORD   0               ; VECTOR FOR QIR TEST
002222  000000          LOOPB1: .WORD   0               ; LOOPBACK CONN. FLAG FOR SLU1
002224  000000          LOOPB2: .WORD   0               ; LOOPBACK CONN. FLAG FOR SLU2 CHANNEL A
002226  000000          LOOPB3: .WORD   0               ; LOOPBACK CONN. FLAG FOR CHANNEL B
002230  000000          LOOPB4: .WORD   0               ; LOOPBACK CONN. FLAG FOR PL'L I/O
002232  000000          SL2DMA: .WORD   0               ; "1" SAYS SLU2 SETUP FOR DMA
002234  000000          ROMTST: .WORD   0               ; FLAG FOR USER ROM TESTS (NON-0 = TEST ROM)
002236  000000          DELCNT: .WORD   0               ; USED IN RDELAY SUBROUTINE.
002240  000000          INTFLG: .WORD   0               ; SOFTWARE FLAG FOR QIR TEST
002242  000000          HIMEM:  .WORD   0               ; BASE OF HIGHEST 4KW PAGE FROM L$HIME

                                ;
                                ;       THE FOLLOWING ARE THE DATA TO INVOKE INDIVIDUAL ROM TESTS.
                                ;       EACH XXDP+ TEST MUST WRITE ONE OF THESE WORDS INTO THE IOP'S TWO
                                ;       PORT REGISTER FILE (TWO-PORT RAM, REGISTER 0).  THE IOP BOOT
                                ;       CODE WILL INTERPRET THE CONTENTS OF DPR0 AND INVOKE THE APPROPRIATE
                                ;       IOP ROM TEST.
                                ;
002244  100001          CSR:    .WORD   100001          ; CSR TEST
```

K2

SEQ 0023

GLOBAL DATA SECTION

```
765 002246  100002          RAM:    .WORD   100002          ; 16KW RAM TEST
766 002250  100004          ROM:    .WORD   100004          ; ROM TEST
767 002252  100010          CPU:    .WORD   100010          ; IOP INSTRUCTION TEST
768 002254  100020          BVNT:   .WORD   100020          ; BEVNT INTERRUPT TEST
769 002256  100040          SLU1:   .WORD   100040          ; SERIAL PORT #1 TEST (CONSOLE)
770 002260  100100          SLU2:   .WORD   100100          ; SERIAL PORT #2 TEST (MODEM)
771 002262  100200          PLLIO:  .WORD   100200          ; PARALLEL I/O TEST
772 002264  100400          DMA:    .WORD   100400          ; DMA CONTROLLER TEST
773 002266  101000          QIR:    .WORD   101000          ; Q-BUS INTERRUPT TEST
774 002270  102000          DPR:    .WORD   102000          ; TWO-PORT RAM TEST
```

GLOBAL DATA SECTION

```
                        ;
                        ;++
                        ; THE FOLLOWING ADDRESSES ARE USED TO PRINT FURTHER ERROR INFORMATION WHICH
                        ; IS PASSED FROM THE KXT11-CA ROM-RESIDENT TESTS TO XXDP+ VIA THE TWO-PORT
                        ; REGISTER 3.  THE FORMAT OF REGISTER 3 IS:
                        ;
                        ;       TTEEEE  WHERE:
                        ;
                        ;       TT =  THE TEST NUMBER WHERE THE FAILURE WAS DETECTED, AND
                        ;       EEEE = DISCRETE ERROR FLAGS IDENTIFYING THE ERROR TYPE.
                        ;
                        ;       FOR EXAMPLE:    010004 = TEST 01, ERROR BIT 2
                        ;                       120111 = TEST 12, ERROR BITS 0, 3, AND 6.
                        ;
                        ;       THIS FORMAT ALLOWS FOR 17(O) TESTS, AND 12(D) ERROR BITS PER TEST.
                        ;
                        ; THE PROGRAM MUST PRINT A MESSAGE INDICATING THE ROM TEST WHICH FAILED
                        ; (AFTER PRINTING ITS OWN MESSAGE) AND THEN A MESSAGE FOR EACH ERROR BIT
                        ; THAT IS SET.  THIS IS DONE BY FIRST STRIPPING THE TEST NUMBER FROM
                        ; BITS 15 THRU 12 AND INDEXING TO A POINTER TO THE PROPER ASCII STRING.
                        ; THE ERROR BITS (0 THRU 11) ARE THEN TESTED. FOR EACH BIT THAT IS SET, A
                        ; MESSAGE WILL BE PRINTED.  THE PROPER MESSAGE IS DERIVED BY INDEXING
                        ; TO AN ASCII STRING POINTER.  ALL THIS INVOLVES 2 TABLES -  ONE WHICH
                        ; LISTS INDIVIDUAL ADDRESSES EACH POINTING TO AN ENTRY IN THE SECOND TABLE.
                        ; THE SECOND CONTAINS A POINTER TO THE "TEST NUMBER" ASCII STRING, FOLLOWED
                        ; BY UP TO 12 POINTERS TO THE "ERROR BIT" ASCII STRINGS.  THEREFORE, THIS
                        ; SECOND TABLE WILL CONTAIN 13 ENTRIES FOR EACH OF THE ROM-RESIDENT SELFTESTS.
                        ;
                        ;--

002272  002320          T1ADR:  RT1             ; POINTER TO TEST 1 STRINGS
002274  002352          T2ADR:  RT2             ; POINTER TO TEST 2 STRINGS
002276  002404          T3ADR:  RT3             ; POINTER TO TEST 3 STRINGS
002300  002436          T4ADR:  RT4             ; POINTER TO TEST 4 STRINGS
002302  002470          T5ADR:  RT5             ; POINTER TO TEST 5 STRINGS
002304  002522          T6ADR:  RT6             ; POINTER TO TEST 6 STRINGS
002306  002554          T7ADR:  RT7             ; POINTER TO TEST 7 STRINGS
002310  002606          T10ADR: RT10            ; POINTER TO TEST 10 STRINGS
002312  002640          T11ADR: RT11            ; POINTER TO TEST 11 STRINGS
002314  002672          T12ADR: RT12            ; POINTER TO TEST 12 STRINGS
002316  002724          T13ADR: RT13            ; POINTER TO TEST 13 STRINGS
```

GLOBAL DATA SECTION

```
                                ;
                                ; ADD THE NEXT FOUR ADDRESSES WHEN AND IF ADDITIONAL TESTS ARE INSERTED INTO
                                ; THE ROM-RESIDENT CODE.
                                ;
                                ;T14ADR:        RT14                    ; POINTER TO TEST 14 STRINGS
                                ;T15ADR:        RT15                    ; POINTER TO TEST 15 STRINGS
                                ;T16ADR:        RT16                    ; POINTER TO TEST 16 STRINGS
                                ;T17ADR:        RT17                    ; POINTER TO TEST 17 STRINGS
                                ;
                                ;++
                                ; HERE IS THE SECOND TABLE WHICH WAS MENTIONED ABOVE.
                                ;--
002320  004721                  RT1:    ROMT1                   ; POINTER TO T1 STRING
002322  005524                          T1E0                    ; ERROR BIT:    0
002324  005570                          T1E1                    ;               1
002326  005634                          T1E2                    ;               2
002330  005700                          T1E3                    ;               3
002332  005746                          T1E4                    ;               4
002334  006016                          T1E5                    ;               5
002336  006064                          T1E6                    ;               6
002340  006132                          T1E7                    ;               7
002342  000000                          .WORD   0               ; ADD UP TO 4 MORE ERROR BIT MESSAGE POINTERS.
002344  000000                          .WORD   0
002346  000000                          .WORD   0
002350  000000                          .WORD   0

002352  004744                  RT2:    ROMT2                   ; POINTER TO T2 ASCII STRING
002354  006200                  T2E0                            ; ERROR BIT:    0
002356  006253                  T2E1                            ;               1
002360  006323                  T2E2                            ;               2
002362  006374                  T2E3                            ;               3
002364  006457                  T2E4                            ;               4
002366  006542                  T2E5                            ;               5
002370  006613                  T2E6                            ;               6
002372  006661                  T2E7                            ;               7
002374  006725                  T2E8                            ;               8
002376  007003                  T2E9                            ;               9
002400  000000                  .WORD   0                       ; ADD UP TO 2 MORE ERROR BIT MESSAGE POINTERS.
002402  000000                  .WORD   0
```

GLOBAL DATA SECTION

```
861
862 002404  004767                RT3:    ROMT3                   ; POINTER TO T3 ASCII STRING
863 002406  007061                        T3E0                    ; ERROR BIT:    0
864 002410  007137                        T3E1                    ;               1
865 002412  007215                        T3E2                    ;               2
866 002414  007313                        T3E3                    ;               3
867 002416  000000                        .WORD   0               ; ADD UP TO 8 MORE ERROR BIT MESSAGE POINTERS.
868 002420  000000                        .WORD   0
869 002422  000000                        .WORD   0
870 002424  000000                        .WORD   0
871 002426  000000                        .WORD   0
872 002430  000000                        .WORD   0
873 002432  000000                        .WORD   0
874 002434  000000                        .WORD   0
875
876 002436  005023                RT4:    ROMT4                   ; POINTER TO T4 ASCII STRING
877 002440  000000                        .WORD   0               ;       ***T4 NOT INSTALLED AS YET***
878 002442  000000                        .WORD   0
879 002444  000000                        .WORD   0
880 002446  000000                        .WORD   0
881 002450  000000                        .WORD   0
882 002452  000000                        .WORD   0
883 002454  000000                        .WORD   0
884 002456  000000                        .WORD   0
885 002460  000000                        .WORD   0
886 002462  000000                        .WORD   0
887 002464  000000                        .WORD   0
888 002466  000000                        .WORD   0
```

GLOBAL DATA SECTION

```
890
891 002470  005062                RT5:    ROMT5           ; POINTER TO T5 ASCII STRING
892 002472  007411                        T5E0            ; ERROR BIT:    0
893 002474  007471                        T5E1            ;               1
894 002476  007544                        T5E2            ;               2
895 002500  007607                        T5E3            ;               3
896 002502  000000                        .WORD   0       ; ADD UP TO 8 MORE ERROR BIT MESSAGE POINTERS
897 002504  000000                        .WORD   0
898 002506  000000                        .WORD   0
899 002510  000000                        .WORD   0
900 002512  000000                        .WORD   0
901 002514  000000                        .WORD   0
902 002516  000000                        .WORD   0
903 002520  000000                        .WORD   0
904
905 002522  005117                RT6:    ROMT6           ; POINTER TO T6 ASCII STRING
906 002524  007647                        T6E0            ; ERROR BIT:    0
907 002526  007745                        T6E1            ;               1
908 002530  010025                        T6E2            ;               2
909 002532  010074                        T6E3            ;               3
910 002534  010154                        T6E4            ;               4
911 002536  010223                        T6E5            ;               5
912 002540  010266                        T6E6            ;               6
913 002542  000000                        .WORD   0       ; ADD UP TO 5 MORE ERROR BIT MESSAGE POINTERS.
914 002544  000000                        .WORD   0
915 002546  000000                        .WORD   0
916 002550  000000                        .WORD   0
917 002552  000000                        .WORD   0
```

GLOBAL DATA SECTION

```
919
920 002554  000006  RT7:    ROMT7           ; POINTER TO T7 ASCII STRING
921 002556  010337          T7E0            ; ERROR BIT:    0
922 002560  010417          T7E1            ;               1
923 002562  010504          T7E2            ;               2
924 002564  010560          T7E3            ;               3
925 002566  010634          T7E4            ;               4
926 002570  010707          T7E5            ;               5
927 002572  010775          T7E6            ;               6
928 002574  011054          T7E7            ;               7
929 002576  011132          T7E8            ;               8
930 002600  011227          T7E9            ;               9
931 002602  011320          T7E10           ;               10
932 002604  011412          T7E11           ;               11
933
934 002606  005267  RT10:   ROMT10          ; POINTER TO T10 ASCII STRING
935 002610  011477          T10E0           ; ERROR BIT:    0
936 002612  011560          T10E1           ;               1
937 002614  011621          T10E2           ;               2
938 002616  011657          T10E3           ;               3
939 002620  011714          T10E4           ;               4
940 002622  011767          T10E5           ;               5
941 002624  012037          T10E6           ;               6
942 002626  012116          T10E7           ;               7
943 002630  000000          .WORD   0       ; ADD UP TO 4 MORE ERROR BIT MESSAGE POINTERS.
944 002632  000000          .WORD   0
945 002634  000000          .WORD   0
946 002636  000000          .WORD   0
```

GLOBAL DATA SECTION

```
948
949 002640  005317                RT11:   ROMT11          ; POINTER TO T11 ASCII STRING
950 002642  012161                        T11E0           ; ERROR BIT:    0
951 002644  012260                        T11E1           ;               1
952 002646  012365                        T11E2           ;               2
953 002650  012437                        T11E3           ;               3
954 002652  012524                        T11E4           ;               4
955 002654  012573                        T11E5           ;               5
956 002656  000000                        .WORD   0       ; ADD UP TO 6 MORE ERROR BIT MESSAGE POINTERS
957 002660  000000                        .WORD   0
958 002662  000000                        .WORD   0
959 002664  000000                        .WORD   0
960 002666  000000                        .WORD   0
961 002670  000000                        .WORD   0
962
963 002672  005462                RT12:   ROMT12          ; POINTER TO T12 ASCII STRING
964 002674  012625                        T12E0           ; ERROR BIT:    0
965 002676  012721                        T12E1           ;               1
966 002700  012771                        T12E2           ;               2
967 002702  013052                        T12E3           ;               3
968 002704  013132                        T12E4           ;               4
969 002706  013205                        T12E5           ;               5
970 002710  013262                        T12E6           ;               6
971 002712  000000                        .WORD   0       ; ADD UP TO 5 MORE ERROR BIT MESSAGE POINTERS.
972 002714  000000                        .WORD   0
973 002716  000000                        .WORD   0
974 002720  000000                        .WORD   0
975 002722  000000                        .WORD   0
```

GLOBAL DATA SECTION

```
 977
 978 002724  005507                RT13:   ROMT13          ; POINTER TO T13 ASCII STRING
 979 002726  013336                        T13E0           ; ERROR BIT:    0
 980 002730  013404                        T13E1           ;               1
 981 002732  013460                        T13E2           ;               2
 982 002734  013545                        T13E3           ;               3
 983 002736  013653                        T13E4           ;               4
 984 002740  013727                        T13E5           ;               5
 985 002742  014005                        T13E6           ;               6
 986 002744  014105                        T13E7           ;               7
 987 002746  014161                        T13E8           ;               8
 988 002750  014227                        T13E9           ;               9
 989 002752  014277                        T13E10          ;               10
 990 002754  014350                        T13E11          ;               11
 991
 992
 993                                ;
 994                                ; IF (UP TO) 4 MORE TESTS ARE ADDED TO THE ROM-RESIDENT CODE, PLACE THE
 995                                ; MESSAGE POINTERS HERE.  USE IDENTICAL FORMAT AS FOR 1 THRU 13, ABOVE.
 996                                ; DON'T FORGET TO MODIFY THE TABLE IMMEDIATELY PRECEEDING THIS ONE, ALSO.
 997                                ;
 998
 999 002756                             ENDMOD
1000
```

GLOBAL TEXT SECTION

```
                                .SBTTL  GLOBAL TEXT SECTION

                                ;++
                                ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                ; MORE THAN ONE TEST.
                                ;--

                                ; ++
                                ;
                                ;       GLOBAL MESSAGES -- ERROR AND OTHERWISE
                                ;
                                ; --

002756  114  123  111  NOIOP:  .ASCIZ  /LSI-11 BUS TIMEOUT - NO IOP PRESENT, OR KXT11 INTERFACE ERROR/
002761  055  061  061
002764  040  102  125
002767  123  040  124
002772  111  115  105
002775  117  125  124
003000  040  055  040
003003  116  117  040
003006  111  117  120
003011  040  120  122
003014  105  123  105
003017  116  124  054
003022  040  117  122
003025  040  113  130
003030  124  061  061
003033  040  111  116
003036  124  105  122
003041  106  101  103
003044  105  040  105
003047  122  122  117
003052  122  000
003054  116  117  040  NORES:  .ASCIZ  /NO RESPONSE FROM ROM SELFTEST/
003057  122  105  123
003062  120  117  116
003065  123  105  040
003070  106  122  117
003073  115  040  122
003076  117  115  040
003101  123  105  114
003104  106  124  105
003107  123  124  000
```

GLOBAL TEXT SECTION

```
1019 003112  105  122  122  ROMD:   .ASCIZ  /ERROR DETECTED BY IOP SELFTEST/
     003115  117  122  040
     003120  104  105  124
     003123  105  103  124
     003126  105  104  040
     003131  102  131  040
     003134  111  117  120
     003137  040  123  105
     003142  114  106  124
     003145  105  123  124
     003150  000
1020 003151  102  117  117  BADSW:  .ASCIZ  "BOOT/SELFTEST SWITCH NOT SETUP PROPERLY"
     003154  124  057  123
     003157  105  114  106
     003162  124  105  123
     003165  124  040  123
     003170  127  111  124
     003173  103  110  040
     003176  116  117  124
     003201  040  123  105
     003204  124  125  120
     003207  040  120  122
     003212  117  120  105
     003215  122  114  131
     003220  000
```

GLOBAL TEXT SECTION

```
1022 003221     124     105     123  CMND:   .ASCIZ  /TEST COMMAND STATUS ERROR FROM IOP/
     003224     124     040     103
     003227     117     115     115
     003232     101     116     104
     003235     040     123     124
     003240     101     124     125
     003243     123     040     105
     003246     122     122     117
     003251     122     040     106
     003254     122     117     115
     003257     040     111     117
     003262     120     000
1023 003264     124     120     122  NOTRDY: .ASCIZ  /TPRO NOT = 000000; IOP IS NOT READY TO ACCEPT COMMANDS/
     003267     060     040     116
     003272     117     124     040
     003275     075     040     060
     003300     060     060     060
     003303     060     060     073
     003306     040     111     117
     003311     120     040     111
     003314     123     040     116
     003317     117     124     040
     003322     122     105     101
     003325     104     131     040
     003330     124     117     040
     003333     101     103     103
     003336     105     120     124
     003341     040     103     117
     003344     115     115     101
     003347     116     104     123
     003352     000
```

GLOBAL TEXT SECTION

```
   1025 003353     120     117     123  NOTPR:  .ASCIZ  /POSSIBLE FATAL IOP ERROR DETECTED/
        003356     123     111     102
        003361     114     105     040
        003364     106     101     124
        003367     101     114     040
        003372     111     117     120
        003375     040     105     122
        003400     122     117     122
        003403     040     104     105
        003406     124     105     103
        003411     124     105     104
        003414     000
   1026 003415     123     102     103  CCPU:   .ASCIZ  /SBC ID SWITCH SETTING/
        003420     040     111     104
        003423     040     123     127
        003426     111     124     103
        003431     110     040     123
        003434     105     124     124
        003437     111     116     107
        003442     000
```

GLOBAL TEXT SECTION

```
1028 003443  111  123  040  BASE:   .ASCIZ  "IS IOP'S LSI-11 BUS ADDRESS IN THE LOW ADDRESS RANGE(Y/N)"
     003446  111  117  120
     003451  047  123  040
     003454  114  123  111
     003457  055  061  061
     003462  040  102  125
     003465  123  040  101
     003470  104  104  122
     003473  105  123  123
     003476  040  111  116
     003501  040  124  110
     003504  105  040  114
     003507  117  127  040
     003512  101  104  104
     003515  122  105  123
     003520  123  040  122
     003523  101  116  107
     003526  105  050  131
     003531  057  116  051
     003534  000
1029 003535  114  117  117  LOOP1:  .ASCIZ  /LOOP-BACK CONNECTOR ON SERIAL PORT #1 (CONSOLE PORT)/
     003540  120  055  102
     003543  101  103  113
     003546  040  103  117
     003551  116  116  105
     003554  103  124  117
     003557  122  040  117
     003562  116  040  123
     003565  105  122  111
     003570  101  114  040
     003573  120  117  122
     003576  124  040  043
     003601  061  040  050
     003604  103  117  116
     003607  123  117  114
     003612  105  040  120
     003615  117  122  124
     003620  051  000
```

GLOBAL TEXT SECTION

```
1031 003622  103  110  101  LOOP2:  .ASCIZ  /CHANNEL A LOOP-BACK CONNECTOR ON SERIAL PORT #2/
     003625  116  116  105
     003630  114  040  101
     003633  040  114  117
     003636  117  120  055
     003641  102  101  103
     003644  113  040  103
     003647  117  116  116
     003652  105  103  124
     003655  117  122  040
     003660  117  116  040
     003663  123  105  122
     003666  111  101  114
     003671  040  120  117
     003674  122  124  040
     003677  043  062  000
1032 003702  103  110  101  LOOP3:  .ASCIZ  /CHANNEL B LOOP-BACK CONNECTOR ON SERIAL PORT #2/
     003705  116  116  105
     003710  114  040  102
     003713  040  114  117
     003716  117  120  055
     003721  102  101  103
     003724  113  040  103
     003727  117  116  116
     003732  105  103  124
     003735  117  122  040
     003740  117  116  040
     003743  123  105  122
     003746  111  101  114
     003751  040  120  117
     003754  122  124  040
     003757  043  062  000
```

GLOBAL TEXT SECTION

```
1034 003762  114  117  117  LOOP4:  .ASCIZ  /LOOP-BACK CONNECTOR ON PARALLEL PORT/
     003765  120  055  102
     003770  101  103  113
     003773  040  103  117
     003776  116  116  105
     004001  103  124  117
     004004  122  040  117
     004007  116  040  120
     004012  101  122  101
     004015  114  114  105
     004020  114  040  120
     004023  117  122  124
     004026  000
1035 004027  111  123  040  SLU2CF: .ASCIZ  "IS SLU2 CHANNEL A SERIAL PORT CONFIGURED FOR DMA OPERATION(Y/N)"
     004032  123  114  125
     004035  062  040  103
     004040  110  101  116
     004043  116  105  114
     004046  040  101  040
     004051  123  105  122
     004054  111  101  114
     004057  040  120  117
     004062  122  124  040
     004065  103  117  116
     004070  106  111  107
     004073  125  122  105
     004076  104  040  106
     004101  117  122  040
     004104  104  115  101
     004107  040  117  120
     004112  105  122  101
     004115  124  111  117
     004120  116  050  131
     004123  057  116  051
     004126  000
```

GLOBAL TEXT SECTION

```
1037 004127  124  105  123  UROM:   .ASCIZ  /TEST USER ROM/
     004132  124  040  125
     004135  123  105  122
     004140  040  122  117
     004143  115  000
1038
1039 004145  103  123  122  CSRT:   .ASCIZ  /CSR/
     004150  000
```

GLOBAL TEXT SECTION

```
   1041 004151      061      066      113  RAMT:   .ASCIZ  /16KW LOCAL RAM/
        004154      127      040      114
        004157      117      103      101
        004162      114      040      122
        004165      101      115      000
   1042 004170      122      117      115  ROMT:   .ASCIZ  /ROM/
        004173      000
```

GLOBAL TEXT SECTION

```
1044 004174   102   105   126  BEVNT:  .ASCIZ  /BEVNT/
     004177   116   124   000
1045 004202   103   117   116  SLU1T:  .ASCIZ  /CONSOLE SERIAL PORT (SLU1)/
     004205   123   117   114
     004210   105   040   123
     004213   105   122   111
     004216   101   114   040
     004221   120   117   122
     004224   124   040   050
     004227   123   114   125
     004232   061   051   000
1046 004235   123   105   122  SLU2A:  .ASCIZ  /SERIAL PORT (SLU2), CHANNEL A/
     004240   111   101   114
     004243   040   120   117
     004246   122   124   040
     004251   050   123   114
     004254   125   062   051
     004257   054   040   103
     004262   110   101   116
     004265   116   105   114
     004270   040   101   000
```

GLOBAL TEXT SECTION

```
1048 004273  123  105  122  SLU2B:  .ASCIZ  /SERIAL PORT (SLU2), CHANNEL B/
     004276  111  101  114
     004301  040  120  117
     004304  122  124  040
     004307  050  123  114
     004312  125  062  051
     004315  054  040  103
     004320  110  101  116
     004323  116  105  114
     004326  040  102  000
1049 004331  120  101  122  PLLP:   .ASCIZ  "PARALLEL I/O PORT"
     004334  101  114  114
     004337  105  114  040
     004342  111  057  117
     004345  040  120  117
     004350  122  124  000
```

GLOBAL TEXT SECTION

```
1051 004353  104  115  101  DMAL:   .ASCIZ  /DMA CONTROLLER (LOCAL IOP ONLY)/
     004356  040  103  117
     004361  116  124  122
     004364  117  114  114
     004367  105  122  040
     004372  050  114  117
     004375  103  101  114
     004400  040  111  117
     004403  120  040  117
     004406  116  114  131
     004411  051  000
1052 004413  104  115  101  DMAT:   .ASCIZ  /DMA CONTROLLER (LSI-11 BUS DMA)/
     004416  040  103  117
     004421  116  124  122
     004424  117  114  114
     004427  105  122  040
     004432  050  114  123
     004435  111  055  061
     004440  061  040  102
     004443  125  123  040
     004446  104  115  101
     004451  051  000
```

GLOBAL TEXT SECTION

```
1054 004453  114  123  111  QIRT:   .ASCIZ  /LSI-11 BUS INTERRUPT/
     004456  055  061  061
     004461  040  102  125
     004464  123  040  111
     004467  116  124  105
     004472  122  122  125
     004475  120  124  000
1055 004500  116  117  040  QIRT1:  .ASCIZ  /NO IOP INTERRUPT FROM FIRST OF 2 ATTEMPTS/
     004503  111  117  120
     004506  040  111  116
     004511  124  105  122
     004514  122  125  120
     004517  124  040  106
     004522  122  117  115
     004525  040  106  111
     004530  122  123  124
     004533  040  117  106
     004536  040  062  040
     004541  101  124  124
     004544  105  115  120
     004547  124  123  000
```

GLOBAL TEXT SECTION

```
1057 004552     116     117     040  QIRT2:  .ASCIZ  /NO IOP INTERRUPT FROM SECOND OF 2 ATTEMPTS./
     004555     111     117     120
     004560     040     111     116
     004563     124     105     122
     004566     122     125     120
     004571     124     040     106
     004574     122     117     115
     004577     040     123     105
     004602     103     117     116
     004605     104     040     117
     004610     106     040     062
     004613     040     101     124
     004616     124     105     115
     004621     120     124     123
     004624     056     000
1058 004626     124     127     117  DPRT:   .ASCIZ  /TWO-PORT RAM/
     004631     055     120     117
     004634     122     124     040
     004637     122     101     115
     004642     000
```

GLOBAL TEXT SECTION

```
1060 004643    103    120    125  CPUT:   .ASCIZ  /CPU INSTRUCTION/
     004646    040    111    116
     004651    123    124    122
     004654    125    103    124
     004657    111    117    116
     004662    000
1061 004663    126    105    122  TST1:   .ASCIZ  /VERIFY THE IOP IS ADDRESSABLE/
     004666    111    106    131
     004671    040    124    110
     004674    105    040    111
     004677    117    120    040
     004702    111    123    040
     004705    101    104    104
     004710    122    105    123
     004713    123    101    102
     004716    114    105    000
```

GLOBAL TEXT SECTION

```
 1063 004721    111     057     117  ROMT1:  .ASCIZ  "I/O REGISTER CHECK"
      004724    040     122     105
      004727    107     111     123
      004732    124     105     122
      004735    040     103     110
      004740    105     103     113
      004743    000
 1064 004744    116     101     124  ROMT2:  .ASCIZ  /NATIVE OR USER RAM/
      004747    111     126     105
      004752    040     117     122
      004755    040     125     123
      004760    105     122     040
      004763    122     101     115
      004766    000
```

GLOBAL TEXT SECTION

```
1066 004767     116     101     124  ROMT3:  .ASCIZ  /NATIVE OR USER ROM CHECKSUM/
     004772     111     126     105
     004775     040     117     122
     005000     040     125     123
     005003     105     122     040
     005006     122     117     115
     005011     040     103     110
     005014     105     103     113
     005017     123     125     115
     005022     000
1067 005023     124     061     061  ROMT4:  .ASCIZ  /T11 CPU INSTRUCTIONS AND TRAPS/
     005026     040     103     120
     005031     125     040     111
     005034     116     123     124
     005037     122     125     103
     005042     124     111     117
     005045     116     123     040
     005050     101     116     104
     005053     040     124     122
     005056     101     120     123
     005061     000
```

GLOBAL TEXT SECTION

```
1069 005062     114     111     116  ROMT5:  .ASCIZ  /LINE CLOCK (BEVNT) INTERRUPT/
     005065     105     040     103
     005070     114     117     103
     005073     113     040     050
     005076     102     105     126
     005101     116     124     051
     005104     040     111     116
     005107     124     105     122
     005112     122     125     120
     005115     124     000
1070 005117     103     117     116  ROMT6:  .ASCIZ  /CONSOLE SERIAL PORT DC319/
     005122     123     117     114
     005125     105     040     123
     005130     105     122     111
     005133     101     114     040
     005136     120     117     122
     005141     124     040     104
     005144     103     063     061
     005147     071     000
```

GLOBAL TEXT SECTION

```
1072 005151  123  105  103  ROMT7A: .ASCIZ  /SECOND SERIAL PORT NEC7201 (CHANNEL A)/
     005154  117  116  104
     005157  040  123  105
     005162  122  111  101
     005165  114  040  120
     005170  117  122  124
     005173  040  116  105
     005176  103  067  062
     005201  060  061  040
     005204  050  103  110
     005207  101  116  116
     005212  105  114  040
     005215  101  051  000
1073 005220  123  105  103  ROMT7B: .ASCIZ  /SECOND SERIAL PORT NEC7201 (CHANNEL B)/
     005223  117  116  104
     005226  040  123  105
     005231  122  111  101
     005234  114  040  120
     005237  117  122  124
     005242  040  116  105
     005245  103  067  062
     005250  060  061  040
     005253  050  103  110
     005256  101  116  116
     005261  105  114  040
     005264  102  051  000
```

GLOBAL TEXT SECTION

```
1075 005267  120  101  122  ROMT10: .ASCIZ  "PARALLEL I/O PORT Z8036"
     005272  101  114  114
     005275  105  114  040
     005300  111  057  117
     005303  040  120  117
     005306  122  124  040
     005311  132  070  060
     005314  063  066  000
1076 005317  104  115  101  ROMT11: .ASCIZ  /DMA CONTROLLER AMZ8016/
     005322  040  103  117
     005325  116  124  122
     005330  117  114  114
     005333  105  122  040
     005336  101  115  132
     005341  070  060  061
     005344  066  000
```

GLOBAL TEXT SECTION

```
1078 005346  104  115  101  ROM11A: .ASCIZ  /DMA CONTROLLER AMZ8016 (LOCAL IOP ONLY)/
     005351  040  103  117
     005354  116  124  122
     005357  117  114  114
     005362  105  122  040
     005365  101  115  132
     005370  070  060  061
     005373  066  040  050
     005376  114  117  103
     005401  101  114  040
     005404  111  117  120
     005407  040  117  116
     005412  114  131  051
     005415  000
1079 005416  104  115  101  ROM11B: .ASCIZ  /DMA CONTROLLER AMZ8016 (LSI-11 BUS)/
     005421  040  103  117
     005424  116  124  122
     005427  117  114  114
     005432  105  122  040
     005435  101  115  132
     005440  070  060  061
     005443  066  040  050
     005446  114  123  111
     005451  055  061  061
     005454  040  102  125
     005457  123  051  000
```

GLOBAL TEXT SECTION

```
1081 005462     114     123     111  ROMT12: .ASCIZ  /LSI-11 BUS INTERRUPT/
     005465     055     061     061
     005470     040     102     125
     005473     123     040     111
     005476     116     124     105
     005501     122     122     125
     005504     120     124     000
1082 005507     124     127     117  ROMT13: .ASCIZ  /TWO-PORT RAM/
     005512     055     120     117
     005515     122     124     040
     005520     122     101     115
     005523     000
```

GLOBAL TEXT SECTION

```
1084 005524  105  122  122  T1E0:   .ASCIZ  /ERROR #0 - BUS ERROR AT CSR ADDRESS/
     005527  117  122  040
     005532  043  060  040
     005535  055  040  102
     005540  125  123  040
     005543  105  122  122
     005546  117  122  040
     005551  101  124  040
     005554  103  123  122
     005557  040  101  104
     005562  104  122  105
     005565  123  123  000
1085 005570  105  122  122  T1E1:   .ASCIZ  /ERROR #1   BUS ERROR AT QIR ADDRESS/
     005573  117  122  040
     005576  043  061  040
     005601  055  040  102
     005604  125  123  040
     005607  105  122  122
     005612  117  122  040
     005615  101  124  040
     005620  121  111  122
     005623  040  101  104
     005626  104  122  105
     005631  123  123  000
```

GLOBAL TEXT SECTION

```
1087 005634  105  122  122  T1E2:   .ASCIZ  /ERROR #2 - BUS ERROR AT TPR ADDRESS/
     005637  117  122  040
     005642  043  062  040
     005645  055  040  102
     005650  125  123  040
     005653  105  122  122
     005656  117  122  040
     005661  101  124  040
     005664  124  120  122
     005667  040  101  104
     005672  104  122  105
     005675  123  123  000
1088 005700  105  122  122  T1E3:   .ASCIZ  /ERROR #3 - BUS ERROR AT DC319 ADDRESS/
     005703  117  122  040
     005706  043  063  040
     005711  055  040  102
     005714  125  123  040
     005717  105  122  122
     005722  117  122  040
     005725  101  124  040
     005730  104  103  063
     005733  061  071  040
     005736  101  104  104
     005741  122  105  123
     005744  123  000
```

GLOBAL TEXT SECTION

```
1090 005746  105  122  122  T1E4:   .ASCIZ  /ERROR #4 - BUS ERROR AT NEC7201 ADDRESS/
     005751  117  122  040
     005754  043  064  040
     005757  055  040  102
     005762  125  123  040
     005765  105  122  122
     005770  117  122  040
     005773  101  124  040
     005776  116  105  103
     006001  067  062  060
     006004  061  040  101
     006007  104  104  122
     006012  105  123  123
     006015  000
1091 006016  105  122  122  T1E5:   .ASCIZ  /ERROR #5 - BUS ERROR AT I8254 ADDRESS/
     006021  117  122  040
     006024  043  065  040
     006027  055  040  102
     006032  125  123  040
     006035  105  122  122
     006040  117  122  040
     006043  101  124  040
     006046  111  070  062
     006051  065  064  040
     006054  101  104  104
     006057  122  105  123
     006062  123  000
```

GLOBAL TEXT SECTION

```
1093 006064  105  122  122  T1E6:   .ASCIZ  /ERROR #6 - BUS ERROR AT Z8036 ADDRESS/
     006067  117  122  040
     006072  043  066  040
     006075  055  040  102
     006100  125  123  040
     006103  105  122  122
     006106  117  122  040
     006111  101  124  040
     006114  132  070  060
     006117  063  066  040
     006122  101  104  104
     006125  122  105  123
     006130  123  000
1094 006132  105  122  122  T1E7:   .ASCIZ  /ERROR #7 - BUS ERROR AT Z8016 ADDRESS/
     006135  117  122  040
     006140  043  067  040
     006143  055  040  102
     006146  125  123  040
     006151  105  122  122
     006154  117  122  040
     006157  101  124  040
     006162  132  070  060
     006165  061  066  040
     006170  101  104  104
     006173  122  105  123
     006176  123  000
```

GLOBAL TEXT SECTION

```
1096 006200  105  122  122  T2E0:   .ASCIZ  /ERROR #0 - BUS ERROR AT NATIVE RAM ADDRESS/
     006203  117  122  040
     006206  043  060  040
     006211  055  040  102
     006214  125  123  040
     006217  105  122  122
     006222  117  122  040
     006225  101  124  040
     006230  116  101  124
     006233  111  126  105
     006236  040  122  101
     006241  115  040  101
     006244  104  104  122
     006247  105  123  123
     006252  000
1097 006253  105  122  122  T2E1:   .ASCIZ  /ERROR #1 - WRITE-READ ERROR, NATIVE RAM/
     006256  117  122  040
     006261  043  061  040
     006264  055  040  127
     006267  122  111  124
     006272  105  055  122
     006275  105  101  104
     006300  040  105  122
     006303  122  117  122
     006306  054  040  116
     006311  101  124  111
     006314  126  105  040
     006317  122  101  115
     006322  000
```

GLOBAL TEXT SECTION

```
1099 006323     105     122     122  T2E2:   .ASCIZ  /ERROR #2 - READ-MODIFY-WRITE, NATIVE RAM/
     006326     117     122     040
     006331     043     062     040
     006334     055     040     122
     006337     105     101     104
     006342     055     115     117
     006345     104     111     106
     006350     131     055     127
     006353     122     111     124
     006356     105     054     040
     006361     116     101     124
     006364     111     126     105
     006367     040     122     101
     006372     115     000
1100 006374     105     122     122  T2E3:   .ASCIZ  /ERROR #3 - READ-MODIFY-WRITE (LO BYTE), NATIVE RAM/
     006377     117     122     040
     006402     043     063     040
     006405     055     040     122
     006410     105     101     104
     006413     055     115     117
     006416     104     111     106
     006421     131     055     127
     006424     122     111     124
     006427     105     040     050
     006432     114     117     040
     006435     102     131     124
     006440     105     051     054
     006443     040     116     101
     006446     124     111     126
     006451     105     040     122
     006454     101     115     000
```

GLOBAL TEXT SECTION

```
   1102 006457     105     122     122  T2E4:   .ASCIZ  /ERROR #4 - READ-MODIFY-WRITE (HI BYTE), NATIVE RAM/
        006462     117     122     040
        006465     043     064     040
        006470     055     040     122
        006473     105     101     104
        006476     055     115     117
        006501     104     111     106
        006504     131     055     127
        006507     122     111     124
        006512     105     040     050
        006515     110     111     040
        006520     102     131     124
        006523     105     051     054
        006526     040     116     101
        006531     124     111     126
        006534     105     040     122
        006537     101     115     000
   1103 006542     105     122     122  T2E5:   .ASCIZ  /ERROR #5 - BUS ERROR AT USER RAM ADDRESS/
        006545     117     122     040
        006550     043     065     040
        006553     055     040     102
        006556     125     123     040
        006561     105     122     122
        006564     117     122     040
        006567     101     124     040
        006572     125     123     105
        006575     122     040     122
        006600     101     115     040
        006603     101     104     104
        006606     122     105     123
        006611     123     000
```

GLOBAL TEXT SECTION

```
1105 006613     105     122     122  T2E6:   .ASCIZ  /ERROR #6 - WRITE-READ ERROR, USER RAM/
     006616     117     122     040
     006621     043     066     040
     006624     055     040     127
     006627     122     111     124
     006632     105     055     122
     006635     105     101     104
     006640     040     105     122
     006643     122     117     122
     006646     054     040     125
     006651     123     105     122
     006654     040     122     101
     006657     115     000
1106 006661     105     122     122  T2E7:   .ASCIZ  /ERROR #7 - READ-MOD-WRITE, USER RAM/
     006664     117     122     040
     006667     043     067     040
     006672     055     040     122
     006675     105     101     104
     006700     055     115     117
     006703     104     055     127
     006706     122     111     124
     006711     105     054     040
     006714     125     123     105
     006717     122     040     122
     006722     101     115     000
```

GLOBAL TEXT SECTION

```
1108 006725  105  122  122  T2E8:   .ASCIZ  /ERROR #8 - READ-MOD-WRITE (LO BYTE), USER RAM/
     00673C  117  122  040
     006733  043  070  040
     006736  055  040  122
     006741  105  101  104
     006744  055  115  117
     006747  104  055  127
     006752  122  111  124
     006755  105  040  050
     006760  114  117  040
     006763  102  131  124
     006766  105  051  054
     006771  040  125  123
     006774  105  122  040
     006777  122  101  115
     007002  000
1109 007003  105  122  122  T2E9:   .ASCIZ  /ERROR #9 - READ-MOD-WRITE (HI BYTE), USER RAM/
     007006  117  122  040
     007011  043  071  040
     007014  055  040  122
     007017  105  101  104
     007022  055  115  117
     007025  104  055  127
     007030  122  111  124
     007033  105  040  050
     007036  110  111  040
     007041  102  131  124
     007044  105  051  054
     007047  040  125  123
     007052  105  122  040
     007055  122  101  115
     007060  000
```

GLOBAL TEXT SECTION

```
1111 007061  105  122  122  T3E0:   .ASCIZ  /ERROR #0 - LO BYTE CHECKSUM ERROR, NATIVE ROM/
     007064  117  122  040
     007067  043  060  040
     007072  055  040  114
     007075  117  040  102
     007100  131  124  105
     007103  040  103  110
     007106  105  103  113
     007111  123  125  115
     007114  040  105  122
     007117  122  117  122
     007122  054  040  116
     007125  101  124  111
     007130  126  105  040
     007133  122  117  115
     007136  000
1112 007137  105  122  122  T3E1:   .ASCIZ  /ERROR #1 - HI BYTE CHECKSUM ERROR, NATIVE ROM/
     007142  117  122  040
     007145  043  061  040
     007150  055  040  110
     007153  111  040  102
     007156  131  124  105
     007161  040  103  110
     007164  105  103  113
     007167  123  125  115
     007172  040  105  122
     007175  122  117  122
     007200  054  040  116
     007203  101  124  111
     007206  126  105  040
     007211  122  117  115
     007214  000
```

GLOBAL TEXT SECTION

```
1114 007215  105  122  122  T3E2:   .ASCIZ  /ERROR #2 - USER ROM LO BYTE CHECKSUM ERROR OR ROM NOT PRESENT/
     007220  117  122  040
     007223  043  062  040
     007226  055  040  125
     007231  123  105  122
     007234  040  122  117
     007237  115  040  114
     007242  117  040  102
     007245  131  124  105
     007250  040  103  110
     007253  105  103  113
     007256  123  125  115
     007261  040  105  122
     007264  122  117  122
     007267  040  117  122
     007272  040  122  117
     007275  115  040  116
     007300  117  124  040
     007303  120  122  105
     007306  123  105  116
     007311  124  000
1115 007313  105  122  122  T3E3:   .ASCIZ  /ERROR #3 - USER ROM HI BYTE CHECKSUM ERROR OR ROM NOT PRESENT/
     007316  117  122  040
     007321  043  063  040
     007324  055  040  125
     007327  123  105  122
     007332  040  122  117
     007335  115  040  110
     007340  111  040  102
     007343  131  124  105
     007346  040  103  110
     007351  105  103  113
     007354  123  125  115
     007357  040  105  122
     007362  122  117  122
     007365  040  117  122
     007370  040  122  117
     007373  115  040  116
     007376  117  124  040
     007401  120  122  105
     007404  123  105  116
     007407  124  000
```

GLOBAL TEXT SECTION

```
1117 007411  052  052  040  T5E0:   .ASCIZ  /** ROM IN VECTOR SPACE - SELFTEST #5 SKIPPED **/
     007414  122  117  115
     007417  040  111  116
     007422  040  126  105
     007425  103  124  117
     007430  122  040  123
     007433  120  101  103
     007436  105  040  055
     007441  040  123  105
     007444  114  106  124
     007447  105  123  124
     007452  040  043  065
     007455  040  123  113
     007460  111  120  120
     007463  105  104  040
     007466  052  052  000
1118 007471  105  122  122  T5E1:   .ASCIZ  /ERROR #1 - CLOCK INTERRUPT LEVEL INCORRECT/
     007474  117  122  040
     007477  043  061  040
     007502  055  040  103
     007505  114  117  103
     007510  113  040  111
     007513  116  124  105
     007516  122  122  125
     007521  120  124  040
     007524  114  105  126
     007527  105  114  040
     007532  111  116  103
     007535  117  122  122
     007540  105  103  124
     007543  000
```

GLOBAL TEXT SECTION

```
1120 007544  105  122  122  T5E2:   .ASCIZ  /ERROR #2 - CLOCK DOESN'T INTERRUPT/
     007547  117  122  040
     007552  043  062  040
     007555  055  040  103
     007560  114  117  103
     007563  113  040  104
     007566  117  105  123
     007571  116  047  124
     007574  040  111  116
     007577  124  105  122
     007602  122  125  120
     007605  124  000
1121 007607  105  122  122  T5E3:   .ASCIZ  /ERROR #3 - CAN'T SHUT CLOCK OFF/
     007612  117  122  040
     007615  043  063  040
     007620  055  040  103
     007623  101  116  047
     007626  124  040  123
     007631  110  125  124
     007634  040  103  114
     007637  117  103  113
     007642  040  117  106
     007645  106  000
```

GLOBAL TEXT SECTION

```
1123 007647  052  052  040  T6E0:   .ASCIZ  /** SELFTEST #6 INTERRUPTS NOT TESTED - ROM IN VECTOR SPACE **/
     007652  123  105  114
     007655  106  124  105
     007660  123  124  040
     007663  043  066  040
     007666  111  116  124
     007671  105  122  122
     007674  125  120  124
     007677  123  040  116
     007702  117  124  040
     007705  124  105  123
     007710  124  105  104
     007713  040  055  040
     007716  122  117  115
     007721  040  111  116
     007724  040  126  105
     007727  103  124  117
     007732  122  040  123
     007735  120  101  103
     007740  105  040  052
     007743  052  000
1124 007745  105  122  122  T6E1:   .ASCIZ  /ERROR #1 - XMTR INTERRUPT NOT MASKED AT LEVEL 4/
     007750  117  122  040
     007753  043  061  040
     007756  055  040  130
     007761  115  124  122
     007764  040  111  116
     007767  124  105  122
     007772  122  125  120
     007775  124  040  116
     010000  117  124  040
     010003  115  101  123
     010006  113  105  104
     010011  040  101  124
     010014  040  114  105
     010017  126  105  114
     010022  040  064  000
```

GLOBAL TEXT SECTION

```
1126 010025  105  122  122  T6E2:   .ASCIZ  /ERROR #2 - XMTR INTERRUPT NOT RECEIVED/
     010030  117  122  040
     010033  043  062  040
     010036  055  040  130
     010041  115  124  122
     010044  040  111  116
     010047  124  105  122
     010052  122  125  120
     010055  124  040  116
     010060  117  124  040
     010063  122  105  103
     010066  105  111  126
     010071  105  104  000
1127 010074  105  122  122  T6E3:   .ASCIZ  /ERROR #3 - RCVR INTERRUPT NOT MASKED AT LEVEL 4/
     010077  117  122  040
     010102  043  063  040
     010105  055  040  122
     010110  103  126  122
     010113  040  111  116
     010116  124  105  122
     010121  122  125  120
     010124  124  040  116
     010127  117  124  040
     010132  115  101  123
     010135  113  105  104
     010140  040  101  124
     010143  040  114  105
     010146  126  105  114
     010151  040  064  000
```

GLOBAL TEXT SECTION

```
1129 010154  105  122  122  T6E4:   .ASCIZ  /ERROR #4 - RCVR INTERRUPT NOT RECEIVED/
     010157  117  122  040
     010162  043  064  040
     010165  055  040  122
     010170  103  126  122
     010173  040  111  116
     010176  124  105  122
     010201  122  125  120
     010204  124  040  116
     010207  117  124  040
     010212  122  105  103
     010215  105  111  126
     010220  105  104  000
1130 010223  105  122  122  T6E5:   .ASCIZ  /ERROR #5 - RECEIVED DATA INCORRECT/
     010226  117  122  040
     010231  043  065  040
     010234  055  040  122
     010237  105  103  105
     010242  111  126  105
     010245  104  040  104
     010250  101  124  101
     010253  040  111  116
     010256  103  117  122
     010261  122  105  103
     010264  124  000
```

GLOBAL TEXT SECTION

```
1132 010266  105  122  122  T6E6:   .ASCIZ  /ERROR #6 - NO RCVR DONE -- LOOPBACK OPEN/
     010271  117  122  040
     010274  043  066  040
     010277  055  040  116
     010302  117  040  122
     010305  103  126  122
     010310  040  104  117
     010313  116  105  040
     010316  055  055  040
     010321  114  117  117
     010324  120  102  101
     010327  103  113  040
     010332  117  120  105
     010335  116  000
1133 010337  052  052  040  T7E0:   .ASCIZ  /** ROM IN VECTOR SPACE - SELFTEST #7 SKIPPED **/
     010342  122  117  115
     010345  040  111  116
     010350  040  126  105
     010353  103  124  117
     010356  122  040  123
     010361  120  101  103
     010364  105  040  055
     010367  040  123  105
     010372  114  106  124
     010375  105  123  124
     010400  040  043  067
     010403  040  123  113
     010406  111  120  120
     010411  105  104  040
     010414  052  052  000
```

GLOBAL TEXT SECTION

```
1135 010417  105  122  122  T7E1:   .ASCIZ  /ERROR #1 - I8254 TIMER #2 (800 HZ) DOESN'T INTERRUPT/
     010422  117  122  040
     010425  043  061  040
     010430  055  040  111
     010433  070  062  065
     010436  064  040  124
     010441  111  115  105
     010444  122  040  043
     010447  062  040  050
     010452  070  060  060
     010455  040  110  132
     010460  051  040  104
     010463  117  105  123
     010466  116  047  124
     010471  040  111  116
     010474  124  105  122
     010477  122  125  120
     010502  124  000
1136 010504  105  122  122  T7E2:   .ASCIZ  /ERROR #2 - ASYNC MODE, DATA XFER INCOMPLETE/
     010507  117  122  040
     010512  043  062  040
     010515  055  040  101
     010520  123  131  116
     010523  103  040  115
     010526  117  104  105
     010531  054  040  104
     010534  101  124  101
     010537  040  130  106
     010542  105  122  040
     010545  111  116  103
     010550  117  115  120
     010553  114  105  124
     010556  105  000
```

GLOBAL TEXT SECTION

```
1138 010560     105     122     122  T7E3:   .ASCIZ  /ERROR #3 - SYNC MODE, EOF-SDLC NOT RECEIVED/
     010563     117     122     040
     010566     043     063     040
     010571     055     040     123
     010574     131     116     103
     010577     040     115     117
     010602     104     105     054
     010605     040     105     117
     010610     106     055     123
     010613     104     114     103
     010616     040     116     117
     010621     124     040     122
     010624     105     103     105
     010627     111     126     105
     010632     104     000
1139 010634     105     122     122  T7E4:   .ASCIZ  /ERROR #4 - SYNC MODE, DATA XFER INCOMPLETE/
     010637     117     122     040
     010642     043     064     040
     010645     055     040     123
     010650     131     116     103
     010653     040     115     117
     010656     104     105     054
     010661     040     104     101
     010664     124     101     040
     010667     130     106     105
     010672     122     040     111
     010675     116     103     117
     010700     115     120     114
     010703     105     124     105
     010706     000
```

GLOBAL TEXT SECTION

```
1141 010707     105     122     122  T7E5:   .ASCIZ  "ERROR #5 - SYNC/ASYNC MODES - RECEIVED DATA INCORRECT"
     010712     117     122     040
     010715     043     065     040
     010720     055     040     123
     010723     131     116     103
     010726     057     101     123
     010731     131     116     103
     010734     040     115     117
     010737     104     105     123
     010742     040     055     040
     010745     122     105     103
     010750     105     111     126
     010753     105     104     040
     010756     104     101     124
     010761     101     040     111
     010764     116     103     117
     010767     122     122     105
     010772     103     124     000
1142 010775     105     122     122  T7E6:   .ASCIZ  /ERROR #6 - DMA MODE - DATA TRANSFER INCOMPLETE/
     011000     117     122     040
     011003     043     066     040
     011006     055     040     104
     011011     115     101     040
     011014     115     117     104
     011017     105     040     055
     011022     040     104     101
     011025     124     101     040
     011030     124     122     101
     011033     116     123     106
     011036     105     122     040
     011041     111     116     103
     011044     117     115     120
     011047     114     105     124
     011052     105     000
```

GLOBAL TEXT SECTION

```
1144 011054     105     122     122  T7E7:   .ASCIZ  /ERROR #7 - DMA MODE - RECEIVED DATA INCORRECT/
     011057     117     122     040
     011062     043     067     040
     011065     055     040     104
     011070     115     101     040
     011073     115     117     104
     011076     105     040     055
     011101     040     122     105
     011104     103     105     111
     011107     126     105     104
     011112     040     104     101
     011115     124     101     040
     011120     111     116     103
     011123     117     122     122
     011126     105     103     124
     011131     000
1145 011132     105     122     122  T7E8:   .ASCIZ  /ERROR #8 - STATUS WRONG OR NO INTERRUPT WITH REQ-TO-SEND SET/
     011135     117     122     040
     011140     043     070     040
     011143     055     040     123
     011146     124     101     124
     011151     125     123     040
     011154     127     122     117
     011157     116     107     040
     011162     117     122     040
     011165     116     117     040
     011170     111     116     124
     011173     105     122     122
     011176     125     120     124
     011201     040     127     111
     011204     124     110     040
     011207     122     105     121
     011212     055     124     117
     011215     055     123     105
     011220     116     104     040
     011223     123     105     124
     011226     000
```

GLOBAL TEXT SECTION

```
1147 011227  105  122  122  T7E9:   .ASCIZ  "ERROR #9 - STATUS WRONG OR NO INTERRUPT WITH TT108/2 SET"
     011232  117  122  040
     011235  043  071  040
     011240  055  040  123
     011243  124  101  124
     011246  125  123  040
     011251  127  122  117
     011254  116  107  040
     011257  117  122  040
     011262  116  117  040
     011265  111  116  124
     011270  105  122  122
     011273  125  120  124
     011276  040  127  111
     011301  124  110  040
     011304  124  124  061
     011307  060  070  057
     011312  062  040  123
     011315  105  124  000
1148 011320  105  122  122  T7E10:  .ASCIZ  /ERROR #10 - STATUS WRONG OR NO INT. WITH TERM-IN-SERV SET/
     011323  117  122  040
     011326  043  061  060
     011331  040  055  040
     011334  123  124  101
     011337  124  125  123
     011342  040  127  122
     011345  117  116  107
     011350  040  117  122
     011353  040  116  117
     011356  040  111  116
     011361  124  056  040
     011364  127  111  124
     011367  110  040  124
     011372  105  122  115
     011375  055  111  116
     011400  055  123  105
     011403  122  126  040
     011406  123  105  124
     011411  000
```

K6

GLOBAL TEXT SECTION

```
1150 011412  105  122  122  T7E11:  .ASCIZ  /ERROR #11 - STATUS WRONG WITH ALL OPTIONS DESELECTED/
     011415  117  122  040
     011420  043  061  061
     011423  040  055  040
     011426  123  124  101
     011431  124  125  123
     011434  040  127  122
     011437  117  116  107
     011442  040  127  111
     011445  124  110  040
     011450  101  114  114
     011453  040  117  120
     011456  124  111  117
     011461  116  123  040
     011464  104  105  123
     011467  105  114  105
     011472  103  124  105
     011475  104  000
1151 011477  052  052  040  T10E0:  .ASCIZ  /** ROM IN VECTOR SPACE - SELFTEST #10 SKIPPED **/
     011502  122  117  115
     011505  040  111  116
     011510  040  126  105
     011513  103  124  117
     011516  122  040  123
     011521  120  101  103
     011524  105  040  055
     011527  040  123  105
     011532  114  106  124
     011535  105  123  124
     011540  040  043  061
     011543  060  040  123
     011546  113  111  120
     011551  120  105  104
     011554  040  052  052
     011557  000
```

GLOBAL TEXT SECTION

```
1153 011560     105     122     122  T10E1:  .ASCIZ  /ERROR #1 - RESET STATE INCORRECT/
     011563     117     122     040
     011566     043     061     040
     011571     055     040     122
     011574     105     123     105
     011577     124     040     123
     011602     124     101     124
     011605     105     040     111
     011610     116     103     117
     011613     122     122     105
     011616     103     124     000
1154 011621     105     122     122  T10E2:  .ASCIZ  /ERROR #2 - TIMER DIDN'T START/
     011624     117     122     040
     011627     043     062     040
     011632     055     040     124
     011635     111     115     105
     011640     122     040     104
     011643     111     104     116
     011646     047     124     040
     011651     123     124     101
     011654     122     124     000
```

GLOBAL TEXT SECTION

```
1156 011657     105     122     122  T10E3:  .ASCIZ  /ERROR #3 - TIMER NEVER STOPS/
     011662     117     122     040
     011665     043     063     040
     011670     055     040     124
     011673     111     115     105
     011676     122     040     116
     011701     105     126     105
     011704     122     040     123
     011707     124     117     120
     011712     123     000
1157 011714     105     122     122  T10E4:  .ASCIZ  /ERROR #4 - INTERRUPT NOT MASKED AT LEVEL 4/
     011717     117     122     040
     011722     043     064     040
     011725     055     040     111
     011730     116     124     105
     011733     122     122     125
     011736     120     124     040
     011741     116     117     124
     011744     040     115     101
     011747     123     113     105
     011752     104     040     101
     011755     124     040     114
     011760     105     126     105
     011763     114     040     064
     011766     000
```

GLOBAL TEXT SECTION

```
1159 011767     105     122     122  T10E5:  .ASCIZ  /ERROR #5 - TIMER INTERRUPT NOT RECEIVED/
     011772     117     122     040
     011775     043     065     040
     012000     055     040     124
     012003     111     115     105
     012006     122     040     111
     012011     116     124     105
     012014     122     122     125
     012017     120     124     040
     012022     116     117     124
     012025     040     122     105
     012030     103     105     111
     012033     126     105     104
     012036     000
1160 012037     105     122     122  T10E6:  .ASCIZ  /ERROR #6 - LOOP TIME-OUT, DATA XFER INCOMPLETE/
     012042     117     122     040
     012045     043     066     040
     012050     055     040     114
     012053     117     117     120
     012056     040     124     111
     012061     115     105     055
     012064     117     125     124
     012067     054     040     104
     012072     101     124     101
     012075     040     130     106
     012100     105     122     040
     012103     111     116     103
     012106     117     115     120
     012111     114     105     124
     012114     105     000
```

GLOBAL TEXT SECTION

```
1162 012116  105  122  122  T10E7:  .ASCIZ  /ERROR #7 - RECEIVED DATA INCORRECT/
     012121  117  122  040
     012124  043  067  040
     012127  055  040  122
     012132  105  103  105
     012135  111  126  105
     012140  104  040  104
     012143  101  124  101
     012146  040  111  116
     012151  103  117  122
     012154  122  105  103
     012157  124  000
1163 012161  052  052  040  T11E0:  .ASCIZ  /** SELFTEST #11 INTERRUPTS NOT TESTED - ROM IN VECTOR SPACE **/
     012164  123  105  114
     012167  106  124  105
     012172  123  124  040
     012175  043  061  061
     012200  040  111  116
     012203  124  105  122
     012206  122  125  120
     012211  124  123  040
     012214  116  117  124
     012217  040  124  105
     012222  123  124  105
     012225  104  040  055
     012230  040  122  117
     012233  115  040  111
     012236  116  040  126
     012241  105  103  124
     012244  117  122  040
     012247  123  120  101
     012252  103  105  040
     012255  052  052  000
```

GLOBAL TEXT SECTION

```
1165 012260  052  052  040  T11E1:  .ASCIZ  /** SELFTEST #11 LSI-11 BUS ACCESS NOT TESTED   NO ADDRESS DEFINED **/
     012263  123  105  114
     012266  106  124  105
     012271  123  124  040
     012274  043  061  061
     012277  040  114  123
     012302  111  055  061
     012305  061  040  102
     012310  125  123  040
     012313  101  103  103
     012316  105  123  123
     012321  040  116  117
     012324  124  040  124
     012327  105  123  124
     012332  105  104  040
     012335  055  040  116
     012340  117  040  101
     012343  104  104  122
     012346  105  123  123
     012351  040  104  105
     012354  106  111  116
     012357  105  104  040
     012362  052  052  000
1166 012365  105  122  122  T11E2:  .ASCIZ  /ERROR #2 - CHANNEL INTERRUPT NOT RECEIVED/
     012370  117  122  040
     012373  043  062  040
     012376  055  040  103
     012401  110  101  116
     012404  116  105  114
     012407  040  111  116
     012412  124  105  122
     012415  122  125  120
     012420  124  040  116
     012423  117  124  040
     012426  122  105  103
     012431  105  111  126
     012434  105  104  000
```

GLOBAL TEXT SECTION

```
1168 012437  105  122  122  T11E3:  .ASCIZ  /ERROR #3 - DMA CHANNEL HUNG (TC,EOP BITS BOTH CLEAR)/
     012442  117  122  040
     012445  043  063  040
     012450  055  040  104
     012453  115  101  040
     012456  103  110  101
     012461  116  116  105
     012464  114  040  110
     012467  125  116  107
     012472  040  050  124
     012475  103  054  105
     012500  117  120  040
     012503  102  111  124
     012506  123  040  102
     012511  117  124  110
     012514  040  103  114
     012517  105  101  122
     012522  051  000
1169 012524  105  122  122  T11E4:  .ASCIZ  /ERROR #4 - DMA ABORTED (EOP + 1 + NXM)/
     012527  117  122  040
     012532  043  064  040
     012535  055  040  104
     012540  115  101  040
     012543  101  102  117
     012546  122  124  105
     012551  104  040  050
     012554  105  117  120
     012557  040  075  040
     012562  061  040  075
     012565  040  116  130
     012570  115  051  000
```

GLOBAL TEXT SECTION

```
1171 012573  105  122  122  T11E5:  .ASCIZ  /ERROR #5 - DMA DATA ERROR/
     012576  117  122  040
     012601  043  065  040
     012604  055  040  104
     012607  115  101  040
     012612  104  101  124
     012615  101  040  105
     012620  122  122  117
     012623  122  000
1172 012625  052  052  040  T12E0:  .ASCIZ  /** LSI-11 BUS ADDRESS NOT DEFINED - SELFTEST #12 SKIPPED **/
     012630  114  123  111
     012633  055  061  061
     012636  040  102  125
     012641  123  040  101
     012644  104  104  122
     012647  105  123  123
     012652  040  116  117
     012655  124  040  104
     012660  105  106  111
     012663  116  105  104
     012666  040  055  040
     012671  123  105  114
     012674  106  124  105
     012677  123  124  040
     012702  043  061  062
     012705  040  123  113
     012710  111  120  120
     012713  105  104  040
     012716  052  052  000
```

GLOBAL TEXT SECTION

```
1174 012721  105  122  122  T12E1:  .ASCIZ  /ERROR #1 - BREQ (CSR<14>) NEVER GOT SET/
     012724  117  122  040
     012727  043  061  040
     012732  055  040  102
     012735  122  105  121
     012740  040  050  103
     012743  123  122  074
     012746  061  064  076
     012751  051  040  116
     012754  105  126  105
     012757  122  040  107
     012762  117  124  040
     012765  123  105  124
     012770  000
1175 012771  052  052  040  T12E2:  .ASCIZ  /** SELFTEST #12 SKIPPED - ROM IN VECTOR SPACE **/
     012774  123  105  114
     012777  106  124  105
     013002  123  124  040
     013005  043  061  062
     013010  040  123  113
     013013  111  120  120
     013016  105  104  040
     013021  055  040  122
     013024  117  115  040
     013027  111  116  040
     013032  126  105  103
     013035  124  117  122
     013040  040  123  120
     013043  101  103  105
     013046  040  052  052
     013051  000
```

GLOBAL TEXT SECTION

```
1177 013052  105  122  122  T12E3:  .ASCIZ  /ERROR #3 - INTERRUPT-ON-BIACK NOT MASKED AT PR5/
     013055  117  122  040
     013060  043  063  040
     013063  055  040  111
     013066  116  124  105
     013071  122  122  125
     013074  120  124  055
     013077  117  116  055
     013102  102  111  101
     013105  103  113  040
     013110  116  117  124
     013113  040  115  101
     013116  123  113  105
     013121  104  040  101
     013124  124  040  120
     013127  122  065  000
1178 013132  105  122  122  T12E4:  .ASCIZ  /ERROR #4 - INTERRUPT-ON-BIACK NOT RECEIVED/
     013135  117  122  040
     013140  043  064  040
     013143  055  040  111
     013146  116  124  105
     013151  122  122  125
     013154  120  124  055
     013157  117  116  055
     013162  102  111  101
     013165  103  113  040
     013170  116  117  124
     013173  040  122  105
     013176  103  105  111
     013201  126  105  104
     013204  000
```

GLOBAL TEXT SECTION

```
1180 013205  105  122  122  T12E5:  .ASCIZ  /ERROR #5 - BIACK DIDN'T CLEAR BREQ (CSR<14>)/
     013210  117  122  040
     013213  043  065  040
     013216  055  040  102
     013221  111  101  103
     013224  113  040  104
     013227  111  104  116
     013232  047  124  040
     013235  103  114  105
     013240  101  122  040
     013243  102  122  105
     013246  121  040  050
     013251  103  123  122
     013254  074  061  064
     013257  076  051  000
1181 013262  105  122  122  T12E6:  .ASCIZ  /ERROR #6 - BRESET TRAP THRU 24 DIDN'T OCCUR/
     013265  117  122  040
     013270  043  066  040
     013273  055  040  102
     013276  122  105  123
     013301  105  124  040
     013304  124  122  101
     013307  120  040  124
     013312  110  122  125
     013315  040  062  064
     013320  040  104  111
     013323  104  116  047
     013326  124  040  117
     013331  103  103  125
     013334  122  000
```

GLOBAL TEXT SECTION

```
1183 013336     105     122     122  T13E0:  .ASCIZ  /ERROR #0 - LOCAL TPR WRITE-READ ERROR/
     013341     117     122     040
     013344     043     060     040
     013347     055     040     114
     013352     117     103     101
     013355     114     040     124
     013360     120     122     040
     013363     127     122     111
     013366     124     105     055
     013371     122     105     101
     013374     104     040     105
     013377     122     122     117
     013402     122     000
1184 013404     105     122     122  T13E1:  .ASCIZ  /ERROR #1 - BUS ERROR ON LSI-11 BUS TPR READ/
     013407     117     122     040
     013412     043     061     040
     013415     055     040     102
     013420     125     123     040
     013423     105     122     122
     013426     117     122     040
     013431     117     116     040
     013434     114     123     111
     013437     055     061     061
     013442     040     102     125
     013445     123     040     124
     013450     120     122     040
     013453     122     105     101
     013456     104     000
```

GLOBAL TEXT SECTION

```
1186 013460  105  122  122  T13E2:  .ASCIZ  /ERROR #2 - NON-ZERO DATA RETURNED ON LSI-11 BUS READ/
     013463  117  122  040
     013466  043  062  040
     013471  055  040  116
     013474  117  116  055
     013477  132  105  122
     013502  117  040  104
     013505  101  124  101
     013510  040  122  105
     013513  124  125  122
     013516  116  105  104
     013521  040  117  116
     013524  040  114  123
     013527  111  055  061
     013532  061  040  102
     013535  125  123  040
     013540  122  105  101
     013543  104  000
1187 013545  052  052  040  T13E3:  .ASCIZ  "** TEST #13 BUS WRITES/INTERRUPTS NOT TESTED - ROM IN VECTOR SPACE **"
     013550  124  105  123
     013553  124  040  043
     013556  061  063  040
     013561  102  125  123
     013564  040  127  122
     013567  111  124  105
     013572  123  057  111
     013575  116  124  105
     013600  122  122  125
     013603  120  124  123
     013606  040  116  117
     013611  124  040  124
     013614  105  123  124
     013617  105  104  040
     013622  055  040  122
     013625  117  115  040
     013630  111  116  040
     013633  126  105  103
     013636  124  117  122
     013641  040  123  120
     013644  101  103  105
     013647  040  052  052
     013652  000
```

GLOBAL TEXT SECTION

```
1189 013653     105     122     122  T13E4:  .ASCIZ  /ERROR #4 - BUS ERROR ON WRITE TO TPR WORD 0/
     013656     117     122     040
     013661     043     064     040
     013664     055     040     102
     013667     125     123     040
     013672     105     122     122
     013675     117     122     040
     013700     117     116     040
     013703     127     122     111
     013706     124     105     040
     013711     124     117     040
     013714     124     120     122
     013717     040     127     117
     013722     122     104     040
     013725     060     000
1190 013727     105     122     122  T13E5:  .ASCIZ  /ERROR #5 - TPR COMMAND INTERRUPT DIDN'T OCCUR/
     013732     117     122     040
     013735     043     065     040
     013740     055     040     124
     013743     120     122     040
     013746     103     117     115
     013751     115     101     116
     013754     104     040     111
     013757     116     124     105
     013762     122     122     125
     013765     120     124     040
     013770     104     111     104
     013773     116     047     124
     013776     040     117     103
     014001     103     125     122
     014004     000
```

GLOBAL TEXT SECTION

```
1192 014005  105  122  122  T13E6:  .ASCIZ  "ERROR #6 - LSI-11 BUS WRITE AND/OR INTERRUPTS WITH TPR DISABLED"
     014010  117  122  040
     014013  043  066  040
     014016  055  040  114
     014021  123  111  055
     014024  061  061  040
     014027  102  125  123
     014032  040  127  122
     014035  111  124  105
     014040  040  101  116
     014043  104  057  117
     014046  122  040  111
     014051  116  124  105
     014054  122  122  125
     014057  120  124  123
     014062  040  127  111
     014065  124  110  040
     014070  124  120  122
     014073  040  104  111
     014076  123  101  102
     014101  114  105  104
     014104  000
1193 014105  105  122  122  T13E7:  .ASCIZ  /ERROR #7 - LSI-11 BUS WRITE DIDN'T TIME OUT/
     014110  117  122  040
     014113  043  067  040
     014116  055  040  114
     014121  123  111  055
     014124  061  061  040
     014127  102  125  123
     014132  040  127  122
     014135  111  124  105
     014140  040  104  111
     014143  104  116  047
     014146  124  040  124
     014151  111  115  105
     014154  040  117  125
     014157  124  000
```

GLOBAL TEXT SECTION

```
1195 014161  105  122  122  T13E8:  .ASCIZ  /ERROR #8 - LSI-11 BUS WRITE TIMED OUT/
     014164  117  122  040
     014167  043  070  040
     014172  055  040  114
     014175  123  111  055
     014200  061  061  040
     014203  102  125  123
     014206  040  127  122
     014211  111  124  105
     014214  040  124  111
     014217  115  105  104
     014222  040  117  125
     014225  124  000
1196 014227  105  122  122  T13E9:  .ASCIZ  /ERROR #9 - TPR INTERRUPT 4 NOT RECEIVED/
     014232  117  122  040
     014235  043  071  040
     014240  055  040  124
     014243  120  122  040
     014246  111  116  124
     014251  105  122  122
     014254  125  120  124
     014257  040  064  040
     014262  116  117  124
     014265  040  122  105
     014270  103  105  111
     014273  126  105  104
     014276  000
```

GLOBAL TEXT SECTION

```
1198 014277     105     122     122  T13E10: .ASCIZ  /ERROR #10 - TPR INTERRUPT 8 NOT RECEIVED/
     014302     117     122     040
     014305     043     061     060
     014310     040     055     040
     014313     124     120     122
     014316     040     111     116
     014321     124     105     122
     014324     122     125     120
     014327     124     040     070
     014332     040     116     117
     014335     124     040     122
     014340     105     103     105
     014343     111     126     105
     014346     104     000
1199 014350     105     122     122  T13E11: .ASCIZ  /ERROR #11 - TPR INTERRUPT 12 NOT RECEIVED/
     014353     117     122     040
     014356     043     061     061
     014361     040     055     040
     014364     124     120     122
     014367     040     111     116
     014372     124     105     122
     014375     122     125     120
     014400     124     040     061
     014403     062     040     116
     014406     117     124     040
     014411     122     105     103
     014414     105     111     126
     014417     105     104     000
```

GLOBAL TEXT SECTION

```
1201
1202                                    ;
1203                                    ; NAMES OF DEVICES SUPPORTED BY PROGRAM
1204                                    ;
1205 014422                            DEVTYP  <KXT11CA>
     014422                         L$DVTYP::
     014422    113     130     124           .ASCIZ  #KXT11CA#
     014425    061     061     103
     014430    101     000
                                            .EVEN
1206
1212
1213                                    ; TEST DESCRIPTION
1214                                    ;
1215 014432                            DESCRIPT        <CNKTCA KXT11-CA LSI-11 BUS DIAGNOSTIC>
     014432                         L$DESC::
     014432    103     116     113           .ASCIZ  /CNKTCA KXT11-CA LSI-11 BUS DIAGNOSTIC/
     014435    124     103     101
     014440    040     113     130
     014443    124     061     061
     014446    055     103     101
     014451    040     114     123
     014454    111     055     061
     014457    061     040     102
     014462    125     123     040
     014465    104     111     101
     014470    107     116     117
     014473    123     124     111
     014476    103     000
                                            .EVEN
1216
1223
```

GLOBAL TEXT SECTION

```
1225                                    ;
1226                                    ; FORMAT STATEMENTS USED IN PRINT CALLS
1227                                    ;
1228
1229 014500  045  116  045  NOREG:  .ASCIZ  /%N%ANXM ADDRESS IS %O6%N/
     014503  101  116  130
     014506  115  040  101
     014511  104  104  122
     014514  105  123  123
     014517  040  111  123
     014522  040  045  117
     014525  066  045  116
     014530  000
1230 014531  045  116  045  ROMSG:  .ASCIZ  /%N%T%A ERROR(S):%N%N/
     014534  124  045  101
     014537  040  105  122
     014542  122  117  122
     014545  050  123  051
     014550  072  045  116
     014553  045  116  000
1231 014556  045  101  040  ROMETX: .ASCIZ  /%A   %T%N/
     014561  040  040  045
     014564  124  045  116
     014567  000
1232 014570  045  116  045  TESTID: .ASCIZ  /%N%ATHE %T%A TEST DID NOT COMPLETE ON IOP #%Z2%N%N/
     014573  101  124  110
     014576  105  040  045
     014601  124  045  101
     014604  040  124  105
     014607  123  124  040
     014612  104  111  104
     014615  040  116  117
     014620  124  040  103
     014623  117  115  120
     014626  114  105  124
     014631  105  040  117
     014634  116  040  111
     014637  117  120  040
     014642  043  045  132
     014645  062  045  116
     014650  045  116  000
```

GLOBAL TEXT SECTION

```
1234 014653  045  124  045  TSTERR: .ASCIZ  /%T%A TEST FAILED ON IOP #%72%N/
     014656  101  040  124
     014661  105  123  124
     014664  040  106  101
     014667  111  114  105
     014672  104  040  117
     014675  116  040  111
     014700  117  120  040
     014703  043  045  132
     014706  062  045  116
     014711  000
1235 014712  045  116  045  NOINFO: .ASCIZ  /%N%A   <NO FURTHER ERROR INFORMATION AVAILABLE>%N/
     014715  101  011  074
     014720  116  117  040
     014723  106  125  122
     014726  124  110  105
     014731  122  040  105
     014734  122  122  117
     014737  122  040  111
     014742  116  106  117
     014745  122  115  101
     014750  124  111  117
     014753  116  040  101
     014756  126  101  111
     014761  114  101  102
     014764  114  105  076
     014767  045  116  000
```

GLOBAL TEXT SECTION

```
 1237 014772     045     116     045  DROP:    .ASCIZ  /%N%A   KXT11-CA #%Z2%A DROPPED FROM TESTING.%N/
      014775     101     011     113
      015000     130     124     061
      015003     061     055     103
      015006     101     040     043
      015011     045     132     062
      015014     045     101     040
      015017     104     122     117
      015022     120     120     105
      015025     104     040     106
      015030     122     117     115
      015033     040     124     105
      015036     123     124     111
      015041     116     107     056
      015044     045     116     000
 1238 015047     045     116     045  SWITCH: .ASCIZ  "%N%ABOOT/SELFTEST SWITCH ON IOP #%Z2%A NOT SET FOR XXDP+%N"
      015052     101     102     117
      015055     117     124     057
      015060     123     105     114
      015063     106     124     105
      015066     123     124     040
      015071     123     127     111
      015074     124     103     110
      015077     040     117     116
      015102     040     111     117
      015105     120     040     043
      015110     045     132     062
      015113     045     101     040
      015116     116     117     124
      015121     040     123     105
      015124     124     040     106
      015127     117     122     040
      015132     130     130     104
      015135     120     053     045
      015140     116     000
```

GLOBAL TEXT SECTION

```
1240 015142  045  116  045  CMNDR:  .ASCIZ  /%N%ACO!MAND STATUS ERROR FROM IOP #%Z2%A AFTER LAST COMMAND%N/
     015145  101  103  117
     015150  115  115  101
     015153  116  104  040
     015156  123  124  101
     015161  124  125  123
     015164  040  105  122
     015167  122  117  122
     015172  040  106  122
     015175  117  115  040
     015200  111  117  120
     015203  040  043  045
     015206  132  062  045
     015211  101  040  101
     015214  106  124  105
     015217  122  040  114
     015222  101  123  124
     015225  040  103  117
     015230  115  115  101
     015233  116  104  045
     015236  116  000
1241 015240  045  116  045  NOTST:  .ASCIZ  /%N%AIOP #%Z2%A %T%N/
     015243  101  111  117
     015246  120  040  043
     015251  045  132  062
     015254  045  101  040
     015257  045  124  045
     015262  116  000
```

GLOBAL TEXT SECTION

```
1243 015264     045     101     123  SETSW:  .ASCIZ  /%ASET SWITCH TO POSITION 10./
     015267     105     124     040
     015272     123     127     111
     015275     124     103     110
     015300     040     124     117
     015303     040     120     117
     015306     123     111     124
     015311     111     117     116
     015314     040     061     060
     015317     056     000
1244 015321     045     116     045  NOTCLR: .ASCIZ  /%N%AIOP #%Z2%A NOT READY TO ACCEPT COMMANDS%N/
     015324     101     111     117
     015327     120     040     043
     015332     045     132     062
     015335     045     101     040
     015340     116     117     124
     015343     040     122     105
     015346     101     104     131
     015351     040     124     117
     015354     040     101     103
     015357     103     105     120
     015362     124     040     103
     015365     117     115     115
     015370     101     116     104
     015373     123     045     116
     015376     000
```

GLOBAL TEXT SECTION

```
1246 015377  045  116  045  TPR:    .ASCIZ  /%N%ATWO-PORT RAM ON IOP #%Z2%A IS DISABLED./
     015402  101  124  127
     015405  117  055  120
     015410  117  122  124
     015413  040  122  101
     015416  115  040  117
     015421  116  040  111
     015424  117  120  040
     015427  043  045  132
     015432  062  045  101
     015435  040  111  123
     015440  040  104  111
     015443  123  101  102
     015446  114  105  104
     015451  056  000
1247 015453  045  116  045  TPR1:   .ASCIZ  /%N%ACHECK LEDS ON IOP #%Z2%A FOR ERROR CODE.%N/
     015456  101  103  110
     015461  105  103  113
     015464  040  114  105
     015467  104  123  040
     015472  117  116  040
     015475  111  117  120
     015500  040  043  045
     015503  132  062  045
     015506  101  040  106
     015511  117  122  040
     015514  105  122  122
     015517  117  122  040
     015522  103  117  104
     015525  105  056  045
     015530  116  000
```

GLOBAL TEXT SECTION

```
1249 015532  045  116  045  SLOT:    .ASCIZ  /%N%AENSURE BACKPLANE DMA GRANT CONTINUITY%N/
     015535  101  105  116
     015540  123  125  122
     015543  105  040  102
     015546  101  103  113
     015551  120  114  101
     015554  116  105  040
     015557  104  115  101
     015562  040  107  122
     015565  101  116  124
     015570  040  103  117
     015573  116  124  111
     015576  116  125  111
     015601  124  131  045
     015604  116  000
1250 015606  045  116  045  INTACK: .ASCIZ  /%N%AENSURE BACKPLANE INTERRUPT ACKNOWLEDGE CONTINUITY%N/
     015611  101  105  116
     015614  123  125  122
     015617  105  040  102
     015622  101  103  113
     015625  120  114  101
     015630  116  105  040
     015633  111  116  124
     015636  105  122  122
     015641  125  120  124
     015644  040  101  103
     015647  113  116  117
     015652  127  114  105
     015655  104  107  105
     015660  040  103  117
     015663  116  124  111
     015666  116  125  111
     015671  124  131  045
     015674  116  000
```

GLOBAL TEXT SECTION

```
1252 015676  045  116  045  INITNG: .ASCIZ  /%N%A   ....REINITIALIZING IOP #%Z2%A.  PLEASE WAIT%N%N/
     015701  101  011  056
     015704  056  056  056
     015707  122  105  111
     015712  116  111  124
     015715  111  101  114
     015720  111  132  111
     015723  116  107  040
     015726  111  117  120
     015731  040  043  045
     015734  132  062  045
     015737  101  056  040
     015742  040  120  114
     015745  105  101  123
     015750  105  040  127
     015753  101  111  124
     015756  045  116  045
     015761  116  000
1253 015763  045  101  011  INITOK: .ASCIZ  /%A     INITIALIZATION COMPLETE... STARTING TESTS.%N%N/
     015766  111  116  111
     015771  124  111  101
     015774  114  111  132
     015777  101  124  111
     016002  117  116  040
     016005  103  117  115
     016010  120  114  105
     016013  124  105  056
     016016  056  056  040
     016021  123  124  101
     016024  122  124  111
     016027  116  107  040
     016032  124  105  123
     016035  124  123  056
     016040  045  116  045
     016043  116  000
1254 016045  045  101  040  TSTNO:  .ASCIZ  /%A %T%A - IOP #%Z2/
     016050  045  124  045
     016053  101  040  055
     016056  040  111  117
     016061  120  040  043
     016064  045  132  062
     016067  000
1255                        .EVEN
1256
1267
1268
```

GLOBAL ERROR REPORT SECTION

```
                                        .SBTTL  GLOBAL ERROR REPORT SECTION

                                        ;**
                                        ; THE GLOBAL ERROR REPORT SECTION CONTAINS MESSAGE PRINTING AREAS
                                        ; USED BY MORE THAN ONE TEST TO OUTPUT ADDITIONAL ERROR INFORMATION.  PRINTB
                                        ; (BASIC) AND PRINTX (EXTENDED) CALLS ARE USED TO CALL PRINT SERVICES.
                                        ;--


                                                BGNMSG  RTERR
016070                                  RTERR::
016070  013704  002214                          MOV     IOPNN,R4                ; GET SBC ID SWITCH NUMBER
016074                                          PRINTB  #TSTERR,R2,R4           ; PRINT TEST IDENTIFICATION
016074  010446                                  MOV     R4,-(SP)
016076  010246                                  MOV     R2,-(SP)
016100  012746  014653                          MOV     #TSTERR,-(SP)
016104  012746  000003                          MOV     #3,-(SP)
016110  010600                                  MOV     SP,R0
016112  104414                                  TRAP    C$PNTB
016114  062706  000010                          ADD     #10,SP
016120  032703  007777                          BIT     #7777,R3                ; CHECK FOR EXTENDED INFO
016124  001507                                  BEQ     7$                      ; BRANCH, IF NO EXTENDED INFO
016126  010304                                  MOV     R3,R4                   ; SAVE ROM TEST # AND ERROR BITS
016130  042704  007777                          BIC     #7777,R4                ; STRIP OFF THE TEST #
016134  012702  177772                          MOV     #-6,R2                  ; SETUP COUNTER FOR TEST NUMBER
016140  006104                          1$:     ROL     R4                      ; PUT TEST NUMBER IN BITS 3 - 0
016142  005202                                  INC     R2
016144  001375                                  BNE     1$                      ; BRANCH, IF NOT DONE SHIFTING

016146  022704  000022                  2$:     CMP     #22,R4                  ; IS THE FAILING TEST "TEST #11"?
016152  001010                                  BNE     3$                      ; BRANCH, IF NOT TEST 11 (DMA TEST)
016154                                          PRINTX  #SLOT                   ; PRINT DMA CONTINUITY MESSAGE
016154  012746  015532                          MOV     #SLOT,-(SP)
016160  012746  000001                          MOV     #1,-(SP)
016164  010600                                  MOV     SP,R0
016166  104415                                  TRAP    C$PNTX
016170  062706  000004                          ADD     #4,SP

016174  022704  000024                  3$:     CMP     #24,R4                  ; IS THE FAILING TEST "TEST #12"?
016200  001010                                  BNE     4$                      ; BRANCH, IF NOT TEST 12 (QIR TEST)
016202                                          PRINTX  #INTACK                 ; PRINT INTERRUPT ACK CONTINUITY MESSAGE
016202  012746  015606                          MOV     #INTACK,-(SP)
016206  012746  000001                          MOV     #1,-(SP)
016212  010600                                  MOV     SP,R0
016214  104415                                  TRAP    C$PNTX
016216  062706  000004                          ADD     #4,SP
```

GLOBAL ERROR REPORT SECTION

```
1306 016222  062704  002270          4$:     ADD     #T1ADR-2,R4             ; COMPUTE TEST # ASCII STRING ADDRESS
1307 016226  017405  000000                  MOV     @(R4),R5                ; GET STRING ADDRESS AND PUT IN R5
1308 016232                                  PRINTX  #ROMSG,R5               ; PRINT "ERROR(S):" MESSAGE
     016232  010546                          MOV     R5,-(SP)
     016234  012746  014531                  MOV     #ROMSG,-(SP)
     016240  012746  000002                  MOV     #2,-(SP)
     016244  010600                          MOV     SP,R0
     016246  104415                          TRAP    C$PNTX
     016250  062706  000006                  ADD     #6,SP
1309 016254  011405                          MOV     (R4),R5                 ; SETUP R5 FOR LATER USE
1310 016256  010304                          MOV     R3,R4                   ; GET TEST # AND ERROR BITS AGAIN
1311 016260  042704  170000                  BIC     #170000,R4              ; STRIP OFF ERROR BITS
1312 016264  012703  000001                  MOV     #1,R3                   ; SETUP FOR BIT TESTING
1313 016270  012702  000001                  MOV     #1,R2                   ; SETUP BIT POSITION COUNTER
1314
1315 016274  030304                  5$:     BIT     R3,R4                   ; CHECK FOR AN ERROR BIT SET
1316 016276  001414                          BEQ     6$                      ; BR, IF NONE IN THIS POSITION
1317 016300  010201                          MOV     R2,R1                   ; PUT BIT POSITION COUNT IN R1
1318 016302  006301                          ASL     R1                      ; MAKE IT WORD ADDRESSABLE
1319 016304  060501                          ADD     R5,R1                   ; INDEX TO ERROR BIT MESSAGE ADDRESS
1320 016306                                  PRINTX  #ROMETX,(R1)            ; PRINT ERROR NUMBER AND I.D.
     016306  011146                          MOV     (R1),-(SP)
     016310  012746  014556                  MOV     #ROMETX,-(SP)
     016314  012746  000002                  MOV     #2,-(SP)
     016320  010600                          MOV     SP,R0
     016322  104415                          TRAP    C$PNTX
     016324  062706  000006                  ADD     #6,SP
1321
1322 016330  006303                  6$:     ASL     R3                      ; SHIFT TO NEXT POSITION..AND
1323 016332  005202                          INC     R2                      ; INCREMENT BIT POSITION COUNT
1324 016334  020227  000015                  CMP     R2,#13.                 ; CHECK FOR ALL BITS CHECKED.
1325 016340  001355                          BNE     5$                      ; BRANCH, IF NOT ALL 12 BITS CHECKED
1326 016342  000410                          BR      8$                      ; EXIT THE PRINT ROUTINE
1327
1328 016344                          7$:     PRINTX  #NOINFO                 ; PRINT NO MORE INFO AVAILABLE
     016344  012746  014712                  MOV     #NOINFO,-(SP)
     016350  012746  000001                  MOV     #1,-(SP)
     016354  010600                          MOV     SP,R0
     016356  104415                          TRAP    C$PNTX
     016360  062706  000004                  ADD     #4,SP
1329 016364                          8$:     ENDMSG
     016364                          L10002:
     016364  104423                          TRAP    C$MSG
```

GLOBAL ERROR REPORT SECTION

```
1331
1332 016366                                    BGNMSG  NXM
     016366                              NXM::
1333 016366                                    PRINTB  #NOREG,R1
     016366  010146                            MOV     R1,-(SP)
     016370  012746  014500                    MOV     #NOREG,-(SP)
     016374  012746  000002                    MOV     #2,-(SP)
     016400  010600                            MOV     SP,R0
     016402  104414                            TRAP    C$PNTB
     016404  062706  000006                    ADD     #6,SP
1334 016410                                    ENDMSG
     016410                              L10003:
     016410  104423                            TRAP    C$MSG
1335
1336 016412                                    BGNMSG  NRES
     016412                              NRES::
1337 016412  013704  002214                    MOV     IOPNN,R4
1338 016416                                    PRINTB  #TESTID,R2,R4
     016416  010446                            MOV     R4,-(SP)
     016420  010246                            MOV     R2,-(SP)
     016422  012746  014570                    MOV     #TESTID,-(SP)
     016426  012746  000003                    MOV     #3,-(SP)
     016432  010600                            MOV     SP,R0
     016434  104414                            TRAP    C$PNTB
     016436  062706  000010                    ADD     #10,SP
1339 016442                                    ENDMSG
     016442                              L10004:
     016442  104423                            TRAP    C$MSG
1340
1341 016444                                    BGNMSG  GENMSG
     016444                              GENMSG::
1342 016444  013704  002214                    MOV     IOPNN,R4
1343 016450                                    PRINTB  #TSTERR,R2,R4
     016450  010446                            MOV     R4,-(SP)
     016452  010246                            MOV     R2,-(SP)
     016454  012746  014653                    MOV     #TSTERR,-(SP)
     016460  012746  000003                    MOV     #3,-(SP)
     016464  010600                            MOV     SP,R0
     016466  104414                            TRAP    C$PNTB
     016470  062706  000010                    ADD     #10,SP
1344 016474                                    PRINTX  #ROMETX,R3
     016474  010346                            MOV     R3,-(SP)
     016476  012746  014556                    MOV     #ROMETX,-(SP)
     016502  012746  000002                    MOV     #2,-(SP)
     016506  010600                            MOV     SP,R0
     016510  104415                            TRAP    C$PNTX
     016512  062706  000006                    ADD     #6,SP
1345 016516                                    ENDMSG
     016516                              L10005:
     016516  104423                            TRAP    C$MSG
```

GLOBAL ERROR REPORT SECTION

```
1347 016520                                    BGNMSG  SOFT
     016520                              SOFT::
1348 016520  013704  002214                    MOV     IOPNN,R4            ; GET CURRENT IOP NUMBER
1349 016524                                    PRINTB  #SWITCH,R4
     016524  010446                            MOV     R4,-(SP)
     016526  012746  015047                    MOV     #SWITCH,-(SP)
     016532  012746  000002                    MOV     #2,-(SP)
     016536  010600                            MOV     SP,R0
     016540  104414                            TRAP    C$PNTB
     016542  062706  000006                    ADD     #6,SP
1350 016546                                    PRINTX  #SETSW
     016546  012746  015264                    MOV     #SETSW,-(SP)
     016552  012746  000001                    MOV     #1,-(SP)
     016556  010600                            MOV     SP,R0
     016560  104415                            TRAP    C$PNTX
     016562  062706  000004                    ADD     #4,SP
1351 016566                                    ENDMSG
     016566                              L10006:
     016566  104423                            TRAP    C$MSG
1352
1353 016570                                    BGNMSG  CMDERR
     016570                              CMDERR::
1354 016570  013704  002214                    MOV     IOPNN,R4            ; GET CURRENT IOP NUMBER
1355 016574                                    PRINTB  #CMNDR,R4
     016574  010446                            MOV     R4,-(SP)
     016576  012746  015142                    MOV     #CMNDR,-(SP)
     016602  012746  000002                    MOV     #2,-(SP)
     016606  010600                            MOV     SP,R0
     016610  104414                            TRAP    C$PNTB
     016612  062706  000006                    ADD     #6,SP
1356 016616                                    ENDMSG
     016616                              L10007:
     016616  104423                            TRAP    C$MSG
1357
1358 016620                                    BGNMSG  NONO
     016620                              NONO::
1359 016620  013704  002214                    MOV     IOPNN,R4            ; GET CURRENT IOP NUMBER
1360 016624                                    PRINTB  #NOTCLR,R4
     016624  010446                            MOV     R4,-(SP)
     016626  012746  015321                    MOV     #NOTCLR,-(SP)
     016632  012746  000002                    MOV     #2,-(SP)
     016636  010600                            MOV     SP,R0
     016640  104414                            TRAP    C$PNTB
     016642  062706  000006                    ADD     #6,SP
1361 016646                                    ENDMSG
     016646                              L10010:
     016646  104423                            TRAP    C$MSG
```

```
1363
1364 016650                                    BGNMSG  TPRDIS
     016650                              TPRDIS::
1365 016650  013704  002214                    MOV     IOPNN,R4                ; GET CURRENT IOP NUMBER
1366 016654                                    PRINTB  @TPR,R4                 ; PRINT TWO-PORT RAM DISABLED
     016654  010446                            MOV     R4,-(SP)
     016656  012746  015377                    MOV     @TPR,-(SP)
     016662  012746  000002                    MOV     #2,-(SP)
     016666  010600                            MOV     SP,R0
     016670  104414                            TRAP    C$PNTB
     016672  062706  000006                    ADD     #6,SP
1367 016676                                    PRINTX  @TPR1,R4                ; PRINT CHECK THE LEDS
     016676  010446                            MOV     R4,-(SP)
     016700  012746  015453                    MOV     @TPR1,-(SP)
     016704  012746  000002                    MOV     #2,-(SP)
     016710  010600                            MOV     SP,R0
     016712  104415                            TRAP    C$PNTX
     016714  062706  000006                    ADD     #6,SP
1368 016720                                    ENDMSG
     016720                              L10011:
     016720  104423                            TRAP    C$MSG
1369
1370                                        ;**
1371                                        ;
1372                                        ;       SUBROUTINE TO PRINT MESSAGES FOR TESTS THAT ARE SKIPPED.
1373                                        ;       THESE MESSAGES ARE NOT ERROR MESSAGES; FOR INFO ONLY.
1374                                        ;
1375                                        ;       CALL:
1376                                        ;               MOV     @MSGADDRESS,R2
1377                                        ;               JSR     R5,SKIPED
1378                                        ;
1379                                        ;--
1380
1381 016722  013704  002214                SKIPED: MOV     IOPNN,R4                ; GET CURRENT IOP NUMBER
1382 016726                                    PRINTB  @NOTST,R4,R2
     016726  010246                            MOV     R2,-(SP)
     016730  010446                            MOV     R4,-(SP)
     016732  012746  015240                    MOV     @NOTST,-(SP)
     016736  012746  000003                    MOV     #3,-(SP)
     016742  010600                            MOV     SP,R0
     016744  104414                            TRAP    C$PNTB
     016746  062706  000010                    ADD     #10,SP
1383 016752  000205                            RTS     R5                      ; RETURN
1384
```

```
                                .SBTTL  GLOBAL SUBROUTINES SECTION

                                ;**
                                ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                                ; THAT ARE USED IN MORE THAN ONE TEST.
                                ;--

                                ;**
                                ;
                                ; FUNCTIONAL DESCRIPTION:
                                ;
                                ;    SUBROUTINE TO DELAY IN MILLISECONDS.
                                ;
                                ;       CALL:
                                ;
                                ;       JSR     R5,RDELAY
                                ;       N.                          ; DELAY IN MILLISECONDS
                                ;--

016754  010146                  RDELAY: MOV     R1,-(SP)                ; SAVE REGS 1 & 2 ON STACK
016756  010246                          MOV     R2,-(SP)
016760  012502                          MOV     (R5)+,R2                ; GET MILLISECOND ARGUMENT
016762  012737  000144  002236    1$:     MOV     #100.,DELCNT            ; SETUP COUNT FOR 1 MS LOOP

016770  013701  002236            2$:     MOV     DELCNT,R1               ; SETUP R1 FOR 1 MS LOOP
016774                                  BREAK                           ; ALLOWS <CTRL-C> RECOGNITION
016774  104422                          TRAP    C$BRK
016776  005301                  3$:     DEC     R1                      ; START OF 1 MS LOOP
017000  001376                          BNE     3$                      ; BRANCH, IF < 1 MS
017002  005302                          DEC     R2                      ; DECREMENT MULTIPLIER (WHICH YOU WANT)
017004  001371                          BNE     2$                      ; DO ANOTHER MS, IF BRANCH
017006  012602                          MOV     (SP)+,R2                ; RESTORE R1 AND R2
017010  012601                          MOV     (SP)+,R1
017012  000205                          RTS     R5                      ; RETURN
```

GLOBAL SUBROUTINES SECTION

```
1435
1436                                    ;**
1437                                    ;       SUBROUTINE TO CHECK FOR THE CURRENT IOP BEING READY.  THIS IS DONE
1438                                    ;       BY READING REGISTER 0 OF THE IOP'S TWO-PORT RAM.  IF IT IS ALL 0'S,
1439                                    ;       THE IOP IS CONSIDERED READY; NOT READY/DEVICE FATAL IF TPRO IS NON-0.
1440                                    ;--
1441
1442 017014  013701  002216          CKTPRO: MOV     QBASE,R1                ; GET LSI-11 BASE BUS ADDRESS
1443 017020  004537  016754                  JSR     R5,RDELAY               ; DELAY A BIT BEFORE READING TPRO
1444 017024  000372                          250.                            ; ABOUT 250 MILLISECONDS
1445 017026  016102  000000                  MOV     DPR0(R1),R2             ; READ TPRO
1446 017032  001416                          BEQ     1$                      ; BR, IF IOP IS ALL SET FOR TESTING.
1447 017034  004537  017210                  JSR     R5,REINIT               ; RE-INITIALIZE THE CURRENT IOP
1448 017040  000413                          BR      1$                      ; SUCCESS RETURN
1449
1450 017042                                  ERRDF   3,NOTRDY,NONO           ; PRINT DEVICE FATAL
     017042  104455                          TRAP    C$ERDF
     017044  000003                          .WORD   3
     017046  003264                          .WORD   NOTRDY
     017050  016620                          .WORD   NONO
1451 017052                                  DODU    LUN                     ; DROP THE UNIT FROM TESTING
     017052  013700  002210                  MOV     LUN,R0
     017056  104451                          TRAP    C$DODU
1452 017060  012737  177777  002206          MOV     #-1,DROPUN              ; SET THE DROPPED UNIT FLAG AND GET OUT
1453 017066                                  DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     017066  104444                          TRAP    C$DCLN
1454
1455 017070  016102  000002          1$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
1456 017074  042702  177770                  BIC     #-10,R2                 ; CLEAR ALL BUT BITS 2-0.
1457 017100  022702  000002                  CMP     #002,R2                 ; CHECK BOOT SWITCH..IF SET FOR XXDP+,
1458                                                                         ; ..COMMAND REGISTER SHOULD = 000002
1459 017104  001434                          BEQ     3$                      ; BR, IF THE SWITCH IS CORRECT
1460 017106  004537  017210                  JSR     R5,REINIT               ; RE-INITIALIZE THE CURRENT IOP
1461 017112  000431                          BR      3$                      ; SUCCESS RETURN
```

GLOBAL SUBROUTINES SECTION

```
1463
1464 017114  016102  000002                    MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
1465 017120  001413                            BEQ     2$                      ; BR, IF TPR IS DISABLED (ERROR)
1466 017122                                    ERRSOFT 1,BADSW,SOFT            ; SOFT ERROR. PRINT IT, AND THEN
     017122  104457                            TRAP    C$ERSOFT
     017124  000001                            .WORD   1
     017126  003151                            .WORD   BADSW
     017130  016520                            .WORD   SOFT
1467 017132                                    DODU    LUN                     ; DROP THIS UNIT
     017132  013700  002210                    MOV     LUN,R0
     017136  104451                            TRAP    C$DODU
1468 017140  012737  177777  002206            MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
1469 017146                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     017146  104444                            TRAP    C$DCLN
1470
1471 017150                            2$:     ERRDF   4,NOTPR,TPRDIS          ; FATAL ERROR.  TPR IS DISABLED
     017150  104455                            TRAP    C$ERDF
     017152  000004                            .WORD   4
     017154  003353                            .WORD   NOTPR
     017156  016650                            .WORD   TPRDIS
1472 017160                                    DODU    LUN                     ; DROP THIS UNIT
     017160  013700  002210                    MOV     LUN,R0
     017164  104451                            TRAP    C$DODU
1473 017166  012737  177777  002206            MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
1474 017174                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     017174  104444                            TRAP    C$DCLN
1475
1476 017176  005061  000004            3$:     CLR     DPR2(R1)                ; CLEAR SELFTEST ERROR REGISTER
1477 017202  005061  000006                    CLR     DPR3(R1)                ; CLEAR SELFTEST EXTENDED ERROR REGISTER
1478 017206  000205                    4$:     RTS     R5                      ; EXIT
```

GLOBAL SUBROUTINES SECTION

```
1480
1481                                    ;++
1482                                    ;       SUBROUTINE REINIT
1483                                    ;
1484                                    ;       CALLED WHENEVER TPR0 OR TPR1 ARE NOT SETUP PROPERLY.
1485                                    ;
1486                                    ;       CALL:   JSR     R5,REINIT
1487                                    ;
1488                                    ;       RETURN: RETURN+4 IF ERROR IN INITIALIZING
1489                                    ;               RETURN+2 IF SUCCESSFUL INITIALIZATION
1490                                    ;
1491                                    ;--
1492
1493 017210  013704  002214            REINIT: MOV     IOPNN,R4                ; GET CURRENT IOP NUMBER
1494 017214  013701  002216                    MOV     QBASE,R1                ; GET Q-BUS BASE ADDRESS
1495 017220                                    PRINTF  #INITNG,R4              ; PRINT "...RE-INITIALIZING"
      017220  010446                           MOV     R4,-(SP)
      017222  012746  015676                   MOV     #INITNG,-(SP)
      017226  012746  000002                   MOV     #2,-(SP)
      017232  010600                           MOV     SP,R0
      017234  104417                           TRAP    C$PNTF
      017236  062706  000006                   ADD     #6,SP
1496 017242  012761  000010  000006           MOV     #10,DPR3(R1)            ; SETUP SOFTWARE BOOTSELECT CODE
1497 017250  012761  000004  000000           MOV     #4,DPR0(R1)             ; SEND INITIALIZE COMMAND
1498 017256  004537  016754                   JSR     R5,RDELAY               ; DELAY ABOUT 5 SECONDS
1499 017262  013560                           6000.
1500 017264  016102  000000                   MOV     DPR0(R1),R2             ; READ TPR0
1501 017270  001402                           BEQ     2$                      ; TPR0 SHOULD NOW BE ALL 0'S
1502
1503 017272  005725                   1$:     TST     (R5)+                   ; SETUP FOR ERROR RETURN
1504 017274  000205                           RTS     R5                      ; ERROR RETURN
1505
1506 017276  016102  000002           2$:     MOV     DPR1(R1),R2             ; READ TPR1
1507 017302  042702  177770                   BIC     #-10,R2                 ; CLEAR ALL BUT BITS 2-0.
1508 017306  022702  000002                   CMP     #2,R2                   ; TPR1 SHOULD SAY Q-BUS TESTING MODE.
1509 017312  001367                           BNE     1$                      ; BRANCH, IF NOT SETUP FOR XXDP+ (ERROR)
1510 017314                                    PRINTF  #INITOK                 ; PRINT "INITIALIZATION COMPLETE..."
      017314  012746  015763                   MOV     #INITOK,-(SP)
      017320  012746  000001                   MOV     #1,-(SP)
      017324  010600                           MOV     SP,R0
      017326  104417                           TRAP    C$PNTF
      017330  062706  000004                   ADD     #4,SP
1511 017334  000205                           RTS     R5                      ; SUCCESS RETURN
```

GLOBAL SUBROUTINES SECTION

```
1513
1514                                    ;++
1515                                    ;
1516                                    ;       SUBROUTINE TO APPEND TEST TITLES TO TEST NUMBER IF
1517                                    ;       OPERATOR HAS SET THE "PNT" FLAG AT START TIME.
1518                                    ;
1519                                    ;       CALL:   MOV     #STRING,R2      ; TEST TITLE ADDRESS
1520                                    ;               JSR     R5,PNTFLG
1521                                    ;
1522                                    ;--
1523
1524 017336                            PNTFLG: RFLAGS  R4                      ; READ DRS FLAGS
     017336  104421                             TRAP    C$RFLA
     017340  010004                             MOV     R0,R4
1525 017342  032704  001000                     BIT     #BIT9,R4                ; CHECK DRS BIT 9 FLAG (PNT)
1526 017346  001414                             BEQ     1$                      ; RETURN, IF PNT NOT SET
1527 017350  013704  002214                     MOV     IOPNN,R4                ; GET CURRENT IOP NUMBER
1528 017354                                     PRINTF  #TSTNO,R2,R4            ; PRINT TITLE, IOP # AFTER TEST NUMBER
     017354  010446                             MOV     R4,-(SP)
     017356  010246                             MOV     R2,-(SP)
     017360  012746  016045                     MOV     #TSTNO,-(SP)
     017364  012746  000003                     MOV     #3,-(SP)
     017370  010600                             MOV     SP,R0
     017372  104417                             TRAP    C$PNTF
     017374  062706  000010                     ADD     #10,SP
1529 017400  000205                     1$:     RTS     R5                      ; RETURN TO TEST
1530
```

```
1532
1539
1545
1552
1558
1565
1571
1579
1588
1595
1601                                    .TITLE MISCELLANEOUS SECTIONS
1602                                    .SBTTL  IDENTIFICATION
1608                                    .SBTTL  REPORT CODING SECTION
1609
1610                                    ;++
1611                                    ; THE REPORT CODING SECTION CONTAINS THE
1612                                    ; "PRINTS" CALLS THAT GENERATE STATISTICAL REPORTS.
1613                                    ;--
1614
1615 017402                                     BGNRPT
     017402                             L$RPT::
1616
1628
1640
1641                                            .EVEN
1642
1643 017402                                     ENDRPT
     017402                             L10012:
     017402  104425                             TRAP    C$RPT
```

PROTECTION TABLE

```
                                .SBTTL  PROTECTION TABLE

                                ;++
                                ; THIS TABLE IS USED BY THE RUNTIME SERVICES
                                ; TO PROTECT THE LOAD MEDIA.
                                ;--

                                        BGNPROT
                                L$PROT::

                                        -1              ;OFFSET INTO P-TABLE FOR CSR ADDRESS
                                        -1              ;OFFSET INTO P-TABLE FOR MASSBUS ADDRESS
                                        -1              ;OFFSET INTO P-TABLE FOR DRIVE NUMBER

                                        ENDPROT
```

INITIALIZE SECTION

```
                                        .SBTTL  INITIALIZE SECTION

                                        ;++
                                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE BEGINNING OF EACH PASS.
                                        ;--

017412                                          BGNINIT
017412                                  L$INIT::

                                                SETVEC  #140,#170000,#340       ;ODT ROM ADDRESS                ;JB REV A-0
017412  012746  000340                          MOV     #340,-(SP)
017416  012746  170000                          MOV     #170000,-(SP)
017422  012746  000140                          MOV     #140,-(SP)
017426  012746  000003                          MOV     #3,-(SP)
017432  104437                                  TRAP    C$SVEC
017434  062706  000010                          ADD     #10,SP

017440                                          READEF  #EF.CONTINUE            ; CHECK FOR CONTINUED
017440  012700  000036                          MOV     #EF.CONTINUE,R0
017444  104447                                  TRAP    C$REFG
017446                                          BCOMPLETE       END             ; BRANCH, IF CONTINUED.
017446  103517                                  BCS     END

017450  005037  002206                          CLR     DROPUN                  ; CLEAR THE DROPPED IOP FLAG
017454                                          READEF  #EF.PWR                 ; CHECK FOR POWER FAIL RESTART
017454  012700  000034                          MOV     #EF.PWR,R0
017460  104447                                  TRAP    C$REFG
017462                                          BCOMPLETE       ABORT           ; ABORT - NO SENSE TRYING TO GO ON.
017462  103510                                  BCS     ABORT

017464                                          READEF  #EF.NEW                 ; CHECK FOR THIS PASS BEING A FIRST
017464  012700  000035                          MOV     #EF.NEW,R0
017470  104447                                  TRAP    C$REFG
017472                                          BNCOMPLETE      NEXT            ; BRANCH, IF NOT FIRST PASS
017472  103011                                  BCC     NEXT
017474  013737  002120  002242                  MOV     L$HIME,HIMEM            ; GET HIGHEST 4KW PAGE FROM DRS.
017502  162737  000577  002242                  SUB     #577,HIMEM              ; ADJUST IT TO = START OF PAGE BEFORE..
                                                                                ; ...THE I/O PAGE.
017510  012737  177777  002210                  MOV     #-1,LUN                 ; SETUP UNIT NUMBER FOR #0 MINUS 1

017516  005237  002210          NEXT:   INC     LUN                     ; INCREMENT IOP CPU NUMBER
017522  023737  002210  002012          CMP     LUN,L$UNIT              ; CHECK CURRENT AS LAST UNIT + 1
017530  001465                          BEQ     ABORT                   ; BRANCH, IF DONE ALL IOPS.
017532                                  GPHARD  LUN,R1                  ; GET HW P-TABLE ADDRESS
017532  013700  002210                  MOV     LUN,R0
017536  104442                          TRAP    C$GPHRD
017540  010001                          MOV     R0,R1
017542                                  BNCOMPLETE      NEXT            ; BRANCH, IF NO PTABLE FOR THIS LUN
017542  103365                          BCC     NEXT
```

INITIALIZE SECTION

```
1728 017544  012137  002212                    MOV     (R1)+,IOPN          ; GET IOP CPU NUMBER
1729 017550  001455                            BEQ     ABORT               ; BRANCH, IF THIS IS UNIT 0.
1730 017552  013737  002212  002214            MOV     IOPN,IOPNN          ; SAVE FOR PRINTOUTS
1731 017560  012702  177773                    MOV     #-5,R2              ; SETUP SHIFT COUNTER
1732
1733 017564  006237  002214          1$:       ASR     IOPNN               ; SHIFT 5 RIGHT FOR PRINTOUTS
1734 017570  005202                            INC     R2
1735 017572  001374                            BNE     1$                  ; BRANCH, IF NOT DONE SHIFTING
1736 017574  023727  002212  000340            CMP     IOPN,#340           ; SEE IF IOP NO. IS GREATER THAN 7
1737 017602  003004                            BGT     2$                  ; BRANCH IF NO. IS 8 OR MORE
1738 017604  012737  160000  002216            MOV     #160000,QBASE       ; SET BASE ADDRESS FOR UNITS 0-7
1739 017612  000406                            BR      3$                  ; THEN ADD IN IOP NUMBER
1740
1741 017614  012737  175400  002216  2$:       MOV     #175400,QBASE       ; SET BASE ADDRESS TO UNITS 8-15
1742 017622  042737  000400  002212            BIC     #400,IOPN           ; CLEAR BIT 8 OF NUMBER INPUT
1743
1744 017630  063737  002212  002216  3$:       ADD     IOPN,QBASE          ; COMBINE IOP # AND BASE ADDRESS
1745 017636  005721                            TST     (R1)+               ; CHECK IF HIGH OR LOW RANGE WANTED
1746 017640  001003                            BNE     4$                  ; BRANCH, IF LOW RANGE WANTED
1747 017642  062737  002000  002216            ADD     #BIT10,QBASE        ; ADD IN 2000 TO GET HIGH RANGE
1748
1749 017650  012137  002222          4$:       MOV     (R1)+,LOOPB1        ; GET LOOP CONN FLAG FOR SLU1
1750 017654  012137  002224                    MOV     (R1)+,LOOPB2        ; GET LOOP CONN FLAG FOR SLU2 CHANNEL A
1751 017660  012137  002226                    MOV     (R1)+,LOOPB3        ; GET LOOP CONN FLAG FOR CHANNEL B
1752 017664  012137  002230                    MOV     (R1)+,LOOPB4        ; GET LOOP CONN FLAG FOR PARALLEL I/O
1753 017670  012137  002232                    MOV     (R1)+,SL2DMA        ; GET SLU2 DMA CONFIGURATION
1754 017674  011137  002234                    MOV     (R1),ROMTST         ; GET FLAG FOR USER ROM TEST
1755 017700                                    EXIT    INIT                ; EXIT THE INIT CODE
     017700  104432                            TRAP    C$EXIT
     017702  000004                            .WORD   L10014-.
1756
1757 017704                            ABORT:  DOCLN                       ; EXECUTE CLEANUP CODE
     017704  104444                            TRAP    C$DCLN
1758 017706                            END:
1759
1771
1772 017706                                    ENDINIT
     017706                            L10014:
     017706  104411                            TRAP    C$INIT
```

AUTODROP SECTION

```
                                        .SBTTL  AUTODROP SECTION

                                        ;++
                                        ; THIS CODE IS EXECUTED IMMEDIATELY AFTER THE INITIALIZE CODE IF
                                        ; THE "ADR" FLAG WAS SET.  THE UNIT(S) UNDER TEST ARE CHECKED TO
                                        ; SEE IF THEY WILL RESPOND.  THOSE THAT DON'T ARE IMMEDIATELY
                                        ; DROPPED FROM TESTING.
                                        ;--

017710                                          BGNAUTO
017710                                  L$AUTO::

                                                ; THIS SECTION IS NOT USED.  RUN XXDP+ TEST 1 TO CHECK FOR RESPONSE.

017710                                          PRINTF  #NOSEC
017710  012746  017732                          MOV     #NOSEC,-(SP)
017714  012746  000001                          MOV     #1,-(SP)
017720  010600                                  MOV     SP,R0
017722  104417                                  TRAP    C$PNTF
017724  062706  000004                          ADD     #4,SP

017730                                          ENDAUTO
017730                                  L10015:
017730  104461                                  TRAP    C$AUTO

017732     045     116     045  NOSEC:  .ASCIZ  /%N%A"ADR" SWITCH NOT SUPPORTED.  RUN TEST 1 FOR RESPONSE CHECK.%N/
017735     101     042     101
017740     104     122     042
017743     040     123     127
017746     111     124     103
017751     110     040     116
017754     117     124     040
017757     123     125     120
017762     120     117     122
017765     124     105     104
017770     056     040     040
017773     122     125     116
017776     040     124     105
020001     123     124     040
020004     061     040     106
020007     117     122     040
020012     122     105     123
020015     120     117     116
020020     123     105     040
020023     103     110     105
020026     103     113     056
020031     045     116     000
```

CLEANUP CODING SECTION

```
1799                                    .SBTTL  CLEANUP CODING SECTION
1800
1801                                    ;++
1802                                    ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
1803                                    ; AFTER THE HARDWARE TESTS HAVE BEEN PERFORMED.
1804                                    ;--
1805
1806 020034                                     BGNCLN
     020034                             L$CLEAN::
1807
1816
1817 020034                                     EXIT    CLN
     020034  104432                             TRAP    C$EXIT
     020036  000002                             .WORD   L10016-.
1818
1830
1831                                            .EVEN
1832
1833 020040                                     ENDCLN
     020040                             L10016:
     020040  104412                             TRAP    C$CLEAN
```

DROP UNIT SECTION

```
                                .SBTTL  DROP UNIT SECTION

                                ;++
                                ; THE DROP-UNIT SECTION CONTAINS THE CODING THAT CAUSES A DEVICE
                                ; TO NO LONGER BE TESTED.
                                ;--

020042                                  BGNDU
020042                          L$DU::

020042  013701  002214                  MOV     IOPNN,R1                ; GET IOP NUMBER
020046                                  PRINTF  #DROP,R1                ; PRINT IOP #N DROPPED
020046  010146                          MOV     R1,-(SP)
020050  012746  014772                  MOV     #DROP,-(SP)
020054  012746  000002                  MOV     #2,-(SP)
020060  010600                          MOV     SP,R0
020062  104417                          TRAP    C$PNTF
020064  062706  000006                  ADD     #6,SP

020070                                  EXIT    DU
020070  000167                          .WORD   J$JMP
020072  000000                          .WORD   L10017-2-.


                                        .EVEN

                                        ENDDU
020074                          L10017:
020074  104453                          TRAP    C$DU
```

```
                                .SBTTL  ADD UNIT SECTION

                                ;**
                                ; THE ADD-UNIT SECTION CONTAINS ANY CODE THE PROGRAMMER WISHES
                                ;  TO BE EXECUTED IN CONJUNCTION WITH THE ADDING OF A UNIT BACK
                                ;  TO THE TEST CYCLE.
                                ;--

020076                                  BGNAU
020076                          L$AU::

                                        EXIT    AU
020076  000167                          .WORD   J$JMP
020100  000000                          .WORD   L10020-2-.

                                        .EVEN

                                        ENDAU
020102                          L10020:
020102  104452                          TRAP    C$AU
```

```
                                .TITLE HARDWARE TESTS
                                .SBTTL  IDENTIFICATION
                                
                                
                                .SBTTL  TEST 1: VERIFY THAT THE IOP(S) IS ADDRESSABLE
                                
                                ;**
                                ; THE CURRENT IOP IS CHECKED FOR BEING PRESENT ON THE Q BUS BY REFERENCING
                                ; ITS I/O PAGE ADDRESS.  THE I/O ADDRESS IS THE LSI-11 BUS BASE ADDRESS PLUS
                                ; THE IOP NUMBER.  AN NXM WILL OCCUR IF THE IOP IS NOT PRESENT.
                                ;--
                                
                 000004         NXMVEC=4
                                
020104                                  BGNTST
020104  012702  004663                  MOV     #TST1,R2                ; GET TITLE ADDRESS
020110  004537  017336                  JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
                                ;1$:    SETVEC  #NXMVEC,#3$,#PRIO7      ; SETUP NXM VECTOR                      ;JB REV A-0
020114                          1$:     SETVEC  #NXMVEC,#3$,#PRIO6      ; SETUP NXM VECTOR                      ;JB REV A-0
020114  012746  000300                  MOV     #PRIO6,-(SP)
020120  012746  020170                  MOV     #3$,-(SP)
020124  012746  000004                  MOV     #NXMVEC,-(SP)
020130  012746  000003                  MOV     #3,-(SP)
020134  104437                          TRAP    C$SVEC
020136  062706  000010                  ADD     #10,SP
020142  012702  177760                  MOV     #-20,R2                 ; SETUP TPR REGISTER COUNTER
020146  013701  002216                  MOV     QBASE,R1                ; IOP BASE ADDRESS TO R1
                                
020152                          2$:     SETPRI  #PRIO0                  ; LOWER PRIORITY FOR NXM
020152  012700  000000                  MOV     #PRIO0,R0
020156  104441                          TRAP    C$SPRI
020160  005721                  TST     (R1)+                   ; REFERENCE AN IOP REGISTER
020162  005202                  INC     R2                      ; INCR. COUNTER...NO NXM AS YET
020164  001372                  BNE     2$                      ; BRANCH, IF NOT DONE
020166  000414                  BR      4$                      ; ALL REGISTERS ARE THERE.
                                
                                ; A NXM INTERRUPT WILL END UP HERE FROM THE TRAP TO 4.
                                
020170  022626                  3$:     CMP     (SP)+,(SP)+             ; FIX THE STACK, SINCE NO RTI ISSUED
020172                                  ERRDF   1,NOIOP,NXM             ; FATAL DEVICE ERROR
020172  104455                          TRAP    C$ERDF
020174  000001                          .WORD   1
020176  002756                          .WORD   NOIOP
020200  016366                          .WORD   NXM
020202                                  DODU    LUN                     ; DROP THIS IOP
020202  013700  002210                  MOV     LUN,R0
020206  104451                          TRAP    C$DODU
020210  012737  177777  002206          MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
020216                                  DOCLN                           ; EXIT TEST
020216  104444                          TRAP    C$DCLN
```

TEST 1: VERIFY THAT THE IOP(S) IS ADDRESSABLE

```
1944                                    ;
1945                                    ; NOW MAKE SURE BOOT/SELFTEST SWITCH IS SET PROPERLY.
1946                                    ;
1947
1948 020220  004537  017210    4$:     JSR     R5,REINIT               ; INITIALIZE THE CURRENT IOP
1949 020224  000240                    NOP                             ; NORMALLY A SUCCESS RETURN...WE DON'T
1950                                                                    ; CARE IN THIS CASE.
1951 020226  004537  017014            JSR     R5,CKTPRO               ; NOW SEE IF THE IOP IS READY
1952
1953 020232                    5$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     020232  104406                    TRAP    C$CLP1
1954 020234                            CLRVEC  @NXMVEC                 ; CLEAR AND RESTORE NXM VECTOR
     020234  012700  000004            MOV     @NXMVEC,R0
     020240  104436                    TRAP    C$CVEC
1955 020242                            ENDTST                          ; DONE
     020242                    L10021:
     020242  104401                    TRAP    C$ETST
1956
```

```
1958
1959
1960                                    .SBTTL  TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.
1961
1962                                    ;++
1963                                    ;
1964                                    ;               IOP SELFTEST #1.
1965                                    ;
1966                                    ; THE ROM TEST VERIFIES THAT THE INTERNAL KXT11 CSRA,B & C REGISTERS
1967                                    ; RESPOND.
1968                                    ;
1969                                    ;--
1970
1971 020244                                     BGNTST
1972 020244  012702  004721                     MOV     #ROMT1,R2               ; GET TITLE ADDRESS
1973 020250  004537  017336                     JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
1974 020254  005737  002206                     TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
1975 020260  001401                             BEQ     1$                      ; BRANCH, IF NOT DROPPED
1976 020262                                     DOCLN                           ; THIS ONE IS DROPPED. FORGET IT.
     020262  104444                             TRAP    C$DCLN
1977
1978 020264  004537  017014             1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
1979 020270  013701  002216                     MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
1980 020274  013761  002244  000000             MOV     CSR,DPRO(R1)            ; SEND COMMAND TO DPRO
1981
1982 020302  012704  140000                     MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
1983 020306  005761  000000             2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
1984 020312  001423                             BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
1985 020314  004537  016754                     JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
1986 020320  000001                             1
1987 020322  005204                             INC     R4                      ; ERROR, IF R4 WRAPS TO 0
1988 020324  001370                             BNE     2$                      ; ERROR, IF NO BRANCH
1989 020326  012702  004145                     MOV     #CSRT,R2                ; SETUP FOR ERROR REPORTING
1990 020332                                     ERRDF   2,NORES,NRES            ; FATAL ERROR. NO RESPONSE FROM TEST.
     020332  104455                             TRAP    C$ERDF
     020334  000002                             .WORD   2
     020336  003054                             .WORD   NORES
     020340  016412                             .WORD   NRES
1991 020342                                     CKLOOP                          ; CHECK FOR LOOP ON TEST
     020342  104406                             TRAP    C$CLP1
1992 020344                                     DODU    LUN                     ; DROP THIS IOP
     020344  013700  002210                     MOV     LUN,R0
     020350  104451                             TRAP    C$DODU
1993 020352  012737  177777  002206             MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
1994 020360                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     020360  104444                             TRAP    C$DCLN
```

TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.

```
1996
1997                                    ;
1998                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
1999                                    ;
2000
2001 020362  016102  000002        4$:  MOV     DPR1(R1),R2            ; READ BOOT COMMAND STATUS REGISTER
2002 020366  100005                     BPL     5$                     ; BR, IF NO COMMAND STATUS ERROR
2003 020370                             ERRHRD  3,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     020370  104456                     TRAP    C$ERHRD
     020372  000003                     .WORD   3
     020374  003221                     .WORD   CMND
     020376  016570                     .WORD   CMDERR
2004 020400  000420                     BR      6$                     ; EXIT TEST
2005
2006 020402  016102  000004        5$:  MOV     DPR2(R1),R2            ; READ IOP DPR2
2007 020406  033702  002244             BIT     CSR,R2                 ; CHECK FOR ERROR IN CSR TEST
2008 020412  001413                     BEQ     6$                     ; BRANCH, IF SUCCESSFUL TEST
2009 020414  043761  002244  000004     BIC     CSR,DPR2(R1)           ; CLEAR THE ERROR BIT FOR THIS TIME.
2010 020422  016103  000006             MOV     DPR3(R1),R3            ; READ DPR3 FOR EXTENDED INFO
2011 020426  012702  004145             MOV     #CSRT,R2               ; ERROR MESSAGE POINTER
2012 020432                             ERRHRD  4,ROMD,RTERR           ; CSR TEST FAILED
     020432  104456                     TRAP    C$ERHRD
     020434  000004                     .WORD   4
     020436  003112                     .WORD   ROMD
     020440  016070                     .WORD   RTERR
2013
2014 020442                        6$:  CKLOOP                         ; CHECK FOR LOOP ON TEST
     020442  104406                     TRAP    C$CLP1
2015
2016 020444                             ENDTST
     020444                        L10022:
     020444  104401                     TRAP    C$ETST
```

TEST 2: INVOKE ROM - RESIDENT TEST OF THE KXT11'S CSR REGS.

```
2018
2019
2020                                    .SBTTL  TEST 3: INVOKE ROM TEST OF THE IOP 16KW LOCAL RAM
2021
2022                                    ;**
2023                                    ;
2024                                    ;               IOP SELFTEST #2.
2025                                    ;
2026                                    ; THE 16KW RAM IN THE IOP WILL BE TESTED.
2027                                    ;
2028
2029 020446                                     BGNTST
2030
2031 020446  012702  004744                     MOV     #ROMT2,R2               ; GET TITLE ADDRESS
2032 020452  004537  017336                     JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2033 020456  005737  002206                     TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2034 020462  001401                             BEQ     1$                      ; BRANCH, IF NOT DROPPED
2035 020464                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     020464  104444                             TRAP    C$DCLN
2036
2037 020466  004537  017014          1$:        JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2038 020472  013701  002216                     MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2039 020476  013761  002246  000000             MOV     RAM,DPRO(R1)            ; SEND COMMAND TO DPRO
2040
2041 020504  012704  140000                     MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2042 020510  005761  000000          2$:        TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
2043 020514  001423                             BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2044 020516  004537  016754                     JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2045 020522  000001                             1
2046 020524  005204                             INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2047 020526  001370                             BNE     2$                      ; ERROR, IF NO BRANCH
2048 020530  012702  004151                     MOV     #RAMT,R2                ; SETUP FOR ERROR REPORTING
2049 020534                                     ERRDF   5,NORES,NRES            ; FATAL ERROR. NO RESPONSE FROM TEST.
     020534  104455                             TRAP    C$ERDF
     020536  000005                             .WORD   5
     020540  003054                             .WORD   NORES
     020542  016412                             .WORD   NRES
2050 020544                                     CKLOOP                          ; CHECK FOR LOOP ON TEST
     020544  104406                             TRAP    C$CLP1
2051 020546                                     DODU    LUN                     ; DROP THIS UNIT
     020546  013700  002210                     MOV     LUN,R0
     020552  104451                             TRAP    C$DODU
2052 020554  012737  177777  002206             MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2053 020562                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     020562  104444                             TRAP    C$DCLN
```

TEST 3: INVOKE ROM TEST OF THE IOP 16KW LOCAL RAM

```
2055
2056                                    ;
2057                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2058                                    ;
2059
2060 020564  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2061 020570  100005                        BPL     5$                      ; BR. IF NO COMMAND STATUS ERROR
2062 020572                                ERRHRD  6,CMND,CMDERR           ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     020572  104456                        TRAP    C$ERHRD
     020574  000006                        .WORD   6
     020576  003221                        .WORD   CMND
     020600  016570                        .WORD   CMDERR
2063 020602  000427                        BR      6$                      ; EXIT TEST
2064
2065 020604  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2066 020610  033702  002246                BIT     RAM,R2                  ; CHECK FOR ERROR IN RAM TEST
2067 020614  001422                        BEQ     6$                      ; BRANCH, IF SUCCESSFUL TEST
2068 020616  043761  002246  000004        BIC     RAM,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2069 020624  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2070 020630  012702  004151                MOV     #RAMT,R2                ; ERROR MESSAGE POINTER
2071 020634                                ERRDF   7,ROMD,RTERR            ; RAM TEST FAILED
     020634  104455                        TRAP    C$ERDF
     020636  000007                        .WORD   7
     020640  003112                        .WORD   ROMD
     020642  016070                        .WORD   RTERR
2072 020644                                DODU    LUN                     ; DROP THIS UNIT 'CAUSE OF FATAL ERROR
     020644  013700  002210                MOV     LUN,R0
     020650  104451                        TRAP    C$DODU
2073 020652  012737  177777  002206        MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
2074 020660                                DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     020660  104444                        TRAP    C$DCLN
2075
2076 020662                        6$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     020662  104406                        TRAP    C$CLP1
2077
2078 020664                                ENDTST
     020664                     L10023:
     020664  104401                        TRAP    C$ETST
```

```
2080
2081
2082                                    .SBTTL  TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST
2083
2084                                    ;**
2085                                    ;
2086                                    ;               IOP SELFTEST #3.
2087                                    ;
2088                                    ; THE ROM TEST OF THE BOOT/SELFTEST ROM WILL BE INVOKED.  THE USER ROM
2089                                    ; WILL BE TESTED HERE IF SO INDICATED BY THE OPERATOR.
2090                                    ;
2091                                    ;--
2092
2093 020666                                    BGNTST
2094
2095 020666  012702  004767                    MOV     #ROMT3,R2               ; GET TITLE ADDRESS
2096 020672  004537  017336                    JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2097 020676  005737  002206                    TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2098 020702  001401                            BEQ     1$                      ; BRANCH, IF NOT DROPPED
2099 020704                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     020704  104444                            TRAP    C$DCLN
2100
2101 020706  004537  017014            1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2102 020712  013701  002216                    MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2103 020716  005737  002234                    TST     ROMTST                  ; CHECK IF USER ROM IS TO BE TESTED
2104 020722  001403                            BEQ     2$                      ; BRANCH, IF NOT
2105 020724  012761  177777  000006            MOV     #-1,DPR3(R1)            ; DPR 3 MUST BE NON-0 FOR USER ROM...
2106                                                                            ; ...TO BE TESTED
2107 020732  013761  002250  000000    2$:     MOV     ROM,DPR0(R1)            ; SEND COMMAND TO DPR0
2108 020740  012704  140000                    MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2109 020744  005761  000000            3$:     TST     DPR0(R1)                ; TEST THE IOP'S DPR0 REG.
2110 020750  001423                            BEQ     5$                      ; BRANCH, IF THE TEST HAS COMPLETED
2111 020752  004537  016754                    JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2112 020756  000001                            1
2113 020760  005204                            INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2114 020762  001370                            BNE     3$                      ; ERROR, IF NO BRANCH
2115 020764  012702  004170                    MOV     #ROMT,R2                ; SETUP FOR ERROR REPORTING
2116 020770                                    ERRDF   10,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
     020770  104455                            TRAP    C$ERDF
     020772  000012                            .WORD   10
     020774  003054                            .WORD   NORES
     020776  016412                            .WORD   NRES
2117 021000                                    CKLOOP                          ; CHECK FOR LOOP ON TEST
     021000  104406                            TRAP    C$CLP1
2118 021002                                    DODU    LUN                     ; DROP THIS UNIT
     021002  013700  002210                    MOV     LUN,R0
     021006  104451                            TRAP    C$DODU
2119 021010  012737  177777  002206            MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2120 021016                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021016  104444                            TRAP    C$DCLN
```

TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST

```
2122
2123                                    ;
2124                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2125                                    ;
2126
2127 021020  016102  000002      5$:    MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2128 021024  100005                     BPL     6$                      ; BR, IF NO COMMAND STATUS ERROR
2129 021026                             ERRHRD  11,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     021026  104456                     TRAP    C$ERHRD
     021030  000013                     .WORD   11
     021032  003221                     .WORD   CMND
     021034  016570                     .WORD   CMDERR
2130 021036  000427                     BR      7$                      ; EXIT TEST
2131
2132 021040  016102  000004      6$:    MOV     DPR2(R1),R2             ; READ IOP DPR2
2133 021044  033702  002250             BIT     ROM,R2                  ; CHECK FOR ERROR IN ROM TEST
2134 021050  001422                     BEQ     7$                      ; BRANCH, IF SUCCESSFUL TEST
2135 021052  043761  002250  000004     BIC     ROM,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2136 021060  016103  000006             MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2137 021064  012702  004170             MOV     #ROMT,R2                ; ERROR MESSAGE POINTER
2138 021070                             ERRDF   12,ROMD,RTERR           ; ROM TEST FAILED
     021070  104455                     TRAP    C$ERDF
     021072  000014                     .WORD   12
     021074  003112                     .WORD   ROMD
     021076  016070                     .WORD   RTERR
2139 021100                             DODU    LUN                     ; FATAL ERROR.  DROP THIS UNIT
     021100  013700  002210             MOV     LUN,R0
     021104  104451                     TRAP    C$DODU
2140 021106  012737  177777  002206     MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
2141 021114                             DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021114  104444                     TRAP    C$DCLN
2142
2143 021116                     7$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     021116  104406                     TRAP    C$CLP1
2144
2145 021120                             ENDTST
     021120                     L10024:
     021120  104401                     TRAP    C$ETST
```

TEST 4: INVOKE THE BOOT/SELFTEST CHECKSUM TEST

```
2147
2148                                    .SBTTL  TEST 5: IOP CPU INSTRUCTION TEST
2149
2150                                    ;**
2151                                    ;
2152                                    ;               IOP SELFTEST #4.
2153                                    ;
2154                                    ; INVOKE THE IOP T11 INSTRUCION TEST.
2155                                    ;
2156                                    ;--
2157
2158 021122                                    BGNTST
2159
2160 021122  012702  005023                    MOV     #ROMT4,R2               ; GET TITLE ADDRESS
2161 021126  004537  017336                    JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2162 021132  005737  002206                    TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2163 021136  001401                            BEQ     1$                      ; BRANCH, IF NOT DROPPED
2164 021140                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021140  104444                            TRAP    C$DCLN
2165
2166 021142  004537  017014            1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2167 021146  013701  002216                    MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2168 021152  013761  002252  000000            MOV     CPU,DPRO(R1)            ; SEND COMMAND TO DPRO
2169
2170 021160  012704  140000                    MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2171 021164  005761  000000            2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
2172 021170  001423                            BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2173 021172  004537  016754                    JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2174 021176  000001                            1
2175 021200  005204                    INC     R4                              ; ERROR, IF R4 WRAPS TO 0
2176 021202  001370                    BNE     2$                              ; ERROR, IF NO BRANCH
2177 021204  012702  004643            MOV     #CPUT,R2                        ; SETUP FOR ERROR REPORTING.
2178 021210                            ERRDF   13,NORES,NRES                   ; FATAL ERROR. NO RESPONSE FROM TEST.
     021210  104455                    TRAP    C$ERDF
     021212  000015                    .WORD   13
     021214  003054                    .WORD   NORES
     021216  016412                    .WORD   NRES
2179 021220                            CKLOOP                                  ; CHECK FOR LOOP ON TEST
     021220  104406                    TRAP    C$CLP1
2180 021222                            DODU    LUN                             ; DROP THIS UNIT
     021222  013700  002210            MOV     LUN,R0
     021226  104451                    TRAP    C$DODU
2181 021230  012737  177777  002206    MOV     #-1,DROPUN                      ; SET DROPPED UNIT FLAG.
2182 021236                            DOCLN                                   ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021236  104444                    TRAP    C$DCLN
```

```
2184
2185                                    ;
2186                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2187                                    ;
2188
2189 021240  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2190 021244  100005                         BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2191 021246                                 ERRHRD  14,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
      021246  104456                        TRAP    C$ERHRD
      021250  000016                        .WORD   14
      021252  003221                        .WORD   CMND
      021254  016570                        .WORD   CMDERR
2192 021256  000427                         BR      6$                      ; EXIT TEST
2193
2194 021260  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2195 021264  033702  002252                BIT     CPU,R2                  ; CHECK FOR ERROR IN CPU TEST
2196 021270  001422                         BEQ     6$                      ; BRANCH, IF SUCCESSFUL TEST
2197 021272  043761  002252  000004        BIC     CPU,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2198 021300  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2199 021304  012702  004643                MOV     #CPUT,R2                ; ERROR MESSAGE POINTER
2200 021310                                 ERRDF   15,ROMD,RTERR           ; CPU TEST FAILED
      021310  104455                        TRAP    C$ERDF
      021312  000017                        .WORD   15
      021314  003112                        .WORD   ROMD
      021316  016070                        .WORD   RTERR
2201 021320                                 DODU    LUN                     ; FATAL ERROR. DROP THIS UNIT
      021320  013700  002210                MOV     LUN,R0
      021324  104451                        TRAP    C$DODU
2202 021326  012737  177777  002206        MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
2203 021334                                 DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      021334  104444                        TRAP    C$DCLN
2204
2205 021336                         6$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
      021336  104406                        TRAP    C$CLP1
2206
2207 021340                                 ENDTST
      021340                        L10025:
      021340  104401                        TRAP    C$ETST
2208
```

TEST 5: IOP CPU INSTRUCTION TEST

```
                                .SBTTL  TEST 6: INVOKE THE LINE CLOCK INTERRUPT TEST

                                ;++
                                ;
                                ;               IOP SELFTEST #5.
                                ;
                                ; THE LINE CLOCK (BEVNT) INTERRUPT TEST IS INVOKED IN THE IOP ROM
                                ;
                                ;--

021342                                  BGNTST

021342  012702  005062                  MOV     #ROMT5,R2               ; GET TITLE ADDRESS
021346  004537  017336                  JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
021352  005737  002206                  TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
021356  001401                          BEQ     1$                      ; BRANCH, IF NOT DROPPED
021360                                  DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
021360  104444                          TRAP    C$DCLN

021362  004537  017014          1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
021366  013701  002216                  MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
021372  013761  002254  000000          MOV     BVNT,DPRO(R1)           ; SEND COMMAND TO DPRO

021400  012704  140000                  MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
021404  005761  000000          2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
021410  001423                          BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
021412  004537  016754                  JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
021416  000001                          1
021420  005204                          INC     R4                      ; ERROR, IF R4 WRAPS TO 0
021422  001370                          BNE     2$                      ; ERROR, IF NO BRANCH
021424  012702  004174                  MOV     #BEVNT,R2               ; SETUP FOR ERROR REPORTING.
021430                                  ERRDF   16,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
021430  104455                          TRAP    C$ERDF
021432  000020                          .WORD   16
021434  003054                          .WORD   NORES
021436  016412                          .WORD   NRES
021440                                  CKLOOP                          ; CHECK FOR LOOP ON TEST
021440  104406                          TRAP    C$CLP1
021442                                  DODU    LUN                     ; DROP THIS UNIT
021442  013700  002210                  MOV     LUN,R0
021446  104451                          TRAP    C$DODU
021450  012737  177777  002206          MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
021456                                  DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
021456  104444                          TRAP    C$DCLN
```

TEST 6: INVOKE THE LINE CLOCK INTERRUPT TEST

```
2248
2249                                    ;
2250                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2251                                    ;
2252
2253 021460  016102  000002      4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2254 021464  100005                      BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2255 021466                              ERRHRD  17,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     021466  104456                      TRAP    C$ERHRD
     021470  000021                      .WORD   17
     021472  003221                      .WORD   CMND
     021474  016570                      .WORD   CMDERR
2256 021476  000431                      BR      7$                      ; EXIT TEST
2257
2258 021500  016102  000004      5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2259 021504  033702  002254              BIT     BVNT,R2                 ; CHECK FOR ERROR IN CLOCK TEST
2260 021510  001424                      BEQ     7$                      ; BRANCH, IF SUCCESSFUL TEST
2261 021512  043761  002254  000004      BIC     BVNT,DPR2(R1)           ; CLEAR THE ERROR BIT FOR THIS TIME.
2262 021520  016103  000006              MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2263 021524  032703  000001              BIT     #BIT0,R3                ; CHECK FOR ENTIRE TEST SKIPPED
2264 021530  001406                      BEQ     6$                      ; BR, IF TEST WASN'T SKIPPED
2265 021532  012702  007411              MOV     #T5E0,R2                ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2266 021536  004537  016722              JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2267 021542                              EXIT    TST                     ; EXIT THIS TEST
     021542  104432                      TRAP    C$EXIT
     021544  000020                      .WORD   L10026-.
2268
2269 021546  012702  004174      6$:     MOV     #BEVNT,R2               ; ERROR MESSAGE POINTER
2270 021552                              ERRHRD  20,ROMD,RTERR           ; CLOCK TEST FAILED
     021552  104456                      TRAP    C$ERHRD
     021554  000024                      .WORD   20
     021556  003112                      .WORD   ROMD
     021560  016070                      .WORD   RTERR
2271
2272 021562                      7$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     021562  104406                      TRAP    C$CLP1
2273
2274 021564                              ENDTST
     021564                  L10026:
     021564  104401                      TRAP    C$ETST
```

```
2276
2277                                    .SBTTL  TEST 7: INVOKE SERIAL PORT #1 TEST
2278
2279                                    ;**
2280                                    ;
2281                                    ;               IOP SELFTEST #6.
2282                                    ;
2283                                    ; INVOKE THE ROM TEST OF THE CONSOLE SERIAL PORT DC319 (SLU1).
2284                                    ;
2285                                    ;--
2286
2287 021566                                     BGNTST
2288
2289 021566  012702  005117                     MOV     #ROMT6,R2               ; GET TITLE ADDRESS
2290 021572  004537  017336                     JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2291 021576  005737  002206                     TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2292 021602  001401                             BEQ     1$                      ; BRANCH, IF NOT DROPPED
2293 021604                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021604  104444                             TRAP    C$DCLN
2294
2295 021606  004537  017014             1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2296 021612  005737  002222                     TST     LOOPB1                  ; CHECK FOR LOOPBACK CONNECTOR INSTALLED
2297 021616  001500                             BEQ     7$                      ; BRANCH, IF NO CONNECTOR INSTALLED
2298 021620  013701  002216                     MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2299 021624  013761  002256  000000             MOV     SLU1,DPRO(R1)           ; SEND COMMAND TO DPRO
2300
2301 021632  012704  140000                     MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2302 021636  005761  000000             2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
2303 021642  001423                             BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2304 021644  004537  016754                     JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2305 021650  000001                             1
2306 021652  005204                             INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2307 021654  001370                             BNE     2$                      ; ERROR, IF NO BRANCH
2308 021656  012702  004202                     MOV     #SLU1T,R2               ; SETUP FOR ERROR REPORTING.
2309 021662                                     ERRDF   21,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
     021662  104455                             TRAP    C$ERDF
     021664  000025                             .WORD   21
     021666  003054                             .WORD   NORES
     021670  016412                             .WORD   NRES
2310 021672                                     CKLOOP                          ; CHECK FOR LOOP ON TEST
     021672  104406                             TRAP    C$CLP1
2311 021674                                     DODU    LUN                     ; DROP THIS UNIT
     021674  013700  002210                     MOV     LUN,R0
     021700  104451                             TRAP    C$DODU
2312 021702  012737  177777  002206             MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2313 021710                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     021710  104444                             TRAP    C$DCLN
```

TEST 7: INVOKE SERIAL PORT #1 TEST

```
2315
2316                                    ;
2317                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2318                                    ;
2319
2320 021712  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2321 021716  100005                        BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2322 021720                                ERRHRD  22,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     021720  104456                        TRAP    C$ERHRD
     021722  000026                        .WORD   22
     021724  003221                        .WORD   CMND
     021726  016570                        .WORD   CMDERR
2323 021730  000433                        BR      7$                      ; EXIT TEST
2324
2325 021732  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2326 021736  033702  002256                BIT     SLU1,R2                 ; CHECK FOR ERROR IN SLU1 TEST
2327 021742  001426                        BEQ     7$                      ; BRANCH, IF SUCCESSFUL TEST
2328 021744  043761  002256  000004        BIC     SLU1,DPR2(R1)           ; CLEAR THE ERROR BIT FOR THIS TIME.
2329 021752  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2330 021756  032703  000001                BIT     #BIT0,R3                ; CHECK IF INTERRUPTS WERE TESTED
2331 021762  001404                        BEQ     6$                      ; BR, IF INTERRUPTS WERE TESTED
2332 021764  012702  007411                MOV     #T5E0,R2                ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2333 021770  004537  016722                JSR     R5,SKIPED               ; PRINT A PORTION OF SELFTEST NOT RUN
2334
2335 021774  042703  000001        6$:     BIC     #BIT0,R3                ; CLEAR BIT 0 FOR NEXT TEST
2336 022000  005703                        TST     R3                      ; SEE IF ANY LEGITIMATE ERRORS
2337 022002  001406                        BEQ     7$                      ; BRANCH, IF NO ERRORS
2338 022004  012702  004202                MOV     #SLU1T,R2               ; ERROR MESSAGE POINTER
2339 022010                                ERRHRD  23,ROMD,RTERR           ; SLU1 TEST FAILED
     022010  104456                        TRAP    C$ERHRD
     022012  000027                        .WORD   23
     022014  003112                        .WORD   ROMD
     022016  016070                        .WORD   RTERR
2340
2341 022020                        7$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     022020  104406                        TRAP    C$CLP1
2342
2343 022022                                ENDTST
     022022                        L10027:
     022022  104401                        TRAP    C$ETST
```

```
2345
2346                                    .SBTTL  TEST 8: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL A) - NEC7201
2347
2348                                    ;**
2349                                    ;
2350                                    ;               IOP SELFTEST #7.
2351                                    ;
2352                                    ; INVOKE THE NEC7201 (SERIAL PORT #2), CHANNEL A SELFTEST
2353                                    ;
2354                                    ;--
2355
2356 022024                                     BGNTST
2357
2358 022024  012702  005151                     MOV     #ROMT7A,R2              ; GET TITLE ADDRESS
2359 022030  004537  017336                     JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2360 022034  005737  002206                     TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2361 022040  001401                             BEQ     1$                      ; BRANCH, IF NOT DROPPED
2362 022042                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      022042  104444                           TRAP    C$DCLN
2363
2364 022044  004537  017014             1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2365 022050  005737  002224                     TST     LOOPB2                  ; CHECK IF LOOPBACK CONNECTOR INSTALLED
2366 022054  001511                             BEQ     8$                      ; BRANCH, IF NO CONNECTOR INSTALLED
2367
2368 022056  013701  002216                     MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2369 022062  012761  000001  000006             MOV     #1,DPR3(R1)             ; SET TEST FLAG FOR CHANNEL A
2370 022070  013761  002260  000000             MOV     SLU2,DPRO(R1)           ; SEND COMMAND TO DPRO
2371
2372 022076  012704  140000                     MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2373 022102  005761  000000             2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
2374 022106  001423                             BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2375 022110  004537  016754                     JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2376 022114  000001                             1
2377 022116  005204                             INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2378 022120  001370                             BNE     2$                      ; ERROR, IF NO BRANCH
2379 022122  012702  004235                     MOV     #SLU2A,R2               ; SETUP FOR ERROR REPORTING.
2380 022126                                     ERRDF   24,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
      022126  104455                           TRAP    C$ERDF
      022130  000030                           .WORD   24
      022132  003054                           .WORD   NORES
      022134  016412                           .WORD   NRES
2381 022136                                     CKLOOP                          ; CHECK FOR LOOP ON TEST
      022136  104406                           TRAP    C$CLP1
2382 022140                                     DODU    LUN                     ; DROP THIS UNIT
      022140  013700  002210                   MOV     LUN,R0
      022144  104451                           TRAP    C$DODU
2383 022146  012737  177777  002206             MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2384 022154                                     DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      022154  104444                           TRAP    C$DCLN
```

TEST 8: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL A) - NEC720

```
2386
2387                                    ;
2388                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2389                                    ;
2390
2391 022156  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2392 022162  100005                        BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2393 022164                                ERRHRD  25,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     022164  104456                        TRAP    C$ERHRD
     022166  000031                        .WORD   25
     022170  003221                        .WORD   CMND
     022172  016570                        .WORD   CMDERR
2394 022174  000441                        BR      8$                      ; EXIT TEST
2395
2396 022176  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2397 022202  033702  002260                BIT     SLU2,R2                 ; CHECK FOR ERROR IN SLU2 TEST
2398 022206  001434                        BEQ     8$                      ; BRANCH, IF SUCCESSFUL TEST
2399 022210  043761  002260  000004        BIC     SLU2,DPR2(R1)           ; CLEAR THE ERROR BIT FOR THIS TIME.
2400 022216  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2401 022222  005737  002232                TST     SL2DMA                  ; CHECK SLU2 SETUP FOR DMA OPERATION
2402 022226  001002                        BNE     6$                      ; BRANCH, IF DMA JUMPER IS IN
2403 022230  042703  000300                BIC     #300,R3                 ; JUMPER IS OUT.  FORCE ERRORS 6,7 CLEAR.
2404
2405 022234  032703  000001        6$:     BIT     #BIT0,R3                ; CHECK FOR ENTIRE TEST SKIPPED
2406 022240  001406                        BEQ     7$                      ; BR, IF TEST WASN'T SKIPPED
2407 022242  012702  010337                MOV     #T7E0,R2                ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2408 022246  004537  016722                JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2409 022252                                EXIT    TST                     ; EXIT THIS TEST
     022252  104432                        TRAP    C$EXIT
     022254  000026                        .WORD   L10030-.
2410
2411 022256  032703  007777        7$:     BIT     #7777,R3                ; CHECK FOR LEGITIMATE ERRORS
2412 022262  001406                        BEQ     8$                      ; BRANCH IF NO LEGITIMATE ERRORS
2413 022264  012702  004235                MOV     #SLU2A,R2               ; ERROR MESSAGE POINTER
2414 022270                                ERRHRD  26,ROMD,RTERR           ; SLU2 CHANNEL A FAILED
     022270  104456                        TRAP    C$ERHRD
     022272  000032                        .WORD   26
     022274  003112                        .WORD   ROMD
     022276  016070                        .WORD   RTERR
2415
2416 022300                        8$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     022300  104406                        TRAP    C$CLP1
2417
2418 022302                                ENDTST
     022302                     L10030:
     022302  104401                        TRAP    C$ETST
```

```
2420
2421                                    .SBTTL  TEST 9: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL B) - NEC7201
2422
2423                                    ;++
2424                                    ;
2425                                    ;               IOP SELFTEST #7.
2426                                    ;
2427                                    ; INVOKE THE NEC7201 (SERIAL PORT #2), CHANNEL B SELFTEST
2428                                    ;
2429                                    ;--
2430
2431 022304                                    BGNTST
2432
2433 022304  012702  005220                    MOV     #ROMT7B,R2              ; GET TITLE ADDRESS
2434 022310  004537  017336                    JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2435 022314  005737  002206                    TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2436 022320  001401                            BEQ     1$                      ; BRANCH, IF NOT DROPPED
2437 022322                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     022322  104444                            TRAP    C$DCLN
2438
2439 022324  004537  017014            1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2440 022330  005737  002226                    TST     LOOPB3                  ; CHECK IF LOOPBACK CONNECTOR INSTALLED
2441 022334  001501                            BEQ     7$                      ; BRANCH, IF NO CONNECTOR INSTALLED
2442
2443 022336  013701  002216                    MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2444 022342  012761  000002  000006            MOV     #2,DPR3(R1)             ; SET TEST FLAG FOR CHANNEL B
2445 022350  013761  002260  000000            MOV     SLU2,DPR0(R1)           ; SEND COMMAND TO DPR0
2446
2447 022356  012704  140000                    MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2448 022362  005761  000000            2$:     TST     DPR0(R1)                ; TEST THE IOP'S DPRO REG.
2449 022366  001423                            BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2450 022370  004537  016754                    JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2451 022374  000001                            1
2452 022376  005204                            INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2453 022400  001370                            BNE     2$                      ; ERROR, IF NO BRANCH
2454 022402  012702  004273                    MOV     #SLU2B,R2               ; SETUP FOR ERROR REPORTING.
2455 022406                                    ERRDF   27,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
     022406  104455                            TRAP    C$ERDF
     022410  000033                            .WORD   27
     022412  003054                            .WORD   NORES
     022414  016412                            .WORD   NRES
2456 022416                                    CKLOOP                          ; CHECK FOR LOOP ON TEST
     022416  104406                            TRAP    C$CLP1
2457 022420                                    DODU    LUN                     ; DROP THIS UNIT
     022420  013700  002210                    MOV     LUN,R0
     022424  104451                            TRAP    C$DODU
2458 022426  012737  177777  002206            MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2459 022434                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     022434  104444                            TRAP    C$DCLN
```

TEST 9: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL B) - NEC720

```
2461
2462                                    ;
2463                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2464                                    ;
2465
2466 022436  016102  000002      4$:    MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2467 022442  100005                     BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2468 022444                             ERRHRD  30,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
      022444  104456                     TRAP    C$ERHRD
      022446  000036                     .WORD   30
      022450  003221                     .WORD   CMND
      022452  016570                     .WORD   CMDERR
2469 022454  000431                     BR      7$                      ; EXIT TEST
2470
2471 022456  016102  000004      5$:    MOV     DPR2(R1),R2             ; READ IOP DPR2
2472 022462  033702  002260              BIT     SLU2,R2                 ; CHECK FOR ERROR IN SLU2 TEST
2473 022466  001424                     BEQ     7$                      ; BRANCH, IF SUCCESSFUL TEST
2474 022470  043761  002260  000004     BIC     SLU2,DPR2(R1)           ; CLEAR THE ERROR BIT FOR THIS TIME.
2475 022476  016103  000006              MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2476 022502  032703  000001              BIT     #BIT0,R3                ; CHECK FOR ENTIRE TEST SKIPPED
2477 022506  001406                     BEQ     6$                      ; BR, IF TEST WASN'T SKIPPED
2478 022510  012702  010337              MOV     #T7E0,R2                ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2479 022514  004537  016722              JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2480 022520                             EXIT    TST                     ; EXIT THIS TEST
      022520  104432                     TRAP    C$EXIT
      022522  000020                     .WORD   L10031-.
2481
2482 022524  012702  004273      6$:    MOV     #SLU2B,R2               ; ERROR MESSAGE POINTER
2483 022530                             ERRHRD  31,ROMD,RTERR           ; SLU2 CHANNEL B FAILED
      022530  104456                     TRAP    C$ERHRD
      022532  000037                     .WORD   31
      022534  003112                     .WORD   ROMD
      022536  016070                     .WORD   RTERR
2484
2485 022540                     7$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
      022540  104406                     TRAP    C$CLP1
2486
2487 022542                             ENDTST
      022542                    L10031:
      022542  104401                     TRAP    C$ETST
```

TEST 9: INVOKE ROM TEST OF SERIAL PORT #2 (CHANNEL B) - NEC720

```
2489
2490                                    .SBTTL  TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036
2491
2492                                    ;**
2493                                    ;
2494                                    ;               IOP SELFTEST #10.
2495                                    ;
2496                                    ; INVOKE THE ROM TEST OF THE Z8036 (PARALLEL I/O).
2497                                    ;
2498                                    ;--
2499
2500 022544                                    BGNTST
2501
2502 022544  012702  005267                    MOV     #ROMT10,R2              ; GET TITLE ADDRESS
2503 022550  004537  017336                    JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2504 022554  005737  002206                    TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2505 022560  001401                            BEQ     1$                      ; BRANCH, IF NOT DROPPED
2506 022562                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      022562  104444                          TRAP    C$DCLN
2507
2508 022564  004537  017014          1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2509 022570  005737  002230                    TST     LOOPB4                  ; CHECK LOOPBACK CONNECTOR INSTALLED
2510 022574  001476                            BEQ     7$                      ; BRANCH IF NO CONNECTOR INSTALLED
2511
2512 022576  013701  002216                    MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2513 022602  013761  002262  000000            MOV     PLLIO,DPRO(R1)          ; SEND COMMAND TO DPRO
2514
2515 022610  012704  140000                    MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2516 022614  005761  000000          2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
2517 022620  001423                            BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2518 022622  004537  016754                    JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2519 022626  000001                            1
2520 022630  005204                            INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2521 022632  001370                            BNE     2$                      ; ERROR, IF NO BRANCH
2522 022634  012702  004331                    MOV     #PLLP,R2                ; SETUP FOR ERROR REPORTING.
2523 022640                                    ERRDF   32,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
      022640  104455                          TRAP    C$ERDF
      022642  000040                          .WORD   32
      022644  003054                          .WORD   NORES
      022646  016412                          .WORD   NRES
2524 022650                                    CKLOOP                          ; CHECK FOR LOOP ON TEST
      022650  104406                          TRAP    C$CLP1
2525 022652                                    DODU    LUN                     ; DROP THIS UNIT
      022652  013700  002210                  MOV     LUN,R0
      022656  104451                          TRAP    C$DODU
2526 022660  012737  177777  002206          MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2527 022666                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
      022666  104444                          TRAP    C$DCLN
```

TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036

```
2529
2530                                    ;
2531                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2532                                    ;
2533
2534 022670  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2535 022674  100005                         BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2536 022676                                 ERRHRD  33,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     022676  104456                         TRAP    C$ERHRD
     022700  000041                         .WORD   33
     022702  003221                         .WORD   CMND
     022704  016570                         .WORD   CMDERR
2537 022706  000431                         BR      7$                      ; EXIT TEST
2538
2539 022710  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2540 022714  033702  002262                BIT     PLLIO,R2                ; CHECK FOR ERROR IN PARALLEL I/O TEST
2541 022720  001424                         BEQ     7$                      ; BRANCH, IF SUCCESSFUL TEST
2542 022722  043761  002262  000004        BIC     PLLIO,DPR2(R1)          ; CLEAR THE ERROR BIT FOR THIS TIME.
2543 022730  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2544 022734  032703  000001                BIT     #BIT0,R3                ; CHECK FOR ENTIRE TEST SKIPPED
2545 022740  001406                         BEQ     6$                      ; BR, IF TEST WASN'T SKIPPED
2546 022742  012702  011477                MOV     #T10E0,R2               ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2547 022746  004537  016722                JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2548 022752                                 EXIT    TST                     ; EXIT THIS TEST
     022752  104432                         TRAP    C$EXIT
     022754  000020                         .WORD   L10032-.
2549
2550 022756  012702  004331        6$:     MOV     #PLLP,R2                ; ERROR MESSAGE POINTER
2551 022762                                 ERRHRD  34,ROMD,RTERR           ; PARALLEL I/O TEST FAILED
     022762  104456                         TRAP    C$ERHRD
     022764  000042                         .WORD   34
     022766  003112                         .WORD   ROMD
     022770  016070                         .WORD   RTERR
2552
2553 022772                         7$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     022772  104406                         TRAP    C$CLP1
2554
2555 022774                                 ENDTST
     022774                      L10032:
     022774  104401                         TRAP    C$ETST
```

TEST 10: INVOKE TEST OF THE PARALLEL I/O PORT, Z8036

```
2557
2558                                    .SBTTL  TEST 11: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LOCAL SIDE)
2559
2560                                    ;++
2561                                    ;
2562                                    ;               IOP SELFTEST #11.
2563                                    ;
2564                                    ; THE ROM TEST OF THE IOP'S AMZ8016 DMA CONTROLLER CHIP IS INVOKED.
2565                                    ;
2566                                    ; DMA TRANSFERS WILL BE DONE ON THE LOCAL SIDE ONLY.  NEXT TEST DOES LSI-11.
2567                                    ;
2568                                    ;--
2569 022776                                BGNTST
2570
2571 022776  012702  005346                MOV     #ROM11A,R2              ; GET TITLE ADDRESS
2572 023002  004537  017336                JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2573 023006  005737  002206                TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2574 023012  001401                        BEQ     1$                      ; BRANCH, IF NOT DROPPED
2575 023014                                DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     023014  104444                        TRAP    C$DCLN
2576
2577 023016  004537  017014          1$:   JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2578 023022  013701  002216                MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2579 023026  005061  000006                CLR     DPR3(R1)                ; CLEAR TPR3 SO ONLY LOCAL DMA'S DONE.
2580 023032  013761  002264  000000        MOV     DMA,DPR0(R1)            ; SEND COMMAND TO DPR0
2581
2582 023040  012704  140000                MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2583 023044  005761  000000          2$:   TST     DPR0(R1)                ; TEST THE IOP'S DPR0 REG.
2584 023050  001423                        BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
2585 023052  004537  016754                JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
2586 023056  000001                        1
2587 023060  005204                        INC     R4                      ; ERROR, IF R4 WRAPS TO 0
2588 023062  001370                        BNE     2$                      ; ERROR, IF NO BRANCH
2589 023064  012702  004353                MOV     #DMAL,R2                ; SETUP FOR ERROR REPORTING.
2590 023070                                ERRDF   35,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
     023070  104455                        TRAP    C$ERDF
     023072  000043                        .WORD   35
     023074  003054                        .WORD   NORES
     023076  016412                        .WORD   NRES
2591 023100                                CKLOOP                          ; CHECK FOR LOOP ON TEST
     023100  104406                        TRAP    C$CLP1
2592 023102                                DODU    LUN                     ; DROP THIS UNIT
     023102  013700  002210                MOV     LUN,R0
     023106  104451                        TRAP    C$DODU
2593 023110  012737  177777  002206        MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
2594 023116                                DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     023116  104444                        TRAP    C$DCLN
```

```
2596
2597                                    ;
2598                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2599                                    ;
2600
2601 023120  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2602 023124  100005                        BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2603 023126                                ERRHRD  36,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
      023126  104456                       TRAP    C$ERHRD
      023130  000044                       .WORD   36
      023132  003221                       .WORD   CMND
      023134  016570                       .WORD   CMDERR
2604 023136  000436                       BR      8$                      ; EXIT TEST
2605
2606 023140  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2607 023144  033702  002264                BIT     DMA,R2                  ; CHECK FOR ERROR IN DMA TEST
2608 023150  001431                       BEQ     8$                      ; BRANCH, IF SUCCESSFUL TEST
2609 023152  043761  002264  000004       BIC     DMA,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2610 023160  016103  000006               MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2611 023164  032703  000001               BIT     #BIT0,R3                ; CHECK IF INTERRUPTS WERE TESTED
2612 023170  001406                       BEQ     6$                      ; BR, IF INTERRUPTS WERE TESTED
2613 023172  013702  012161               MOV     T11E0,R2                ; SETUP MESSAGE ADDRESS
2614 023176  004537  016722               JSR     R5,SKIPED               ; PRINT A PORTION OF SELFTEST NOT RUN
2615 023202  042703  000001               BIC     #BIT0,R3                ; CLEAR IT SO NEXT TEST NOT CONFUSED
2616 023206  042703  000002        6$:     BIC     #BIT1,R3                ; THE BIT 1 ERROR DOESN'T APPLY HERE
2617
2618 023212  032703  007777        7$:     BIT     #7777,R3                ; SEE IF ANY LEGITIMATE ERRORS EXIST
2619 023216  001406                       BEQ     8$                      ; BRANCH, IF NO ERRORS
2620 023220  012702  004353               MOV     #DMAL,R2                ; ERROR MESSAGE POINTER
2621 023224                                ERRHRD  37,ROMD,RTERR           ; DMA TEST FAILED
      023224  104456                       TRAP    C$ERHRD
      023226  000045                       .WORD   37
      023230  003112                       .WORD   ROMD
      023232  016070                       .WORD   RTERR
2622
2623 023234                        8$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
      023234  104406                       TRAP    C$CLP1
2624
2625 023236                                ENDTST
      023236                        L10033:
      023236  104401                       TRAP    C$ETST
```

```
                                .SBTTL  TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11 SIDE)

                                ;++
                                ;
                                ;               IOP SELFTEST #11.
                                ;
                                ; THE ROM TEST OF THE IOP'S AMZ8016 DMA CONTROLLER CHIP IS INVOKED.
                                ;
                                ; TESTS OF DMA TRANSFERS TO AND FROM THE LSI-11 BUS ARE DONE.
                                ;
                                ;--
023240                                  BGNTST

023240  012702  005416                  MOV     #ROM11B,R2              ; GET TITLE ADDRESS
023244  004537  017336                  JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
023250  005737  002206                  TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
023254  001401                          BEQ     1$                      ; BRANCH, IF NOT DROPPED
023256                                  DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
023256  104444                          TRAP    C$DCLN

023260  004537  017014          1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
023264  013701  002216                  MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
023270  013761  002242  000006          MOV     HIMEM,DPR3(R1)          ; SEND BASE OF HI 4KW PAGE (PAR FORMAT)
023276  013761  002264  000000          MOV     DMA,DPRO(R1)            ; SEND COMMAND TO DPRO

023304  012704  140000                  MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
023310  005761  000000          2$:     TST     DPRO(R1)                ; TEST THE IOP'S DPRO REG.
023314  001423                          BEQ     4$                      ; BRANCH, IF THE TEST HAS COMPLETED
023316  004537  016754                  JSR     R5,RDELAY               ; DELAY ABOUT 1 MS
023322  000001                          1
023324  005204                          INC     R4                      ; ERROR, IF R4 WRAPS TO 0
023326  001370                          BNE     2$                      ; ERROR, IF NO BRANCH
023330  012702  004413                  MOV     #DMAT,R2                ; SETUP FOR ERROR REPORTING.
023334                                  ERRDF   40,NORES,NRES           ; FATAL ERROR. NO RESPONSE FROM TEST.
023334  104455                          TRAP    C$ERDF
023336  000050                          .WORD   40
023340  003054                          .WORD   NORES
023342  016412                          .WORD   NRES
023344                                  CKLOOP                          ; CHECK FOR LOOP ON TEST
023344  104406                          TRAP    C$CLP1
023346                                  DODU    LUN                     ; DROP THIS UNIT
023346  013700  002210                  MOV     LUN,R0
023352  104451                          TRAP    C$DODU
023354  012737  177777  002206          MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG.
023362                                  DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
023362  104444                          TRAP    C$DCLN
```

TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11

```
2667
2668                                    ;
2669                                    ; TO HERE IF TEST COMPLETED, AND CHECK DPR2 FOR SUCCESS/FAILURE.
2670                                    ;
2671
2672 023364  016102  000002        4$:     MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2673 023370  100005                        BPL     5$                      ; BR, IF NO COMMAND STATUS ERROR
2674 023372                                ERRHRD  41,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     023372  104456                        TRAP    C$ERHRD
     023374  000051                        .WORD   41
     023376  003221                        .WORD   CMND
     023400  016570                        .WORD   CMDERR
2675 023402  000445                        BR      8$                      ; EXIT TEST
2676
2677 023404  016102  000004        5$:     MOV     DPR2(R1),R2             ; READ IOP DPR2
2678 023410  033702  002264                BIT     DMA,R2                  ; CHECK FOR ERROR IN DMA TEST
2679 023414  001440                        BEQ     8$                      ; BRANCH, IF SUCCESSFUL TEST
2680 023416  043761  002264  000004        BIC     DMA,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2681 023424  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2682 023430  032703  000001                BIT     #BIT0,R3                ; CHECK IF INTERRUPTS WERE TESTED
2683 023434  001406                        BEQ     6$                      ; BR, IF INTERRUPTS WERE TESTED
2684 023436  013702  012161                MOV     T11E0,R2                ; SETUP MESSAGE ADDRESS
2685 023442  004537  016722                JSR     R5,SKIPED               ; PRINT A PORTION OF SELFTEST NOT RUN
2686 023446  042703  000001                BIC     #BIT0,R3                ; CLEAR IT SO NEXT TEST NOT CONFUSED
2687
2688 023452  032703  000002        6$:     BIT     #BIT1,R3                ; CHECK IF BUS TESTS WERE RUN
2689 023456  001406                        BEQ     7$                      ; BR, IF BUS TESTS WERE RUN
2690 023460  012702  012260                MOV     #T11E1,R2               ; SETUP MESSAGE ADDRESS
2691 023464  004537  016722                JSR     R5,SKIPED               ; PRINT BUS TESTS NOT DONE
2692 023470  042703  000002                BIC     #BIT1,R3                ; CLEAR IT SO NEXT TEST NOT CONFUSED
2693
2694 023474  032703  007777        7$:     BIT     #7777,R3                ; SEE IF ANY LEGITIMATE ERRORS EXIST
2695 023500  001406                        BEQ     8$                      ; BRANCH, IF NO ERRORS
2696 023502  012702  004413                MOV     #DMAT,R2                ; ERROR MESSAGE POINTER
2697 023506                                ERRHRD  42,ROMD,RTERR           ; DMA TEST FAILED
     023506  104456                        TRAP    C$ERHRD
     023510  000052                        .WORD   42
     023512  003112                        .WORD   ROMD
     023514  016070                        .WORD   RTERR
2698
2699 023516                        8$:     CKLOOP                          ; CHECK FOR LOOP ON TEST
     023516  104406                        TRAP    C$CLP1
2700
2701 023520                                ENDTST
     023520                     L10034:
     023520  104401                        TRAP    C$ETST
```

TEST 12: INVOKE THE DMA CONTROLLER TEST OF THE AMZ8016 (LSI-11

```
                                .SBTTL  TEST 13: LSI-11 BUS INTERRUPT TEST

                                ;++
                                ;
                                ;               IOP SELFTEST #12.
                                ;
                                ;       INVOKE THE LSI-11 BUS INTERRUPT TEST
                                ;
                                ;--

023522                          BGNTST

023522  012702  005462          MOV     #ROMT12,R2              ; GET TITLE ADDRESS
023526  004537  017336          JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
023532  005737  002206          TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
023536  001401                  BEQ     1$                      ; BRANCH, IF NOT DROPPED
023540                          DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
023540  104444                  TRAP    C$DCLN

023542  004537  017014  1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY

023546  013701  002216  2$:     MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
                        ;       MOV     #1770,QIRVEC            ; ADDRESS 1770 IS THE INTERRUPT VECTOR  ;JB REV A-0
023552  012737  000370  002220  MOV     #370,QIRVEC             ; ADDRESS 370 IS THE INTERRUPT VECTOR   ;JB REV A-0
023560  005037  002240          CLR     INTFLG                  ; SOFTWARE FLAG INDICATES INT. OCCURED
                        ;       SETVEC  QIRVEC,#QIRSRV,#PRIO7   ; SETUP THE VECTOR; TEMP PRIORITY OF 7  ;JB REV A-0
023564                          SETVEC  QIRVEC,#QIRSRV,#PRIO6   ; SETUP THE VECTOR; TEMP PRIORITY OF 6  ;JB REV A-0
023564  012746  000300          MOV     #PRIO6,-(SP)
023570  012746  024272          MOV     #QIRSRV,-(SP)
023574  013746  002220          MOV     QIRVEC,-(SP)
023600  012746  000003          MOV     #3,-(SP)
023604  104437                  TRAP    C$SVEC
023606  062706  000010          ADD     #10,SP
                        ;       SETPRI  #PRIO7                  ; RAISE CPU SO IOP CAN'T INTERRUPT YET. ;JB REV A-0
023612                          SETPRI  #PRIO6                  ; RAISE CPU SO IOP CAN'T INTERRUPT YET. ;JB REV A-0
023612  012700  000300          MOV     #PRIO6,R0
023616  104441                  TRAP    C$SPRI
023620  013761  002220  000006  MOV     QIRVEC,DPR3(R1)         ; TELL IOP WHICH VECTOR WE WANT
023626  013761  002266  000000  MOV     QIR,DPR0(R1)            ; SEND QIR TEST COMMAND TO DPR0
023634                          SETPRI  #PRIO0                  ; LOWER PRIORITY SO IOP CAN INTERRUPT
023634  012700  000000          MOV     #PRIO0,R0
023640  104441                  TRAP    C$SPRI

023642  004537  016754          JSR     R5,RDELAY               ; DELAY, AND THEN CHECK INT. OCCURED
023646  000002                  2                               ; 2 MILLISECONDS
023650  005737  002240          TST     INTFLG                  ; IOP INTERRUPTED, IF INTFLG SET
023654  001060                  BNE     6$                      ; BR, IF OK
023656  016102  000002          MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
023662  100006                  BPL     3$                      ; BR, IF NO COMMAND STATUS ERROR
023664                          ERRHRD  43,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
023664  104456                  TRAP    C$ERHRD
023666  000053                  .WORD   43
023670  003221                  .WORD   CMND
023672  016570                  .WORD   CMDERR
023674                  EXIT    TST                             ; EXIT TEST
```

TEST 13: LSI-11 BUS INTERRUPT TEST

```
023674  104432                          TRAP    C$EXIT
023676  000404                          .WORD   L10035 .
```

```
2746
2747 023700  016102  000004          5$:     MOV     DPR2(R1),R2             ; READ IOP TPR2
2748 023704  033702  002266                  BIT     QIR,R2                  ; CHECK FOR A SELFTEST ERROR
2749 023710  001424                          BEQ     5$                      ; BR, IF NO ERROR.
2750 023712  016103  000006                  MOV     DPR3(R1),R3             ; READ SELFTEST EXTENDED ERROR REGISTER
2751 023716  032703  000001                  BIT     #BIT0,R3                ; CHECK FOR ENTIRE TEST SKIPPED
2752 023722  001406                          BEQ     4$                      ; BR, IF TEST WASN'T SKIPPED
2753 023724  012702  012625                  MOV     #T12E0,R2               ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2754 023730  004537  016722                  JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2755 023734                                  EXIT    TST                     ; EXIT THIS TEST
     023734  104432                          TRAP    C$EXIT
     023736  000344                          .WORD   L10035-.
2756
2757 023740  032703  000004          4$:     BIT     #BIT2,R3                ; NOW CHECK FOR ROM IN VECTOR SPACE
2758 023744  001406                          BEQ     5$                      ; BR, IF RAM AND NOT ROM IN VECTOR SPACE
2759 023746  012702  012771                  MOV     #T12E2,R2               ; SETUP MESSAGE ADDRESS FOR PRINTOUT
2760 023752  004537  016722                  JSR     R5,SKIPED               ; PRINT THIS TEST SKIPPED
2761 023756                                  EXIT    TST                     ; EXIT THIS TEST
     023756  104432                          TRAP    C$EXIT
     023760  000322                          .WORD   L10035-.
2762
2763                                 ;5$:    SETPRI  #PRI07                  ; RESTORE PRIORITY TO 7                 ;JB REV A-0
2764 023762                          5$:     SETPRI  #PRI06                  ; RESTORE PRIORITY TO 6                 ;JB REV A-0
     023762  012700  000300                  MOV     #PRI06,R0
     023766  104441                          TRAP    C$SPRI
2765 023770  012702  004453                  MOV     #QIRT,R2                ; ERROR MESSAGE POINTER
2766 023774  012703  004500                  MOV     #QIRT1,R3               ; ERROR MESSAGE POINTER
2767 024000                                  ERRHRD  44,ROMD,GENMSG          ; ERROR.  NO INTERRUPT FROM IOP
     024000  104456                          TRAP    C$ERHRD
     024002  000054                          .WORD   44
     024004  003112                          .WORD   ROMD
     024006  016444                          .WORD   GENMSG
2768 024010                                  CKLOOP                          ; CHECK FOR LOOP ON TEST
     024010  104406                          TRAP    C$CLP1
2769 024012                                  EXIT    TST                     ; EXIT THIS TEST
     024012  104432                          TRAP    C$EXIT
     024014  000266                          .WORD   L10035-.
```

TEST 13: LSI-11 BUS INTERRUPT TEST

```
2771
2772                                        ;6$:    SETPRI  #PRIO7                  ; SET CPU TEMORARILY TO 7               ;JB REV A-0
2773 024016                                 6$:     SETPRI  #PRIO6                  ; SET CPU TEMORARILY TO 6               ;JB REV A-0
     024016  012700  000300                         MOV     #PRIO6,R0
     024022  104441                                 TRAP    C$SPRI
2774 024024  005037  002240                         CLR     INTFLG                  ; CLEAR THE SOFTWARE INT. FLAG
2775 024030                                         CLRVEC  QIRVEC                  ; CLEAR THE VECTOR JUST USED
     024030  013700  002220                         MOV     QIRVEC,R0
     024034  104436                                 TRAP    C$CVEC
2776 024036  062737  000004  002220                 ADD     #4,QIRVEC               ; ADVANCE TO THE NEXT (#1774)
2777                                        ;       SETVEC  QIRVEC,#QIRSRV,#PRIO7   ; SETUP VECTOR FOR NEXT TEST            ;JB REV A-0
2778 024044                                         SETVEC  QIRVEC,#QIRSRV,#PRIO6   ; SETUP VECTOR FOR NEXT TEST            ;JB REV A-0
     024044  012746  000300                         MOV     #PRIO6,-(SP)
     024050  012746  024272                         MOV     #QIRSRV,-(SP)
     024054  013746  002220                         MOV     QIRVEC,-(SP)
     024060  012746  000003                         MOV     #3,-(SP)
     024064  104437                                 TRAP    C$SVEC
     024066  062706  000010                         ADD     #10,SP
2779 024072                                         SETPRI  #PRIO0                  ; LOWER PRIORITY TO 0
     024072  012700  000000                         MOV     #PRIO0,R0
     024076  104441                                 TRAP    C$SPRI
2780
2781 024100  012704  140000                         MOV     #140000,R4              ; R4 WILL BE USED AS A COUNTER
2782 024104  005737  002240                 7$:     TST     INTFLG                  ; IOP INTERRUPTED, IF INTFLG SET
2783 024110  001023                                 BNE     8$                      ; BR, IF OK
2784 024112  004537  016754                         JSR     R5,RDELAY               ; DELAY, AND THEN TEST THAT INT. OCCURED
2785 024116  000001                                 1                               ; 1 MILLISECOND
2786 024120  005204                                 INC     R4                      ; WAIT FOR INTERRUPT FROM IOP
2787 024122  001370                                 BNE     7$                      ; WAIT.  ERROR IF R4 WRAPS TO 0
2788
2789                                        ;       SETPRI  #PRIO7                  ; RESTORE PRIORITY TO 7                 ;JB REV A-0
2790 024124                                         SETPRI  #PRIO6                  ; RESTORE PRIORITY TO 6                 ;JB REV A-0
     024124  012700  000300                         MOV     #PRIO6,R0
     024130  104441                                 TRAP    C$SPRI
2791 024132  012702  004453                         MOV     #QIRT,R2                ; ERROR MESSAGE POINTER
2792 024136  012703  004552                         MOV     #QIRT2,R3               ; ERROR MESSAGE POINTER
2793 024142                                         ERRHRD  45,ROMD,GENMSG          ; ERROR.  NO INTERRUPT FROM IOP...
     024142  104456                                 TRAP    C$ERHRD
     024144  000055                                 .WORD   45
     024146  003112                                 .WORD   ROMD
     024150  016444                                 .WORD   GENMSG
2794 024152                                         CKLOOP                          ; CHECK FOR LOOP ON TEST
     024152  104406                                 TRAP    C$CLP1
2795 024154                                         EXIT    TST                     ; EXIT THIS TEST
     024154  104432                                 TRAP    C$EXIT
     024156  000124                                 .WORD   L10035-.
```

TEST 13: LSI-11 BUS INTERRUPT TEST

```
2797
2798 024160  000005                    8$:     RESET                   ; ISSUE A BUS RESET AS PART OF..
2799                                                                    ; ..THE IOP SELFTEST CODE.
2800 024162  004537  016754                    JSR     R5,RDELAY       ; WAIT FOR THE RESET TO COMPLETE
2801 024166  000062                            50.                     ; 50 MILLISECONDS
2802 024170  005761  000000                    TST     DPR0(R1)        ; TEST THE IOP'S DPR0 REGISTER
2803 024174  001413                            BEQ     9$              ; BR MEANS TEST COMPLETED
2804 024176  012702  004453                    MOV     #QIRT,R2        ; QIR TEST MESSAGE ADDRESS
2805
2806 024202                                    ERRDF   46,NORES,NRES   ; FATAL ERROR.  NO RESPONSE FROM TEST
     024202  104455                            TRAP    C$ERDF
     024204  000056                            .WORD   46
     024206  003054                            .WORD   NORES
     024210  016412                            .WORD   NRES
2807 024212                                    CKLOOP                  ; CHECK FOR LOOP ON TEST
     024212  104406                            TRAP    C$CLP1
2808 024214  012737  177777  002206            MOV     #-1,DROPUN      ; SET DROPPED UNIT FLAG
2809 024222                                    DOCLN                   ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     024222  104444                            TRAP    C$DCLN
2810
2811 024224  016102  000004            9$:     MOV     DPR2(R1),R2     ; READ IOP DPR2
2812 024230  033702  002266                    BIT     QIR,R2          ; CHECK FOR ERROR IN QIR TEST
2813 024234  001413                            BEQ     10$             ; BR, IF NO ERROR
2814 024236  043761  002266  000004            BIC     QIR,DPR2(R1)    ; CLEAR THE ERROR BIT FOR THIS TIME.
2815 024244  016103  000006                    MOV     DPR3(R1),R3     ; READ DPR3 FOR EXTENDED INFO
2816 024250  012702  004453                    MOV     #QIRT,R2        ; ERROR MESSAGE POINTER
2817 024254                                    ERRHRD  47,ROMD,RTERR   ; QIR TEST FAILED
     024254  104456                            TRAP    C$ERHRD
     024256  000057                            .WORD   47
     024260  003112                            .WORD   ROMD
     024262  016070                            .WORD   RTERR
2818
2819 024264                            10$:    CKLOOP                  ; CHECK FOR LOOP ON TEST
     024264  104406                            TRAP    C$CLP1
2820 024266                                    EXIT    TST             ; EXIT THIS TEST
     024266  104432                            TRAP    C$EXIT
     024270  000012                            .WORD   L10035-.
2821
2822
2823                                   ;++
2824                                   ;
2825                                   ;       IOP INTERRUPT SERVICE ROUTINE FOR TEST 12.
2826                                   ;
2827                                   ;--
2828 024272                                    BGNSRV  QIRSRV
     024272                            QIRSRV::
2829
2830 024272  012737  177777  002240            MOV #-1,INTFLG          ; SET FLAG TO INDICATE INT. OCCURED
2831 024300                                    ENDSRV                  ; EXIT SERVICE ROUTINE
     024300                            L10036:
     024300  000002                            RTI
2832
2833 024302                                    ENDTST
     024302                            L10035:
     024302  104401                            TRAP    C$ETST
```

```
2835
2836
2837                                    .SBTTL  TEST 14: INVOKE THE TWO-PORT RAM TEST
2838
2839                                    ;++
2840                                    ;
2841                                    ;               IOP SELFTEST #13.
2842                                    ;
2843                                    ; THE ROM TEST OF THE IOP'S TWO-PORT RAM IS INVOKED.  THE TWO-PORT RAM
2844                                    ; IS ALSO CONSIDERED AS THE LSI-11 BUS INTERFACE.
2845                                    ;
2846                                    ; THE PROTOCOL BETWEEN THIS PROGRAM AND THE IOP BREAKS DOWN FOR THIS
2847                                    ; PARTICULAR TEST, BECAUSE THE IOP TEST OF THE TWO-PORT RAM MUST
2848                                    ; DISABLE THE DPR IN ORDER TO TEST IT.  THEREFORE, THE STANDARD COMMUNI-
2849                                    ; CATION METHOD ISN'T POSSIBLE.  THIS TEST SIMPLY INITIATES IOP TEST
2850                                    ; #13 AND THEN DELAYS ABOUT 1 SECOND; AFTER WHICH, WE MUST ASSUME THAT
2851                                    ; THE TEST HAS COMPLETED AND THE DPR HAS BEEN RE-ENABLED.  DPR2 IS THEN
2852                                    ; CHECKED FOR ERROR BITS.
2853                                    ;
2854                                    ;--
2855
2856 024304                                    BGNTST
2857
2858 024304  012702  005507                    MOV     #ROMT13,R2              ; GET TITLE ADDRESS
2859 024310  004537  017336                    JSR     R5,PNTFLG               ; SEE IF PNT FLAG IS SET
2860 024314  005737  002206                    TST     DROPUN                  ; CHECK THIS UNIT FOR BEING DROPPED
2861 024320  001401                            BEQ     1$                      ; BRANCH, IF NOT DROPPED
2862 024322                                    DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     024322  104444                           TRAP    C$DCLN
2863
2864 024324  004537  017014            1$:     JSR     R5,CKTPRO               ; SEE IF THE CURRENT IOP IS READY
2865 024330  013701  002216                    MOV     QBASE,R1                ; R1 = IOP BASE ADDRESS
2866 024334  013761  002270  000000            MOV     DPR,DPRO(R1)            ; SEND COMMAND TO DPRO
2867 024342  004537  016754                    JSR     R5,RDELAY               ; DELAY BEFORE CHECKING FOR ERROR.
2868 024346  011610                            5000.                           ; ABOUT 5 SECONDS.
2869
2870 024350  016102  000002                    MOV     DPR1(R1),R2             ; READ BOOT COMMAND STATUS REGISTER
2871 024354  100005                            BPL     2$                      ; BR, IF NO COMMAND STATUS ERROR
2872 024356                                    ERRHRD  50,CMND,CMDERR          ; ERROR.  BOOT CODE DIDN'T LIKE THE COMMAND
     024356  104456                           TRAP    C$ERHRD
     024360  000062                           .WORD   50
     024362  003221                           .WORD   CMND
     024364  016570                           .WORD   CMDERR
2873 024366  000442                            BR      4$                      ; EXIT TEST
```

TEST 14: INVOKE THE TWO-PORT RAM TEST

```
2875
2876 024370  016102  000004          2$:   MOV     DPR2(R1),R2             ; READ IOP DPR2
2877 024374  033702  002270                BIT     DPR,R2                  ; CHECK FOR ERROR IN DPR TEST
2878 024400  001435                        BEQ     4$                      ; BRANCH, IF SUCCESSFUL TEST
2879 024402  043761  002270  000004        BIC     DPR,DPR2(R1)            ; CLEAR THE ERROR BIT FOR THIS TIME.
2880 024410  016103  000006                MOV     DPR3(R1),R3             ; READ DPR3 FOR EXTENDED INFO
2881 024414  032703  000010                BIT     #BIT3,R3                ; CHECK IF BUS WRITES/INTERRUPTS RUN
2882 024420  001410                        BEQ     3$                      ; BR, IF THE TESTS WERE RUN
2883 024422  012702  013545                MOV     #T13E3,R2               ; SETUP MESSAGE ADDRESS
2884 024426  004537  016722                JSR     R5,SKIPED               ; PRINT THAT THE TESTS WERE NOT RUN
2885 024432  042703  000010                BIC     #BIT3,R3                ; CLEAR THE BIT SO NEXT TEST NOT CONFUSED
2886 024436  005703                        TST     R3                      ; CHECK IF LEGITIMATE ERRORS EXIST
2887 024440  001415                        BEQ     4$                      ; BRANCH, IF NO ERRORS
2888
2889 024442  012702  004626          3$:   MOV     #DPRT,R2                ; ERROR MESSAGE POINTER
2890 024446                                ERRDF   51,ROMD,RTERR           ; DPR TEST FAILED
     024446  104455                        TRAP    C$ERDF
     024450  000063                        .WORD   51
     024452  003112                        .WORD   ROMD
     024454  016070                        .WORD   RTERR
2891 024456                                DODU    LUN                     ; FATAL ERROR.  DROP THIS UNIT
     024456  013700  002210                MOV     LUN,R0
     024462  104451                        TRAP    C$DODU
2892 024464  012737  177777  002206        MOV     #-1,DROPUN              ; SET DROPPED UNIT FLAG
2893 024472                                DOCLN                           ; ABORT THE DIAGNOSTIC FOR THIS UNIT
     024472  104444                        TRAP    C$DCLN
2894
2895 024474                          4$:   CKLOOP                          ; CHECK FOR LOOP ON TEST
     024474  104406                        TRAP    C$CLP1
2896
2897 024476                                ENDTST
     024476                         L10037:
     024476  104401                        TRAP    C$ETST
```

```
2899
2900                                    .TITLE PARAMETER CODING
2901                                    .SBTTL  IDENTIFICATION
2902
2903                                    .SBTTL  HARDWARE PARAMETER CODING SECTION
2904
2905                                    ;++
2906                                    ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
2907                                    ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
2908                                    ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2909                                    ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
2910                                    ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2911                                    ; WITH THE OPERATOR.
2912                                    ;--
2913
2914 024500                                     BGNHRD
     024500  000033                             .WORD L10040-L$HARD/2
     024502                             L$HARD::
2915
2916 024502                                     GPRMD   CCPU,0,D,740,2,15.,NO           ; GET SBC ID SWITCH
     024502  000042                             .WORD   T$CODE
     024504  003415                             .WORD   CCPU
     024506  000740                             .WORD   740
     024510  000002                             .WORD   T$LOLIM
     024512  000017                             .WORD   T$HILIM
2917
2918 024514                                     GPRML   BASE,2,-1,YES                   ; GET LSI-11 BUS BASE ADDR. RANGE
     024514  001130                             .WORD   T$CODE
     024516  003443                             .WORD   BASE
     024520  177777                             .WORD   -1
2919
2920 024522                                     GPRML   LOOP1,4,-1,YES                  ; ASK IF LOOPBACK...
     024522  002130                             .WORD   T$CODE
     024524  003535                             .WORD   LOOP1
     024526  177777                             .WORD   -1
2921
2922                                                                                    ; ...IS INSTALLED FOR SLU1
2923 024530                                     GPRML   LOOP2,6,-1,YES                  ; ASK IF CHANNEL A LOOPBACK INSTALLED
     024530  003130                             .WORD   T$CODE
     024532  003622                             .WORD   LOOP2
     024534  177777                             .WORD   -1
2924
2925 024536                                     GPRML   LOOP3,10,-1,YES                 ; ASK IF CHANNEL B LOOPBACK INSTALLED
     024536  004130                             .WORD   T$CODE
     024540  003702                             .WORD   LOOP3
     024542  177777                             .WORD   -1
2926
2927 024544                                     GPRML   LOOP4,12,-1,YES                 ; ASK IF PARALLEL LOOPBACK INSTALLED
     024544  005130                             .WORD   T$CODE
     024546  003762                             .WORD   LOOP4
     024550  177777                             .WORD   -1
```

```
2929
2930 024552
     024552  006130                     GPRML   SLU2CF,14,-1,YES        ; IS SLU2 SET FOR DMA?
     024554  004027                     .WORD   T$CODE
     024556  177777                     .WORD   SLU2CF
                                        .WORD   -1
2931
2932 024560
     024560  007130                     GPRML   UROM,16,-1,YES          ; ASK IF USER ROM IS TO...
     024562  004127                     .WORD   T$CODE
     024564  177777                     .WORD   UROM
                                        .WORD   -1
2933
2934 024566                             EXIT    HRD                     ; ...BE TESTED.
     024566  001004                     .WORD   T$CODE
2935 024570                             ENDHRD
                                        .EVEN
     024570                     L10040:
2936
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

                                        BGNSFT
024570  000000                          .WORD L10041-L$SOFT/2
024572                          L$SOFT::

                                        ENDSFT
                                        .EVEN
024572                          L10041:

024572                          $PATCH::
024572                                  .BLKW   50

                                        LASTAD
                                        .EVEN
024712  025346                          .WORD T$FREE
024714  000214                          .WORD T$SIZE
024716                          L$LAST::
```

```
                                        ; ++
                                        ; HARD-CODED HARDWARE P-TABLES
                                        ;
                                        ; THERE ARE 14 HARDWARE P-TABLES HERE; HOWEVER, KEEP IN MIND THAT
                                        ; THE MAXIMUM LEGAL NUMBER OF KXT11-CA IOP'S ON ANY ONE SYSTEM IS
                                        ; 14(D), AND THE LEGAL UNIT NUMBERS ARE 2 THROUGH 15(D).  IOP UNITS
                                        ; 0 AND 1 ARE RESERVED FOR THE NON-MULTIPROCESSING ARBITER OR DMA
                                        ; DEVICE AND THE HOST MULTIPROCESSOR ARBITER, RESPECTIVELY, AND SHOULD
                                        ; NOT BE USED.  IOPS 0 AND 1 AUTOMATICALLY DISCONNECT THE IOP FROM
                                        ; THE LSI-11 BUS.
                                        ; --

024716                                  BGNSETUP        14.

                                        ; UNIT 0

                                        BGNPTAB
024716  024746                          .WORD   L10043
024720  000010                          .WORD   L10044-./2-1
024722                          L10042:
024722  000000                          .WORD   0
024724  000001                          .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
024726  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
024730  000000                          .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
024732  000000                          .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
024734  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
024736  000000                          .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
024740  000000                          .WORD   0               ; TEST USER ROM DEFAULT IS NO
024742                                  ENDPTAB
024742                          L10044:

                                        ; UNIT 1

                                        BGNPTAB
024742  024772                          .WORD   L10045
024744  000010                          .WORD   L10046-./2-1
024746                          L10043:
024746  000000                          .WORD   0
024750  000001                          .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
024752  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
024754  000000                          .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
024756  000000                          .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
024760  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
024762  000000                          .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
024764  000000                          .WORD   0               ; TEST USER ROM DEFAULT IS NO
024766                                  ENDPTAB
024766                          L10046:
```

SOFTWARE PARAMETER CODING SECTION

```
2999
3000                                        ; UNIT 2
3001
3002 024766                                 BGNPTAB
     024766  025016                         .WORD   L10047
     024770  000010                         .WORD   L10050-./2-1
     024772                         L10045:
3003 024772  000000                         .WORD   0
3004 024774  000001                         .WORD   1           ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3005 024776  000000                         .WORD   0           ; LOOP-BACK DEFAULT IS NO (SLU1)
3006 025000  000000                         .WORD   0           ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3007 025002  000000                         .WORD   0           ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3008 025004  000000                         .WORD   0           ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3009 025006  000000                         .WORD   0           ; SLU2 DMA OPERATION DEFAULT IS NO
3010 025010  000000                         .WORD   0           ; TEST USER ROM DEFAULT IS NO
3011 025012                                 ENDPTAB
     025012                         L10050:
3012
3013                                        ; UNIT 3
3014
3015 025012                                 BGNPTAB
     025012  025042                         .WORD   L10051
     025014  000010                         .WORD   L10052-./2-1
     025016                         L10047:
3016 025016  000000                         .WORD   0
3017 025020  000001                         .WORD   1           ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3018 025022  000000                         .WORD   0           ; LOOP-BACK DEFAULT IS NO (SLU1)
3019 025024  000000                         .WORD   0           ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3020 025026  000000                         .WORD   0           ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3021 025030  000000                         .WORD   0           ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3022 025032  000000                         .WORD   0           ; SLU2 DMA OPERATION DEFAULT IS NO
3023 025034  000000                         .WORD   0           ; TEST USER ROM DEFAULT IS NO
3024 025036                                 ENDPTAB
     025036                         L10052:
```

SOFTWARE PARAMETER CODING SECTION

```
3026
3027                                        ; UNIT 4
3028
3029 025036                                 BGNPTAB
     025036  025066                         .WORD   L10053
     025040  000010                         .WORD   L10054-./2-1
     025042                         L10051:
3030 025042  000000                         .WORD   0
3031 025044  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3032 025046  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3033 025050  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3034 025052  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3035 025054  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3036 025056  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3037 025060  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3038 025062                                 ENDPTAB
     025062                         L10054:
3039
3040                                        ; UNIT 5
3041
3042 025062                                 BGNPTAB
     025062  025112                         .WORD   L10055
     025064  000010                         .WORD   L10056-./2-1
     025066                         L10053:
3043 025066  000000                         .WORD   0
3044 025070  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3045 025072  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3046 025074  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3047 025076  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3048 025100  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3049 025102  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3050 025104  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3051 025106                                 ENDPTAB
     025106                         L10056:
```

SOFTWARE PARAMETER CODING SECTION

```
                                        ; UNIT 6
                                        BGNPTAB
025106                                  .WORD   L10057
025106  025136                          .WORD   L10060-./2-1
025110  000010                  L10055:
025112                                  .WORD   0
025112  000000                          .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
025114  000001                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
025116  000000                          .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
025120  000000                          .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
025122  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
025124  000000                          .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
025126  000000                          .WORD   0               ; TEST USER ROM DEFAULT IS NO
025130  000000                          ENDPTAB
025132                          L10060:

                                        ; UNIT 7
                                        BGNPTAB
025132                                  .WORD   L10061
025132  025162                          .WORD   L10062-./2-1
025134  000010                  L10057:
025136                                  .WORD   0
025136  000000                          .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
025140  000001                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
025142  000000                          .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
025144  000000                          .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
025146  000000                          .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
025150  000000                          .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
025152  000000                          .WORD   0               ; TEST USER ROM DEFAULT IS NO
025154  000000                          ENDPTAB
025156                          L10062:
```

SOFTWARE PARAMETER CODING SECTION

```
3080
3081                                        ; UNIT 8
3082
3083 025156                                 BGNPTAB
     025156  025206                         .WORD   L10063
     025160  000010                         .WORD   L10064-./2-1
     025162                         L10061:
3084 025162  000000                         .WORD   0
3085 025164  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3086 025166  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3087 025170  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3088 025172  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3089 025174  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3090 025176  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3091 025200  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3092 025202                                 ENDPTAB
     025202                         L10064:
3093
3094                                        ; UNIT 9
3095
3096 025202                                 BGNPTAB
     025202  025232                         .WORD   L10065
     025204  000010                         .WORD   L10066-./2-1
     025206                         L10063:
3097 025206  000000                         .WORD   0
3098 025210  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3099 025212  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3100 025214  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3101 025216  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3102 025220  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3103 025222  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3104 025224  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3105 025226                                 ENDPTAB
     025226                         L10066:
```

SOFTWARE PARAMETER CODING SECTION

```
3107
3108                                        ; UNIT 10
3109
3110 025226                                 BGNPTAB
     025226  025256                         .WORD   L10067
     025230  000010                         .WORD   L10070-./2-1
     025232                         L10065:
3111 025232  000000                         .WORD   0
3112 025234  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3113 025236  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3114 025240  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3115 025242  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3116 025244  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3117 025246  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3118 025250  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3119 025252                                 ENDPTAB
     025252                         L10070:
3120
3121                                        ; UNIT 11
3122
3123 025252                                 BGNPTAB
     025252  025302                         .WORD   L10071
     025254  000010                         .WORD   L10072-./2-1
     025256                         L10067:
3124 025256  000000                         .WORD   0
3125 025260  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3126 025262  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3127 025264  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3128 025266  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3129 025270  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3130 025272  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3131 025274  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3132 025276                                 ENDPTAB
     025276                         L10072:
```

SOFTWARE PARAMETER CODING SECTION

```
3134
3135                                        ; UNIT 12
3136
3137 025276                                 BGNPTAB
     025276  025326                         .WORD   L10073
     025300  000010                         .WORD   L10074-./2-1
     025302                         L10071:
3138 025302  000000                         .WORD   0
3139 025304  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3140 025306  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3141 025310  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3142 025312  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3143 025314  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3144 025316  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3145 025320  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3146 025322                                 ENDPTAB
     025322                         L10074:
3147
3148                                        ; UNIT 13
3149
3150 025322                                 BGNPTAB
     025322  000000                         .WORD   0
     025324  000010                         .WORD   L10076-./2-1
     025326                         L10073:
3151 025326  000000                         .WORD   0
3152 025330  000001                         .WORD   1               ; BUS ADDRESS RANGE (LOW IS DEFAULT)
3153 025332  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (SLU1)
3154 025334  000000                         .WORD   0               ; CHANNEL A LOOP-BACK DEFAULT IS NO (SLU2)
3155 025336  000000                         .WORD   0               ; CHANNEL B LOOP-BACK DEFAULT IS NO (SLU2)
3156 025340  000000                         .WORD   0               ; LOOP-BACK DEFAULT IS NO (PARALLEL I/O)
3157 025342  000000                         .WORD   0               ; SLU2 DMA OPERATION DEFAULT IS NO
3158 025344  000000                         .WORD   0               ; TEST USER ROM DEFAULT IS NO
3159 025346                                 ENDPTAB
     025346                         L10076:
3160
3161 025346                                         ENDSETUP
3162          000001                        .END
```

SYMBOL TABLE

```
ABORT   017704          C$DU   = 000053          DPR2   = 000004 G        G$RADL= 000120          L$DESC  014432 G
ADR    = 000020 G       C$EDIT= 000003          DPR3   = 000006 G        G$RADO= 000020          L$DESP  002076 G
ASSEMB= 000010          C$ERDF= 000055          DPR4   = 000010 G        G$XFER= 000004          L$DEVP  002060 G
BADSW   003151          C$ERHR= 000056          DPR5   = 000012 G        G$YES  = 000010         L$DISP  002124 G
BASE    003443          C$ERRO= 000060          DPR6   = 000014 G        HELP   = 000000         L$DLY   002116 G
BEVNT   004174          C$ERSF= 000054          DPR7   = 000016 G        HIMEM   002242          L$DTP   002040 G
BIT0   = 000001 G       C$ERSO= 000057          DROP    014772           HOE    = 100000 G       L$DTYP  002034 G
BIT00  = 000001 G       C$ESCA= 000010          DROPUN  002206           IBE    = 010000 G       L$DU    020042 G
BIT01  = 000002 G       C$ESEG= 000005          DSPCOD  002122 G         IDU    = 000040 G       L$DUT   002072 G
BIT02  = 000004 G       C$ESUB= 000003          EF.CON= 000036 G         IER    = 020000 G       L$DVTY  014422 G
BIT03  = 000010 G       C$ETST= 000001          EF.NEW= 000035 G         INITNG  015676          L$EF    002052 G
BIT04  = 000020 G       C$EXIT= 000032          EF.PWR= 000034 G         INITOK  015763          L$ENVI  002044 G
BIT05  = 000040 G       C$GETB= 000026          EF.RES= 000037 G         INTACK  015606          L$ETP   002102 G
BIT06  = 000100 G       C$GETW= 000027          EF.STA= 000040 G         INTFLG  002240          L$EXP1  002046 G
BIT07  = 000200 G       C$GMAN= 000043          END     017706           IOPN    002212          L$EXP4  002064 G
BIT08  = 000400 G       C$GPHR= 000042          EVL    = 000004 G        IOPNN   002214          L$EXP5  002066 G
BIT09  = 001000 G       C$GPLO= 000030          E$END  = 002100          ISR    = 000100 G       L$HARD  024502 G
BIT1   = 000002 G       C$GPRI= 000040          E$LOAD= 000035           IXE    = 004000 G       L$HIME  002120 G
BIT10  = 002000 G       C$INIT= 000011          F$AU   = 000015          I$AU   = 000041         L$HPCP  002016 G
BIT11  = 004000 G       C$INLP= 000020          F$AUTO= 000020           I$AUTO= 000041          L$HPTP  002022 G
BIT12  = 010000 G       C$MANI= 000050          F$BGN  = 000040          I$CLN  = 000041         L$HW    002162 G
BIT13  = 020000 G       C$MEM  = 000031         F$CLEA= 000007           I$DU   = 000041         L$ICP   002104 G
BIT14  = 040000 G       C$MSG  = 000023         F$DU   = 000016          I$HRD  = 000041         L$INIT  017412 G
BIT15  = 100000 G       C$OPEN= 000034          F$END  = 000041          I$INIT= 000041          L$LADP  002026 G
BIT2   = 000004 G       C$PNTB= 000014          F$HARD= 000004           I$MOD  = 000041         L$LAST  024716 G
BIT3   = 000010 G       C$PNTF= 000017          F$HW   = 000013          I$MSG  = 000041         L$LOAD  002100 G
BIT4   = 000020 G       C$PNTS= 000016          F$INIT= 000006           I$PROT= 000040          L$LUN   002074 G
BIT5   = 000040 G       C$PNTX= 000015          F$JMP  = 000050          I$PTAB= 000041          L$MREV  002050 G
BIT6   = 000100 G       C$QIO  = 000377         F$MOD  = 000000          I$PWR  = 000041         L$NAME  002000 G
BIT7   = 000200 G       C$RDBU= 000007          F$MSG  = 000011          I$RPT  = 000041         L$PRIO  002042 G
BIT8   = 000400 G       C$REFG= 000047          F$PROT= 000021           I$SEG  = 000041         L$PROT  017404 G
BIT9   = 001000 G       C$RESE= 000033          F$PWR  = 000017          I$SETU= 000041          L$PRT   002112 G
BOE    = 000400 G       C$REVI= 000003          F$RPT  = 000012          I$SFT  = 000041         L$REPP  002062 G
BVNT    002254          C$RFLA= 000021          F$SEG  = 000003          I$SRV  = 000041         L$REV   002010 G
CCPU    003415          C$RPT  = 000025         F$SOFT= 000005           I$SUB  = 000041         L$RPT   017402 G
CKTPRO  017014          C$SEFG= 000046          F$SRV  = 000010          I$TST  = 000041         L$SOFT  024572 G
CMDERR  016570 G        C$SPRI= 000041          F$SUB  = 000002          J$JMP  = 000167         L$SPC   002056 G
CMND    003221          C$SVEC= 000037          F$SW   = 000014          LOE    = 040000 G       L$SPCP  002020 G
CMNDR   015142          C$TPRI= 000013          F$TEST= 000001           LOOPB1  002222          L$SPTP  002024 G
CPU     002252          DELCNT  002236          GENMSG  016444 G         LOOPB2  002224          L$STA   002030 G
CPUT    004643          DFPTBL  002162 G        GLBDAT  002204 G         LOOPB3  002226          L$SW    002204 G
CSR     002244          DIAGMC= 000000          GLBEQA  002204 G         LOOPB4  002230          L$TEST  002114 G
CSRT    004145          DMA     002264          G$CNTO= 000200           LOOP1   003535          L$TIML  002014 G
C$AU   = 000052         DMAL    004353          G$DELM= 000372           LOOP2   003622          L$UNIT  002012 G
C$AUTO= 000061          DMAT    004413          G$DISP= 000003           LOOP3   003702          L10000  002202
C$BRK  = 000022         DPR     002270          G$EXCP= 000400           LOOP4   003762          L10001  002204
C$BSEG= 000004          DPRT    004626          G$HILI= 000002           LOT    = 000010 G       L10002  016364
C$BSUB= 000002          DPR0   = 000000 G       G$LOLI= 000001           LUN     002210          L10003  016410
C$CEFG= 000045          DPR1   = 000002 G       G$NO   = 000000          L$ACP   002110 G        L10004  016442
C$CLCK= 000062          DPR10  = 000020 G       G$OFFS= 000400           L$APT   002036 G        L10005  016516
C$CLEA= 000012          DPR11  = 000022 G       G$OFSI= 000376           L$AU    020076 G        L10006  016566
C$CLOS= 000035          DPR12  = 000024 G       G$PRMA= 000001           L$AUT   002070 G        L10007  016616
C$CLP1= 000006          DPR13  = 000026 G       G$PRMD= 000002           L$AUTO  017710 G        L10010  016646
C$CVEC= 000036          DPR14  = 000030 G       G$PRML= 000000           L$CCP   002106 G        L10011  016720
C$DCLN= 000044          DPR15  = 000032 G       G$RADA= 000140           L$CLEA  020034 G        L10012  017402
C$DODU= 000051          DPR16  = 000034 G       G$RADB= 000000           L$CO    002032 G        L10014  017706
C$DRPT= 000024          DPR17  = 000036 G       G$RADD= 000040           L$DEPO  002011 G        L10015  017730
```

SYMBOL TABLE

```
L10016  020040          NOTPR   003353          ROMT7B  005220          T$PCNT= 000000          T11E4   012524
L10017  020074          NOTRDY  003264          ROM11A  005346          T$PTAB= 010075          T11E5   012573
L10020  020102          NOTST   015240          ROM11B  005416          T$PTHV= 000016          T12     023240 G
L10021  020242          NRES    016412 G        RTERR   016070 G        T$PTNU= 000016          T12ADR  002314
L10022  020444          NXM     016366 G        RT1     002320          T$SAVL= 177777          T12E0   012625
L10023  020664          NXMVEC= 000004          RT10    002606          T$SEGL= 177777          T12E1   012721
L10024  021120          O$APTS= 000000          RT11    002640          T$SIZE= 000214          T12E2   012771
L10025  021340          O$AU  = 000001          RT12    002672          T$SUBN= 000000          T12E3   013052
L10026  021564          O$BGNR= 000001          RT13    002724          T$TAGL= 177777          T12E4   013132
L10027  022022          O$BGNS= 000000          RT2     002352          T$TAGN= 010077          T12E5   013205
L10030  022302          O$DU  = 000001          RT3     002404          T$TEMP= 000005          T12E6   013262
L10031  022542          O$ERRT= 000000          RT4     002436          T$TEST= 000016          T13     023522 G
L10032  022774          O$GNSW= 000000          RT5     002470          T$TSTM= 177777          T13ADR  002316
L10033  023236          O$POIN= 000001          RT6     002522          T$TSTS= 000001          T13E0   013336
L10034  023520          O$SETU= 000001          RT7     002554          T$$AU = 010020          T13E1   013404
L10035  024302          PLLIO   002262          SAVEC   002204          T$$AUT= 010015          T13E10  014277
L10036  024300          PLLP    004331          SETSW   015264          T$$CLE= 010016          T13E11  014350
L10037  024476          PNT   = 001000 G        SFPTBL  002204 G        T$$DAT= 010076          T13E2   013460
L10040  024570          PNTFLG  017336          SKIPED  016722          T$$DU = 010017          T13E3   013545
L10041  024572          PRI   = 002000 G        SLOT    015532          T$$HAR= 010040          T13E4   013653
L10042  024722          PRI00 = 000000 G        SLU1    002256          T$$HW = 010000          T13E5   013727
L10043  024746          PRI01 = 000040 G        SLU1T   004202          T$$INI= 010014          T13E6   014005
L10044  024742          PRI02 = 000100 G        SLU2    002260          T$$MSG= 010011          T13E7   014105
L10045  024772          PRI03 = 000140 G        SLU2A   004235          T$$PC = 000016          T13E8   014161
L10046  024766          PRI04 = 000200 G        SLU2B   004273          T$$PRO= 010013          T13E9   014227
L10047  025016          PRI05 = 000240 G        SLU2CF  004027          T$$PTA= 010075          T14     024304 G
L10050  025012          PRI06 = 000300 G        SL2DMA  002232          T$$RPT= 010012          T2      020244 G
L10051  025042          PRI07 = 000340 G        SOFT    016520 G        T$$SOF= 010041          T2ADR   002274
L10052  025036          QBASE   002216          SVCGBL= 000000          T$$SRV= 010036          T2E0    006200
L10053  025066          QIR     002266          SVCINS= 000000          T$$SW = 010001          T2E1    006253
L10054  025062          QIRSRV  024272 G        SVCSUB= 177777          T$$TES= 010037          T2E2    006323
L10055  025112          QIRT    004453          SVCTAG= 000000          T1      020104 G        T2E3    006374
L10056  025106          QIRT1   004500          SVCTST= 177777          T1ADR   002272          T2E4    006457
L10057  025136          QIRT2   004552          SWITCH  015047          T1E0    005524          T2E5    006542
L10060  025132          QIRVEC  002220          S$LSYM= 010000          T1E1    005570          T2E6    006613
L10061  025162          RAM     002246          TESTID  014570          T1E2    005634          T2E7    006661
L10062  025156          RAMT    004151          TPR     015377          T1E3    005700          T2E8    006725
L10063  025206          RDELAY  016754          TPRDIS  016650 G        T1E4    005746          T2E9    007003
L10064  025202          REINIT  017210          TPR1    015453          T1E5    006016          T3      020446 G
L10065  025232          ROM     002250          TSTERR  014653          T1E6    006064          T3ADR   002276
L10066  025226          ROMD    003112          TSTNO   016045          T1E7    006132          T3E0    007061
L10067  025256          ROMETX  014556          TST1    004663          T10     022544 G        T3E1    007137
L10070  025252          ROMSG   014531          T$ARGC= 000002          T10ADR  002310          T3E2    007215
L10071  025302          ROMT    004170          T$CODE= 001004          T10E0   011477          T3E3    007313
L10072  025276          ROMTST  002234          T$ERRN= 000063          T10E1   011560          T4      020666 G
L10073  025326          ROMT1   004721          T$EXCP= 000000          T10E2   011621          T4ADR   002300
L10074  025322          ROMT10  005267          T$FLAG= 000041          T10E3   011657          T5      021122 G
L10076  025346          ROMT11  005317          T$FREE= 025346          T10E4   011714          T5ADR   002302
MDHEDR  002000 G        ROMT12  005462          T$GMAN= 000000          T10E5   011767          T5E0    007411
NEXT    017516          ROMT13  005507          T$HILI= 000017          T10E6   012037          T5E1    007471
NOINFO  014712          ROMT2   004744          T$LAST= 000001          T10E7   012116          T5E2    007544
NOIOP   002756          ROMT3   004767          T$LOLI= 000002          T11     022776 G        T5E3    007607
NONO    016620 G        ROMT4   005023          T$LSYM= 010000          T11ADR  002312          T6      021342 G
NOREG   014500          ROMT5   005062          T$LTNO= 000016          T11E0   012161          T6ADR   002304
NORES   003054          ROMT6   005117          T$NEST= 177777          T11E1   012260          T6E0    007647
NOSEC   017732          ROMT7 = ****** GX       T$NS0 = 000005          T11E2   012365          T6E1    007745
NOTCLR  015321          ROMT7A  005151          T$NS1 = 000010          T11E3   012437          T6E2    010025
```

SYMBOL TABLE

```
T6E3    010074          T7E0    010337          T7E4    010634          T7E9    011227          X$ALWA= 000000
T6E4    010154          T7E1    010417          T7E5    010707          T8      022024 G        X$FALS= 000040
T6E5    010223          T7E10   011320          T7E6    010775          T9      022304 G        X$OFFS= 000400
T6E6    010266          T7E11   011412          T7E7    011054          UAM   = 000200 G        X$TRUE= 000020
T7      021566 G        T7E2    010504          T7E8    011132          UROM    004127          $PATCH  024572 G
T7ADR   002306          T7E3    010560

. ABS.  025346      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  28581 WORDS  ( 112 PAGES)
DYNAMIC MEMORY:  19748 WORDS  ( 75 PAGES)
ELAPSED TIME:  00:18:19
CNKTCA.BIC,CNKTCA.LST/CR/-SP=SVC34.MLB/ML,CNKTCA.P11
```

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES								
ABORT	017704		110-1714	110-1724	111-1729	#111-1757					
ADR	= 000020	G	#19-691								
ASSEMB	= 000010		15-543	15-543							
BADSW	003151		#29-1020	105-1466							
BASE	003443		#32-1028	146-2918							
BEVNT	004174		#37-1044	126-2241	127-2269						
BIT0	= 000001	G	#19-691	127-2263	129-2330	129-2335	131 2405	133-2476	135-2544	137-2611	137-2615
			139-2682	139-2686	141-2751						
BIT00	= 000001	G	#19-691	19-691							
BIT01	= 000002	G	#19-691	19-691							
BIT02	= 000004	G	#19-691	19-691							
BIT03	= 000010	G	#19-691	19-691							
BIT04	= 000020	G	#19-691	19-691							
BIT05	= 000040	G	#19-691	19-691							
BIT06	= 000100	G	#19-691	19-691							
BIT07	= 000200	G	#19-691	19-691							
BIT08	= 000400	G	#19-691	19-691							
BIT09	= 001000	G	#19-691	19-691							
BIT1	= 000002	G	#19-691	137-2616	139-2688	139-2692					
BIT10	= 002000	G	#19-691	111-1747							
BIT11	= 004000	G	#19-691								
BIT12	= 010000	G	#19-691								
BIT13	= 020000	G	#19-691								
BIT14	= 040000	G	#19-691								
BIT15	= 100000	G	#19-691								
BIT2	= 000004	G	#19-691	141-2757							
BIT3	= 000010	G	#19-691	145-2881	145-2885						
BIT4	= 000020	G	#19-691								
BIT5	= 000040	G	#19-691								
BIT6	= 000100	G	#19-691								
BIT7	= 000200	G	#19-691								
BIT8	= 000400	G	#19-691								
BIT9	= 001000	G	#19-691	107-1525							
BOE	= 000400	G	#19-691								
BVNT	002254		#20-768	126-2232	127-2259	127-2261					
CCPU	003415		#31-1026	146-2916							
CKTPRO	017014		#104-1442	117-1951	118-1978	120-2037	122-2101	124-2166	126-2230	128-2295	130-2364
			132-2439	134-2508	136-2577	138-2648	140-2723	144-2864			
CMDERR	016570	G	#101-1353	119-2003	121-2062	123-2129	125-2191	127-2255	129-2322	131-2393	- 133-2468
			135-2536	137-2603	139-2674	140-2743	144-2872				
CMND	003221		#30-1022	119-2003	121-2062	123-2129	125-2191	127-2255	129-2322	131-2393	133-2468
			135-2536	137-2603	139-2674	140-2743	144-2872				
CMNDR	015142		#93-1240	101-1355							
CPU	002252		#20-767	124-2168	125-2195	125-2197					
CPUT	004643		#42-1060	124-2177	125-2199						
CSR	002244		#20-764	118-1980	119-2007	119-2009					
CSRT	004145		#35-1039	118-1989	119-2011						
C$AU	= 000052		#15-543	115-1900							
C$AUTO	= 000061		#15-543	112-1795							
C$BRK	= 000022		#15-543	103-1426							
C$BSEG	= 000004		#15-543								
C$BSUB	= 000002		#15-543								

SEQ 0164

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE	REFERENCES								
C$CEFG	= 000045	#15-543								
C$CLCK	= 000062	#15-543								
C$CLEA	= 000012	#15-543	113-1833							
C$CLOS	= 000035	#15-543								
C$CLP1	= 000006	#15-543	117-1953	118-1991	119-2014	120-2050	121-2076	122-2117	123-2143	124-2179
		125-2205	126-2243	127-2272	128-2310	129-2341	130-2381	131-2416	132-2456	133-2485
		134-2524	135-2553	136-2591	137-2623	138-2662	139-2699	141-2768	142-2794	143-2807
		143-2819	145-2895							
C$CVEC	= 000036	#15-543	117-1954	142-2775						
C$DCLN	= 000044	#15-543	104-1453	105-1469	105-1474	111-1757	116-1942	118-1976	118-1994	120-2035
		120-2053	121-2074	122-2099	122-2120	123-2141	124-2164	124-2182	125-2203	126-2228
		126-2246	128-2293	128-2313	130-2362	130-2384	132-2437	132-2459	134-2506	134-2527
		136-2575	136-2594	138-2646	138-2665	140-2721	143-2809	144-2862	145-2893	
C$DODU	= 000051	#15-543	104-1451	105-1467	105-1472	116-1940	118-1992	120-2051	121-2072	122-2118
		123-2139	124-2180	125-2201	126-2244	128-2311	130-2382	132-2457	134-2525	136-2592
		138-2663	145-2891							
C$DRPT	= 000024	#15-543								
C$DU	= 000053	#15-543	114-1863							
C$EDIT	= 000003	#15-543	15-585							
C$ERDF	= 000055	#15-543	104-1450	105-1471	116-1939	118-1990	120-2049	121-2071	122-2116	123-2138
		124-2178	125-2200	126-2242	128-2309	130-2380	132-2455	134-2523	136-2590	138-2661
		143-2806	145-2890							
C$ERHR	= 000056	#15-543	119-2003	119-2012	121-2062	123-2129	125-2191	127-2255	127-2270	129-2322
		129-2339	131-2393	131-2414	133-2468	133-2483	135-2536	135-2551	137-2603	137-2621
		139-2674	139-2697	140-2743	141-2767	142-2793	143-2817	144-2872		
C$ERRO	= 000060	#15-543								
C$ERSF	= 000054	#15-543								
C$ERSO	= 000057	#15-543	105-1466							
C$ESCA	= 000010	#15-543								
C$ESEG	= 000005	#15-543								
C$ESUB	= 000003	#15-543								
C$ETST	= 000001	#15-543	117-1955	119-2016	121-2078	123-2145	125-2207	127-2274	129-2343	131-2418
		133-2487	135-2555	137-2625	139-2701	143-2833	145-2897			
C$EXIT	= 000032	#15-543	111-1755	113-1817	127-2267	131-2409	133-2480	135-2548	140-2744	141-2755
		141-2761	141-2769	142-2795	143-2820					
C$GETB	= 000026	#15-543								
C$GETW	= 000027	#15-543								
C$GMAN	= 000043	#15-543								
C$GPHR	= 000042	#15-543	110-1725							
C$GPLO	= 000030	#15-543								
C$GPRI	= 000040	#15-543								
C$INIT	= 000011	#15-543	111-1772							
C$INLP	= 000020	#15-543								
C$MANI	= 000050	#15-543								
C$MEM	= 000031	#15-543								
C$MSG	= 000023	#15-543	99-1329	100-1334	100-1339	100-1345	101-1351	101-1356	101-1361	102-1368
C$OPEN	= 000034	#15-543								
C$PNTB	= 000014	#15-543	98-1288	100-1333	100-1338	100-1343	101-1349	101-1355	101-1360	102-1366
		102-1382								
C$PNTF	= 000017	#15-543	106-1495	106-1510	107-1528	112-1793	114-1845			
C$PNTS	= 000016	#15-543								
C$PNTX	= 000015	#15-543	98-1300	98-1304	99-1308	99-1320	99-1328	100-1344	101-1350	102-1367

SYMBOL CROSS REFERENCE CREF V02

```
SYMBOL  VALUE          REFERENCES

C$QIO   = 000377       #15-543
C$RDBU  = 000007       #15-543
C$REFG  = 000047       #15-543     110-1709   110-1713   110-1715
C$RESE  = 000033       #15-543    #15-543
C$REVI  = 000003       #15-543     15-585
C$RFLA  = 000021       #15-543     107-1524
C$RPT   = 000025       #15-543     108-1643
C$SEFG  = 000046       #15-543
C$SPRI  = 000041       #15-543     116-1930   140-2732   140-2735   141-2764   142-2773   142-2779   142-2790
C$SVEC  = 000037       #15-543     110-1707   116-1926   140-2730   142-2778
C$TPRI  = 000013       #15-543
DELCNT    002236       #20-753    *103-1423   103-1425
DFPTBL    002162  G    #17-624
DIAGMC  = 000000        15-543      15-543
DMA       002264       #20-772     136-2580   137-2607   137-2609   138-2651   139-2678   139-2680
DMAL      004353       #39-1051    136-2589   137-2620
DMAT      004413       #39-1052    138-2660   139-2696
DPR       002270       #20-774     144-2866   145-2877   145-2879
DPRT      004626       #41-1058    145-2889
DPRO    = 000000  G    #20-723     104-1445  *106-1497   106-1500  *118-1980   118-1983  *120-2039   120-2042  *122-2107
                        122-2109  *124-2168   124-2171  *126-2232   126-2235  *128-2299   128-2302  *130-2370   130-2373
                       *132-2445   132-2448  *134-2513   134-2516  *136-2580   136-2583  *138-2651   138-2654  *140-2734
                        143-2802  *144-2866
DPR1    = 000002  G    #20-724     104-1455   105-1464   106-1506   119-2001   121-2060   123-2127   125-2189   127-2253
                        129-2320   131-2391   133-2466   135-2534   137-2601   139-2672   140-2741   144-2870
DPR10   = 000020  G    #20-731
DPR11   = 000022  G    #20-732
DPR12   = 000024  G    #20-733
DPR13   = 000026  G    #20-734
DPR14   = 000030  G    #20-735
DPR15   = 000032  G    #20-736
DPR16   = 000034  G    #20-737
DPR17   = 000036  G    #20-738
DPR2    = 000004  G    #20-725    *105-1476   119-2006  *119-2009   121-2065  *121-2068   123-2132  *123-2135   125-2194
                       *125-2197   127-2258  *127-2261   129-2325  *129-2328   131-2396  *131-2399   133-2471  *133-2474
                        135-2539  *135-2542   137-2606  *137-2609   139-2677  *139-2680   141-2747   143-2811  *143-2814
                        145-2876  *145-2879
DPR3    = 000006  G    #20-726    *105-1477  *106-1496   119-2010   121-2069  *122-2105   123-2136   125-2198   127-2262
                        129-2329  *130-2369   131-2400  *132-2444   133-2475   135-2543  *136-2579   137-2610  *138-2650
                        139-2681  *140-2733   141-2750   143-2815   145-2880
DPR4    = 000010  G    #20-727
DPR5    = 000012  G    #20-728
DPR6    = 000014  G    #20-729
DPR7    = 000016  G    #20-730
DROP      014772       #92-1237    114-1845
DROPUN    002206       #20-741    *104-1452  *105-1468  *105-1473  *110-1712  *116-1941   118-1974  *118-1993   120-2033
                       *120-2052  *121-2073   122-2097  *122-2119  *123-2140   124-2162  *124-2181  *125-2202   126-2226
                       *126-2245   128-2291  *128-2312   130-2360  *130-2383   132-2435  *132-2458   134-2504  *134-2526
                        136-2573  *136-2593   138-2644  *138-2664   140-2719  *143-2808   144-2860  *145-2892
DSPCOD    002122  G    #16-605
EF.CON  = 000036  G    #19-691     110-1709
EF.NEW  = 000035  G    #19-691     110-1715
```

SYMBOL	VALUE		REFERENCES								
EF.PWR	= 000034	G	#19-691	110-1713							
EF.RES	= 000037	G	#19-691								
EF.STA	= 000040	G	#19-691								
END	017706		110-1710	#111-1758							
EVL	= 000004	G	#19-691								
E$END	= 002100		#15-543								
E$LOAD	= 000035		#15-543	15-585							
F$AU	= 000015		#15-543	115-1873	115-1900						
F$AUTO	= 000020		#15-543	112-1783	112-1795						
F$BGN	= 000040		#15-543	15-559	15-586	16-605	16-607	19-690	19-707	20-715	27-999
			98-1286	100-1332	100-1336	100-1341	101-1347	101-1353	101-1358	102-1364	108-1615
			109-1652	110-1681	111-1755	112-1783	113-1806	113-1817	114-1842	115-1873	116-1922
			117-1955	118-1971	119-2016	120-2029	121-2078	122-2093	123-2145	124-2158	125-2207
			126-2222	127-2267	127-2274	128-2287	129-2343	130-2356	131-2409	131-2418	132-2431
			133-2480	133-2487	134-2500	135-2548	135-2555	136-2569	137-2625	138-2640	139-2701
			140-2715	140-2744	141-2755	141-2761	141-2769	142-2795	143-2820	143-2828	143-2833
			144-2856	145-2897	146-2914	147-2934	148-2949	149-2971	149-2975	149-2975	149-2984
			149-2988	149-2988	149-2997	150-3002	150-3002	150-3011	150-3015	150-3015	150-3024
			151-3029	151-3029	151-3038	151-3042	151-3042	151-3051	152-3056	152-3056	152-3065
			152-3069	152-3069	152-3078	153-3083	153-3083	153-3092	153-3096	153-3096	153-3105
			154-3110	154-3110	154-3119	154-3123	154-3123	154-3132	155-3137	155-3137	155-3146
			155-3150	155-3150	155-3159	155-3161					
F$CLEA	= 000007		#15-543	113-1806	113-1833						
F$DU	= 000016		#15-543	114-1842	114-1863						
F$END	= 000041		#15-543	15-543	15-543	15-543	15-543	15-543	15-543	15-543	15-543
			15-543	15-543	15-543	15-543	15-543	15-543	15-543	15-543	15-559
			15-586	16-605	16-607	19-690	19-707	20-715	27-999	99-1329	100-1334
			100-1339	100-1345	101-1351	101-1356	101-1361	102-1368	108-1643	111-1755	111-1772
			112-1795	113-1817	113-1833	114-1847	114-1863	115-1884	115-1900	116-1922	116-1922
			116-1922	117-1955	117-1955	118-1971	118-1971	118-1971	119-2016	119-2016	120-2029
			120-2029	120-2029	121-2078	121-2078	122-2093	122-2093	122-2093	123-2145	123-2145
			124-2158	124-2158	124-2158	125-2207	125-2207	126-2222	126-2222	126-2222	127-2267
			127-2274	127-2274	128-2287	128-2287	128-2287	129-2343	129-2343	130-2356	130-2356
			130-2356	131-2409	131-2418	131-2418	132-2431	132-2431	132-2431	133-2480	133-2487
			133-2487	134-2500	134-2500	134-2500	135-2548	135-2555	135-2555	136-2569	136-2569
			136-2569	137-2625	137-2625	138-2640	138-2640	138-2640	139-2701	139-2701	140-2715
			140-2715	140-2715	140-2744	141-2755	141-2761	141-2769	142-2795	143-2820	143-2831
			143-2833	143-2833	144-2856	144-2856	144-2856	145-2897	145-2897	147-2934	147-2935
			148-2951	149-2971	149-2975	149-2984	149-2988	149-2997	150-3002	150-3011	150-3015
			150-3024	151-3029	151-3038	151-3042	151-3051	152-3056	152-3065	152-3069	152-3078
			153-3083	153-3092	153-3096	153-3105	154-3110	154-3119	154-3123	154-3132	155-3137
			155-3146	155-3150	155-3159	155-3161					
F$HARD	= 000004		#15-543	146-2914	147-2934	147-2934	147-2935				
F$HW	= 000013		#15-543	17-624	17-653						
F$INIT	= 000006		#15-543	110-1681	111-1772						
F$JMP	= 000050		#15-543	111-1755	113-1817	114-1847	114-1847	115-1884	115-1884	127-2267	131-2409
			133-2480	135-2548	140-2744	141-2755	141-2761	141-2769	142-2795	143-2820	147-2934
F$MOD	= 000000		#15-543	15-559	15-586	16-605	16-607	19-690	19-707	20-715	27-999
F$MSG	= 000011		#15-543	98-1286	99-1329	100-1332	100-1334	100-1336	100-1339	100-1341	100-1345
			101-1347	101-1351	101-1353	101-1356	101-1358	101-1361	102-1364	102-1368	
F$PROT	= 000021		#15-543	109-1652	109-1658						
F$PWR	= 000017		#15-543								

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES								
F$RPT	= 000012		#15-543	108-1615	108-1643						
F$SEG	= 000003		#15-543								
F$SOFT	= 000005		#15-543	148-2949	148-2951						
F$SRV	= 000010		#15-543	143-2828	143-2831						
F$SUB	= 000002		#15-543								
F$SW	= 000014		#15-543	18-664	18-674						
F$TEST	= 000001		#15-543	116-1922	117-1955	118-1971	119 2016	120-2029	121-2078	122-2093	123-2145
			124-2158	125-2207	126-2222	127-2274	128-2287	129-2343	130-2356	131-2418	132-2431
			133-2487	134-2500	135-2555	136-2569	137-2625	138-2640	139-2701	140-2715	143-2833
			144-2856	145-2897							
GENMSG	016444	G	#100-1341	141-2767	142-2793						
GLBDAT	002204	G	#20-715								
GLBEQA	002204	G	#19-690								
G$CNTO	= 000200		#15-543								
G$DELM	= 000372		#15-543								
G$DISP	= 000003		#15-543								
G$EXCP	= 000400		#15-543								
G$HILI	= 000002		#15-543								
G$LOLI	= 000001		#15-543								
G$NO	= 000000		#15-543	146-2916							
G$OFFS	= 000400		#15-543	146-2916	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932
G$OFSI	= 000376		#15-543	146-2916	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932
G$PRMA	= 000001		#15-543								
G$PRMD	= 000002		#15-543	146-2916							
G$PRML	= 000000		#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
G$RADA	= 000140		#15-543								
G$RADB	= 000000		#15-543								
G$RADD	= 000040		#15-543	146-2916							
G$RADL	= 000120		#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
G$RADO	= 000020		#15-543								
G$XFER	= 000004		#15-543	147-2934							
G$YES	= 000010		#15-543	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932	
HELP	= 000000		#2-9	#15-550	15-568	15-588	16-608	17-626	18-666	#19-679	19-693
			89-1207	89-1217	97-1257	97-1269	102-1385	108-1533	108-1540	108-1546	108-1553
			108-1559	108-1566	108-1572	108-1580	108-1589	108-1596	#108-1604	108-1617	108-1629
			109-1660	110-1683	111-1760	112-1785	113-1808	113-1819	114-1849	115-1875	115-1886
			#116-1906								
HIMEM	002242		#20-755	*110-1717	*110-1718	138-2650					
HOE	= 100000	G	#19-691								
IBE	= 010000	G	#19-691								
IDU	= 000040	G	#19-691								
IER	= 020000	G	#19-691								
INITNG	015676		#97-1252	106-1495							
INITOK	015763		#97-1253	106-1510							
INTACK	015606		#96-1250	98-1304							
INTFLG	002240		#20-754	*140-2728	140-2739	*142-2774	142-2782	*143-2830			
IOPN	002212		#20-743	*111-1728	111-1730	111-1736	*111-1742	111-1744			
IOPNN	002214		#20-744	98-1287	100-1337	100-1342	101-1348	101-1354	101-1359	102-1365	102-1381
			106-1493	107-1527	*111-1730	*111-1733	114-1844				
ISR	= 000100	G	#19-691								
IXE	= 004000	G	#19-691								
I$AU	= 000041		#15-543	#115-1873	#115-1900						

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SYMBOL	VALUE		REFERENCES								
I$AUTO	= 000041		#15-543	#112-1783	#112-1795						
I$CLN	= 000041		#15-543	#113-1806	113-1817	#113-1833					
I$DU	= 000041		#15-543	#114-1842	#114-1863						
I$HRD	= 000041		#146-2914	#147-2935							
I$INIT	= 000041		#15-543	#110-1681	111-1755	#111-1772					
I$MOD	= 000041		#15-543	15-559	#15-559	15-586	#15-586	16-605	#16-605	16-607	#16-607
			19-690	#19-690	19-707	#19-707	20-715	#20-715	27-999	#27-999	
I$MSG	= 000041		#15-543	#98-1286	#99-1329	#100-1332	#100-1334	#100-1336	#100-1339	#100-1341	#100-1345
			#101-1347	#101-1351	#101-1353	#101-1356	#101-1358	#101-1361	#102-1364	#102-1368	
I$PROT	= 000040		#15-543	#109-1652							
I$PTAB	= 000041		#15-543	149-2975	#149-2975	149-2984	#149-2984	149-2988	#149-2988	149-2997	#149-2997
			150-3002	#150-3002	150-3011	#150-3011	150-3015	#150-3015	150-3024	#150-3024	151-3029
			#151-3029	151-3038	#151-3038	151-3042	#151-3042	151-3051	#151-3051	152-3056	#152-3056
			152-3065	#152-3065	152-3069	#152-3069	152-3078	#152-3078	153-3083	#153-3083	153-3092
			#153-3092	153-3096	#153-3096	153-3105	#153-3105	154-3110	#154-3110	154-3119	#154-3119
			154-3123	#154-3123	154-3132	#154-3132	155-3137	#155-3137	155-3146	#155-3146	155-3150
			#155-3150	155-3159	#155-3159						
I$PWR	= 000041		#15-543								
I$RPT	= 000041		#15-543	#108-1615	#108-1643						
I$SEG	= 000041		#15-543	116-1922	118-1971	120-2029	122-2093	124-2158	126-2222	128-2287	130-2356
			132-2431	134-2500	136-2569	138-2640	140-2715	144-2856			
I$SETU	= 000041		#15-543	149-2971	#149-2971	149-2975	149-2988	150-3002	150-3015	151-3029	151-3042
			152-3056	152-3069	153-3083	153-3096	154-3110	154-3123	155-3137	155-3150	155-3161
			#155-3161								
I$SFT	= 000041		#148-2949	#148-2951							
I$SRV	= 000041		#15-543	#143-2828	#143-2831						
I$SUB	= 000041		#15-543	116-1922	118-1971	120-2029	122-2093	124-2158	126-2222	128-2287	130-2356
			132-2431	134-2500	136-2569	138-2640	140-2715	144-2856			
I$TST	= 000041		#15-543	116-1922	#116-1922	117-1955	#117-1955	#117-1955	118-1971	#118-1971	119-2016
			#119-2016	#119-2016	120-2029	#120-2029	121-2078	#121-2078	#121-2078	122-2093	#122-2093
			123-2145	#123-2145	#123-2145	124-2158	#124-2158	125-2207	#125-2207	#125-2207	126-2222
			#126-2222	127-2267	127-2274	#127-2274	#127-2274	128-2287	#128-2287	129-2343	#129-2343
			#129-2343	130-2356	#130-2356	131-2409	131-2418	#131-2418	#131-2418	132-2431	#132-2431
			133-2480	133-2487	#133-2487	#133-2487	134-2500	#134-2500	135-2548	135-2555	#135-2555
			#135-2555	136-2569	#136-2569	137-2625	#137-2625	#137-2625	138-2640	#138-2640	139-2701
			#139-2701	#139-2701	140-2715	#140-2715	140-2744	141-2755	141-2761	141-2769	142-2795
			143-2820	143-2833	#143-2833	#143-2833	144-2856	#144-2856	145-2897	#145-2897	#145-2897
J$JMP	= 000167		#15-543	114-1847	115-1884						
LOE	= 040000	G	#19-691								
LOOPB1	002222		#20-747	*111-1749	128-2296						
LOOPB2	002224		#20-748	*111-1750	130-2365						
LOOPB3	002226		#20-749	*111-1751	132-2440						
LOOPB4	002230		#20-750	*111-1752	134-2509						
LOOP1	003535		#32-1029	146-2920							
LOOP2	003622		#33-1031	146-2923							
LOOP3	003702		#33-1032	146-2925							
LOOP4	003762		#34-1034	146-2927							
LOT	= 000010	G	#19-691								
LUN	002210		#20-742	104-1451	105-1467	105-1472	*110-1720	*110-1722	110-1723	110-1725	116-1940
			118-1992	120-2051	121-2072	122-2118	123-2139	124-2180	125-2201	126-2244	128-2311
			130-2382	132-2457	134-2525	136-2592	138-2663	145-2891			
L$ACP	002110	G	#15-585								

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SYMBOL	VALUE		REFERENCES		
L$APT	002036	G	#15-585		
L$AU	020076	G	15-585	#115-1873	
L$AUT	002070	G	#15-585		
L$AUTO	017710	G	15-585	#112-1783	
L$CCP	002106	G	#15-585		
L$CLEA	020034	G	15-585	#113-1806	
L$CO	002032	G	#15-585		
L$DEPO	002011	G	#15-585		
L$DESC	014432	G	15-585	#89-1215	
L$DESP	002076	G	#15-585		
L$DEVP	002060	G	#15-585		
L$DISP	002124	G	15-585	#16-606	
L$DLY	002116	G	#15-585		
L$DTP	002040	G	#15-585		
L$DTYP	002034	G	#15-585		
L$DU	020042	G	15-585	#114-1842	
L$DUT	002072	G	#15-585		
L$DVTY	014422	G	15-585	#89-1205	
L$EF	002052	G	#15-585		
L$ENVI	002044	G	#15-585		
L$ETP	002102	G	#15-585		
L$EXP1	002046	G	#15-585		
L$EXP4	002064	G	#15-585		
L$EXP5	002066	G	#15-585		
L$HARD	024502	G	15-585	146-2914	#146-2914
L$HIME	002120	G	#15-585	110-1717	
L$HPCP	002016	G	#15-585		
L$HPTP	002022	G	#15-585		
L$HW	002162	G	15-585	17-624	#17-624
L$ICP	002104	G	#15-585		
L$INIT	017412	G	15-585	#110-1681	
L$LADP	002026	G	#15-585		
L$LAST	024716	G	15-585	#148-2956	155-3161
L$LOAD	002100	G	#15-585		
L$LUN	002074	G	#15-585		
L$MREV	002050	G	#15-585		
L$NAME	002000	G	#15-585		
L$PRIO	002042	G	#15-585		
L$PROT	017404	G	15-585	#109-1652	
L$PRT	002112	G	#15-585		
L$REPP	002062	G	#15-585		
L$REV	002010	G	#15-585		
L$RPT	017402	G	15-585	#108-1615	
L$SOFT	024572	G	148-2949	#148-2949	
L$SPC	002056	G	#15-585		
L$SPCP	002020	G	#15-585		
L$SPTP	002024	G	#15-585		
L$STA	002030	G	#15-585		
L$SW	002204	G	18-664	#18-664	
L$TEST	002114	G	#15-585		
L$TIML	002014	G	#15-585		
L$UNIT	002012	G	#15-585	110-1723	

SYMBOL	VALUE	REFERENCES						
L10000	002202	17-624	#17-653					
L10001	002204	18-664	#18-674					
L10002	016364	#99-1329						
L10003	016410	#100-1334						
L10004	016442	#100-1339						
L10005	016516	#100-1345						
L10006	016566	#101-1351						
L10007	016616	#101-1356						
L10010	016646	#101-1361						
L10011	016720	#102-1368						
L10012	017402	#108-1643						
L10014	017706	111-1755	#111-1772					
L10015	017730	#112-1795						
L10016	020040	113-1817	#113-1833					
L10017	020074	114-1847	#114-1863					
L10020	020102	115-1884	#115-1900					
L10021	020242	#117-1955						
L10022	020444	#119-2016						
L10023	020664	#121-2078						
L10024	021120	#123-2145						
L10025	021340	#125-2207						
L10026	021564	127-2267	#127-2274					
L10027	022022	#129-2343						
L10030	022302	131-2409	#131-2418					
L10031	022542	133-2480	#133-2487					
L10032	022774	135-2548	#135-2555					
L10033	023236	#137-2625						
L10034	023520	#139-2701						
L10035	024302	140-2744	141-2755	141-2761	141-2769	142-2795	143-2820	#143-2833
L10036	024300	#143-2831						
L10037	024476	#145-2897						
L10040	024570	146-2914	147-2934	#147-2935				
L10041	024572	148-2949	#148-2951					
L10042	024722	#149-2975						
L10043	024746	149-2975	#149-2988					
L10044	024742	149-2975	#149-2984					
L10045	024772	149-2988	#150-3002					
L10046	024766	149-2988	#149-2997					
L10047	025016	150-3002	#150-3015					
L10050	025012	150-3002	#150-3011					
L10051	025042	150-3015	#151-3029					
L10052	025036	150-3015	#150-3024					
L10053	025066	151-3029	#151-3042					
L10054	025062	151-3029	#151-3038					
L10055	025112	151-3042	#152-3056					
L10056	025106	151-3042	#151-3051					
L10057	025136	152-3056	#152-3069					
L10060	025132	152-3056	#152-3065					
L10061	025162	152-3069	#153-3083					
L10062	025156	152-3069	#152-3078					
L10063	025206	153-3083	#153-3096					
L10064	025202	153-3083	#153-3092					

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SYMBOL	VALUE		REFERENCES								
L10065	025232		153-3096	#154-3110							
L10066	025226		153-3096	#153-3105							
L10067	025256		154-3110	#154-3123							
L10070	025252		154-3110	#154-3119							
L10071	025302		154-3123	#155-3137							
L10072	025276		154-3123	#154-3132							
L10073	025326		155-3137	#155-3150							
L10074	025322		155-3137	#155-3146							
L10076	025346		155-3150	#155-3159							
MDMEDR	002000	G	#15-559								
NEXT	017516		110-1716	#110-1722	110-1726						
NOINFO	014712		#91-1235	99-1328							
NOIOP	002756		#28-1016	116-1939							
NONO	016620	G	#101-1358	104-1450							
NOREG	014500		#90-1229	100-1333							
NORES	003054		#28-1017	118-1990	120-2049	122-2116	124-2178	126-2242	128-2309	130-2380	132-2455
			134-2523	136-2590	138-2661	143-2806					
NOSEC	017732		112-1793	#112-1797							
NOTCLR	015321		#94-1244	101-1360							
NOTPR	003353		#31-1025	105-1471							
NOTRDY	003264		#30-1023	104-1450							
NOTST	015240		#93-1241	102-1382							
NRES	016412	G	#100-1336	118-1990	120-2049	122-2116	124-2178	126-2242	128-2309	130-2380	132-2455
			134-2523	136-2590	138-2661	143-2806					
NXM	016366	G	#100-1332	116-1939							
NXMVEC	= 000004		#116-1920	116-1926	117-1954						
O$APTS	= 000000		#15-543	15-585							
O$AU	= 000001		#15-543	#15-566	15-585						
O$BGNR	= 000001		#15-543	#15-566	15-585						
O$BGNS	= 000000		#15-543	15-585							
O$DU	= 000001		#15-543	#15-566	15-585						
O$ERRT	= 000000		#15-543	15-585							
O$GNSW	= 000000		#15-543	15-585							
O$POIN	= 000001		#15-543	#15-566	#15-566	#15-566	#15-566	15-566	15-585		
O$SETU	= 000001		#15-543	#15-566	15-585	148-2956					
PLLIO	002262		#20-771	134-2513	135-2540	135-2542					
PLLP	004331		#38-1049	134-2522	135-2550						
PNT	= 001000	G	#19-691								
PNTFLG	017336		#107-1524	116-1924	118-1973	120-2032	122-2096	124-2161	126-2225	128-2290	130-2359
			132-2434	134-2503	136-2572	138-2643	140-2718	144-2859			
PRI	= 002000	G	#19-691								
PRI00	= 000000	G	#19-691	116-1930	140-2735	142-2779					
PRI01	= 000040	G	#19-691								
PRI02	= 000100	G	#19-691								
PRI03	= 000140	G	#19-691								
PRI04	= 000200	G	#19-691								
PRI05	= 000240	G	#19-691								
PRI06	= 000300	G	#19-691	116-1926	140-2730	140-2732	141-2764	142-2773	142-2778	142-2790	
PRI07	= 000340	G	#19-691								
QBASE	002216		#20-745	104-1442	106-1494	*111-1738	*111-1741	*111-1744	*111-1747	116-1928	118-1979
			120-2038	122-2102	124-2167	126-2231	128-2298	130-2368	132-2443	134-2512	136-2578
			138-2649	140-2725	144-2865						

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SYMBOL	VALUE		REFERENCES								
QIR	002266		#20-773	140-2734	141-2748	143-2812	143-2814				
QIRSRV	024272	G	140-2730	142-2778	#143-2828						
QIRT	004453		#40-1054	141-2765	142-2791	143-2804	143-2816				
QIRT1	004500		#40-1055	141-2766							
QIRT2	004552		#41-1057	142-2792							
QIRVEC	002220		#20-746	*140-2727	140-2730	140-2733	142-2775	*142-2776	142-2778		
RAM	002246		#20-765	120-2039	121-2066	121-2068					
RAMT	004151		#36-1041	120-2048	121-2070						
RDELAY	016754		#103-1420	104-1443	106-1498	118-1985	120-2044	122-2111	124-2173	126-2237	128-2304
			130-2375	132-2450	134-2518	136-2585	138-2656	140-2737	142-2784	143-2800	144-2867
REINIT	017210		104-1447	104-1460	#106-1493	117-1948					
ROM	002250		#20-766	122-2107	123-2133	123-2135					
ROMD	003112		#29-1019	119-2012	121-2071	123-2138	125-2200	127-2270	129-2339	131-2414	133-2483
			135-2551	137-2621	139-2697	141-2767	142-2793	143-2817	145-2890		
ROMETX	014556		#90-1231	99-1320	100-1344						
ROMSG	014531		#90-1230	99-1308							
ROMT	004170		#36-1042	122-2115	123-2137						
ROMTST	002234		#20-752	*111-1754	122-2103						
ROMT1	004721		22-833	#43-1063	118-1972						
ROMT10	005267		25-934	#47-1075	134-2502						
ROMT11	005317		26-949	#47-1076							
ROMT12	005462		26-963	#49-1081	140-2717						
ROMT13	005507		27-978	#49-1082	144-2858						
ROMT2	004744		22-847	#43-1064	120-2031						
ROMT3	004767		23-862	#44-1066	122-2095						
ROMT4	005023		23-876	#44-1067	124-2160						
ROMT5	005062		24-891	#45-1069	126-2224						
ROMT6	005117		24-905	#45-1070	128-2289						
ROMT7	= ******	GX	25-920								
ROMT7A	005151		#46-1072	130-2358							
ROMT7B	005220		#46-1073	132-2433							
ROM11A	005346		#48-1078	136-2571							
ROM11B	005416		#48-1079	138-2642							
RTERR	016070	G	#98-1286	119-2012	121-2071	123-2138	125-2200	127-2270	129-2339	131-2414	133-2483
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RT1	002320		21-807	#22-833							
RT10	002606		21-814	#25-934							
RT11	002640		21-815	#26-949							
RT12	002672		21-816	#26-963							
RT13	002724		21-817	#27-978							
RT2	002352		21-808	#22-847							
RT3	002404		21-809	#23-862							
RT4	002436		21-810	#23-876							
RT5	002470		21-811	#24-891							
RT6	002522		21-812	#24-905							
RT7	002554		21-813	#25-920							
SAVEC	002204		#20-740								
SETSW	015264		#94-1243	101-1350							
SFPTBL	002204	G	#18-664								
SKIPED	016722		#102-1381	127-2266	129-2333	131-2408	133-2479	135-2547	137-2614	139-2685	139-2691
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SLOT	015532		#96-1249	98-1300							

SYMBOL CROSS REFERENCE   CREF V02

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SYMBOL   VALUE        REFERENCES

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SLU2     002260       #20-770     130-2370    131-2397    131-2399    132-2445    133-2472    133-2474
SLU2A    004235       #37-1046    130-2379    131-2413
SLU2B    004273       #38-1048    132-2454    133-2482
SLU2CF   004027       #34-1035    147-2930
SL2DMA   002232       #20-751     *111-1753   131-2401
SOFT     016520  G    #101-1347   105-1466
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SYMBOL CROSS REFERENCE CREF V02

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SYMBOL CROSS REFERENCE CREF V02

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		144-2872	144-2872	144-2872	145-2890	145-2890	145-2890	145-2890	145-2890	145-2890
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		146-2918	146-2918	146-2918	146-2920	146-2920	146-2920	146-2920	146-2920	146-2920
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		153-3096	153-3096	153-3096	154-3110	154-3110	154-3110	154-3110	154-3123	154-3123
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		100-1345	100-1345	101-1351	101-1351	101-1351	101-1356	101-1356	101-1356	101-1361
		101-1361	101-1361	102-1368	102-1368	102-1368	108-1643	108-1643	108-1643	111-1772
		111-1772	111-1772	112-1795	112-1795	112-1795	113-1833	113-1833	113-1833	114-1863
		114-1863	114-1863	115-1900	115-1900	115-1900	117-1955	117-1955	117-1955	119-2016
		119-2016	119-2016	121-2078	121-2078	121-2078	123-2145	123-2145	123-2145	125-2207
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		150-3011	150-3011	150-3015	150-3015	150-3015	150-3024	150-3024	150-3024	151-3029
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		153-3092	153-3092	153-3096	153-3096	153-3096	153-3105	153-3105	153-3105	154-3110
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		126-2222	128-2287	128-2287	128-2287	130-2356	130-2356	130-2356	132-2431	132-2431
		132-2431	134-2500	134-2500	134-2500	136-2569	136-2569	136-2569	138-2640	138-2640
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SWITCH	015047	#92-1238	101-1349							
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		#101-1361	#102-1368	#108-1643	#111-1772	#112-1795	#113-1833	#114-1863	#115-1900	#117-1955
		#119-2016	#121-2078	#123-2145	#125-2207	#127-2274	#129-2343	#131-2418	#133-2487	#135-2555

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES								
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TPRDIS	016650	G	#102-1364	105-1471							
TPR1	015453		#95-1247	102-1367							
TSTERR	014653		#91-1234	98-1288	100-1343						
TSTNO	016045		#97-1254	107-1528							
TST1	004663		#42-1061	116-1923							
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			99-1308	99-1308	#99-1320	99-1320	#99-1320	99-1320	99-1320	#99-1328	99-1328
			99-1328	#100-1333	100-1333	#100-1333	100-1333	100-1333	#100-1338	100-1338	#100-1338
			100-1338	#100-1338	100-1338	100-1338	#100-1343	100-1343	#100-1343	100-1343	#100-1343
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			101-1355	101-1355	#101-1360	101-1360	#101-1360	101-1360	101-1360	#102-1366	102-1366
			#102-1366	102-1366	102-1366	#102-1367	102-1367	#102-1367	102-1367	102-1367	#102-1382
			102-1382	#102-1382	102-1382	#102-1382	102-1382	102-1382	#106-1495	106-1495	#106-1495
			106-1495	106-1495	#106-1510	106-1510	106-1510	#107-1528	107-1528	#107-1528	107-1528
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			121-2062	#121-2071	121-2071	#122-2116	122-2116	#123-2129	123-2129	#123-2138	123-2138
			#124-2178	124-2178	#125-2191	125-2191	#125-2200	125-2200	#126-2242	126-2242	#127-2255
			127-2255	#127-2270	127-2270	#128-2309	128-2309	#129-2322	129-2322	#129-2339	129-2339
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			#136-2590	136-2590	#137-2603	137-2603	#137-2621	137-2621	#138-2661	138-2661	#139-2674
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			#143-2806	143-2806	#143-2817	143-2817	#144-2872	144-2872	#145-2890	145-2890	
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T$FLAG	= 000041		#111-1755	#111-1755	111-1755	111-1755	#113-1817	#113-1817	113-1817	113-1817	#114-1847
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			141-2755	141-2755	#141-2761	#141-2761	141-2761	141-2761	#141-2769	#141-2769	141-2769
			141-2769	#142-2795	#142-2795	142-2795	142-2795	#143-2820	#143-2820	143-2820	143-2820
			#147-2934	147-2934	147-2934						
T$FREE	= 025346		148-2956	#155-3161							
T$GMAN	= 000000		#15-543								
T$HILI	= 000017		#146-2916	146-2916							
T$LAST	= 000001		#15-543	#148-2956	149-2971						

SYMBOL CROSS REFERENCE CREF V02

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		117-1955 119-2016 121-2078 123-2145 125-2207 127-2274 129-2343 131-2418 133-2487
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		102-1368 #108-1615 108-1643 #109-1652 109-1658 #110-1681 111-1772 #112-1783 112-1795
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		137-2625 #138-2640 139-2701 #140-2715 143-2833 #144-2856 145-2897 #146-2914 147-2934
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T$NS1	= 000010	#143-2828 143-2831
T$PCNT	= 000000	#149-2971 149-2975 #149-2975 149-2975 149-2988 #149-2988 149-2988 150-3002 #150-3002
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SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE	REFERENCES
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		#155-3137 155-3137 155-3137 #155-3150 155-3150
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		155-3150 #155-3150 155-3161 155-3161
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		16-606 16-606 #16-606 16-606 16-606 #16-606 16-606 16-606 #16-606
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		16-606 16-606 #16-606 16-606 16-606 #16-606 16-606 16-606 #16-606
		16-606 16-606 #16-606 16-606 16-606 #16-606 16-606 16-606 #16-606
		#16-607 16-607 #17-653 17-653 #18-674 18-674 #19-707 19-707 #27-999
		27-999 #99-1329 99-1329 #100-1334 100-1334 #100-1339 100-1339 #100-1345 100-1345
		#101-1351 101-1351 #101-1356 101-1356 #101-1361 101-1361 #102-1368 102-1368 #108-1643
		108-1643 #109-1658 109-1658 #111-1755 111-1755 #111-1772 111-1772 #112-1795 112-1795
		#113-1817 113-1817 #113-1833 113-1833 #114-1847 114-1847 #114-1863 114-1863 #115-1884
		115-1884 #115-1900 115-1900 #117-1955 117-1955 #119-2016 119-2016 #121-2078 121-2078
		#123-2145 123-2145 #125-2207 125-2207 #127-2267 127-2267 #127-2274 127-2274 #129-2343
		129-2343 #131-2409 131-2409 #131-2418 131-2418 #133-2480 133-2480 #133-2487 133-2487
		#135-2548 135-2548 #135-2555 135-2555 #137-2625 137-2625 #139-2701 139-2701 #140-2744
		140-2744 #141-2755 141-2755 #141-2761 141-2761 #141-2769 141-2769 #142-2795 142-2795

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE	REFERENCES								
		#143-2820	143-2820	#143-2831	143-2831	#143-2833	143-2833	#145-2897	145-2897	#146-2916
		146-2916	#146-2916	146-2916	#146-2916	146-2916	#146-2918	146-2918	#146-2918	146-2918
		#146-2918	146-2918	#146-2920	146-2920	#146-2920	146-2920	#146-2920	146-2920	#146-2923
		146-2923	#146-2923	146-2923	#146-2923	146-2923	#146-2925	146-2925	#146-2925	146-2925
		#146-2925	146-2925	#146-2927	146-2927	#146-2927	146-2927	#146-2927	146-2927	#147-2930
		147-2930	#147-2930	147-2930	#147-2930	147-2930	#147-2932	147-2932	#147-2932	147-2932
		#147-2932	147-2932	#147-2934	147-2934	#147-2935	147-2935	#148-2951	148-2951	
T$TEST	= 000016	#15-543	116-1922	#116-1922	116-1922	118-1971	#118-1971	118-1971	120-2029	#120-2029
		120-2029	122-2093	#122-2093	122-2093	124-2158	#124-2158	124-2158	126-2222	#126-2222
		126-2222	128-2287	#128-2287	128-2287	130-2356	#130-2356	130-2356	132-2431	#132-2431
		132-2431	134-2500	#134-2500	134-2500	136-2569	#136-2569	136-2569	138-2640	#138-2640
		138-2640	140-2715	#140-2715	140-2715	144-2856	#144-2856	144-2856	148-2956	
T$TSTM	= 177777	#15-543	98-1288	98-1300	98-1304	99-1308	99-1320	99-1328	99-1329	100-1333
		100-1334	100-1338	100-1339	100-1343	100-1344	100-1345	101-1349	101-1350	101-1351
		101-1355	101-1356	101-1360	101-1361	102-1366	102-1367	102-1368	102-1382	103-1426
		104-1450	104-1451	104-1453	105-1466	105-1467	105-1469	105-1471	105-1472	105-1474
		106-1495	106-1510	107-1524	107-1528	108-1643	110-1707	110-1709	110-1713	110-1715
		110-1725	111-1755	111-1757	111-1772	112-1793	112-1795	113-1817	113-1833	114-1845
		114-1863	115-1900	116-1926	116-1930	116-1939	116-1940	116-1942	117-1953	117-1954
		117-1955	118-1976	118-1990	118-1991	118-1992	118-1994	119-2003	119-2012	119-2014
		119-2016	120-2035	120-2049	120-2050	120-2051	120-2053	121-2062	121-2071	121-2072
		121-2074	121-2076	121-2078	122-2099	122-2116	122-2117	122-2118	122-2120	123-2129
		123-2138	123-2139	123-2141	123-2143	123-2145	124-2164	124-2178	124-2179	124-2180
		124-2182	125-2191	125-2200	125-2201	125-2203	125-2205	125-2207	126-2228	126-2242
		126-2243	126-2244	126-2246	127-2255	127-2267	127-2270	127-2272	127-2274	128-2293
		128-2309	128-2310	128-2311	128-2313	129-2322	129-2339	129-2341	129-2343	130-2362
		130-2380	130-2381	130-2382	130-2384	131-2393	131-2409	131-2414	131-2416	131-2418
		132-2437	132-2455	132-2456	132-2457	132-2459	133-2468	133-2480	133-2483	133-2485
		133-2487	134-2506	134-2523	134-2524	134-2525	134-2527	135-2536	135-2548	135-2551
		135-2553	135-2555	136-2575	136-2590	136-2591	136-2592	136-2594	137-2603	137-2621
		137-2623	137-2625	138-2646	138-2661	138-2662	138-2663	138-2665	139-2674	139-2697
		139-2699	139-2701	140-2721	140-2730	140-2732	140-2735	140-2743	140-2744	141-2755
		141-2761	141-2764	141-2767	141-2768	141-2769	142-2773	142-2775	142-2778	142-2779
		142-2790	142-2793	142-2794	142-2795	143-2806	143-2807	143-2809	143-2817	143-2819
		143-2820	143-2833	144-2862	144-2872	145-2890	145-2891	145-2893	145-2895	145-2897
T$TSTS	= 000001	#15-543	#116-1922	#118-1971	#120-2029	#122-2093	#124-2158	#126-2222	#128-2287	#130-2356
		#132-2431	#134-2500	#136-2569	#138-2640	#140-2715	#144-2856			
T$$AU	= 010020	#115-1873	115-1884	115-1900						
T$$AUT	= 010015	#112-1783	112-1795							
T$$CLE	= 010016	#113-1806	113-1817	113-1833						
T$$DAT	= 010076	#149-2975	149-2975	149-2984	#149-2988	149-2988	149-2997	#150-3002	150-3002	150-3011
		#150-3015	150-3015	150-3024	#151-3029	151-3029	151-3038	#151-3042	151-3042	151-3051
		#152-3056	152-3056	152-3065	#152-3069	152-3069	152-3078	#153-3083	153-3083	153-3092
		#153-3096	153-3096	153-3105	#154-3110	154-3110	154-3119	#154-3123	154-3123	154-3132
		#155-3137	155-3137	155-3146	#155-3150	155-3150	155-3159			
T$$DU	= 010017	#114-1842	114-1847	114-1863						
T$$HAR	= 010040	#146-2914	146-2914	147-2934	147-2935					
T$$HW	= 010000	#17-624	17-624	17-653						
T$$INI	= 010014	#110-1681	111-1755	111-1772						
T$$MSG	= 010011	#98-1286	99-1329	#100-1332	100-1334	#100-1336	100-1339	#100-1341	100-1345	#101-1347
		101-1351	#101-1353	101-1356	#101-1358	101-1361	#102-1364	102-1368		
T$$PC	= 000016	#149-2971	155-3161							

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES								
T$$PRO	= 010013		#109-1652								
T$$PTA	= 010075		#149-2971	149-2975	#149-2975	149-2988	#149-2988	150-3002	#150-3002	150-3015	#150-3015
			151-3029	#151-3029	151-3042	#151-3042	152-3056	#152-3056	152-3069	#152-3069	153-3083
			#153-3083	153-3096	#153-3096	154-3110	#154-3110	154-3123	#154-3123	155-3137	#155-3137
			155-3150	#155-3150							
T$$RPT	= 010012		#108-1615	108-1643							
T$$SOF	= 010041		#148-2949	148-2949	148-2951						
T$$SRV	= 010036		#143-2828	143-2831							
T$$SW	= 010001		#18-664	18-664	18-674						
T$$TES	= 010037		#116-1922	117-1955	#118-1971	119-2016	#120-2029	121-2078	#122-2093	123-2145	#124-2158
			125-2207	#126-2222	127-2267	127-2274	#128-2287	129-2343	#130-2356	131-2409	131-2418
			#132-2431	133-2480	133-2487	#134-2500	135-2548	135-2555	#136-2569	137-2625	#138-2640
			139-2701	#140-2715	140-2744	141-2755	141-2761	141-2769	142-2795	143-2820	143-2833
			#144-2856	145-2897							
T1	020104	G	16-606	#116-1922							
T1ADR	002272		#21-807	99-1306							
T1E0	005524		22-834	#50-1084							
T1E1	005570		22-835	#50-1085							
T1E2	005634		22-836	#51-1087							
T1E3	005700		22-837	#51-1088							
T1E4	005746		22-838	#52-1090							
T1E5	006016		22-839	#52-1091							
T1E6	006064		22-840	#53-1093							
T1E7	006132		22-841	#53-1094							
T10	022544	G	16-606	#134-2500							
T10ADR	002310		#21-814								
T10E0	011477		25-935	#72-1151	135-2546						
T10E1	011560		25-936	#73-1153							
T10E2	011621		25-937	#73-1154							
T10E3	011657		25-938	#74-1156							
T10E4	011714		25-939	#74-1157							
T10E5	011767		25-940	#75-1159							
T10E6	012037		25-941	#75-1160							
T10E7	012116		25-942	#76-1162							
T11	022776	G	16-606	#136-2569							
T11ADR	002312		#21-815								
T11E0	012161		26-950	#76-1163	137-2613	139-2684					
T11E1	012260		26-951	#77-1165	139-2690						
T11E2	012365		26-952	#77-1166							
T11E3	012437		26-953	#78-1168							
T11E4	012524		26-954	#78-1169							
T11E5	012573		26-955	#79-1171							
T12	023240	G	16-606	#138-2640							
T12ADR	002314		#21-816								
T12E0	012625		26-964	#79-1172	141-2753						
T12E1	012721		26-965	#80-1174							
T12E2	012771		26-966	#80-1175	141-2759						
T12E3	013052		26-967	#81-1177							
T12E4	013132		26-968	#81-1178							
T12E5	013205		26-969	#82-1180							
T12E6	013262		26-970	#82-1181							
T13	023522	G	16-606	#140-2715							

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES			
T13ADR	002316		#21-817			
T13E0	013336		27-979	#83-1183		
T13E1	013404		27-980	#83-1184		
T13E10	014277		27-989	#88-1198		
T13E11	014350		27-990	#88-1199		
T13E2	013460		27-981	#84-1186		
T13E3	013545		27-982	#84-1187	145-2883	
T13E4	013653		27-983	#85-1189		
T13E5	013727		27-984	#85-1190		
T13E6	014005		27-985	#86-1192		
T13E7	014105		27-986	#86-1193		
T13E8	014161		27-987	#87-1195		
T13E9	014227		27-988	#87-1196		
T14	024304	G	16-606	#144-2856		
T2	020244	G	16-606	#118-1971		
T2ADR	002274		#21-808			
T2E0	006200		22-848	#54-1096		
T2E1	006253		22-849	#54-1097		
T2E2	006323		22-850	#55-1099		
T2E3	006374		22-851	#55-1100		
T2E4	006457		22-852	#56-1102		
T2E5	006542		22-853	#56-1103		
T2E6	006613		22-854	#57-1105		
T2E7	006661		22-855	#57-1106		
T2E8	006725		22-856	#58-1108		
T2E9	007003		22-857	#58-1109		
T3	020446	G	16-606	#120-2029		
T3ADR	002276		#21-809			
T3E0	007061		23-863	#59-1111		
T3E1	007137		23-864	#59-1112		
T3E2	007215		23-865	#60-1114		
T3E3	007313		23-866	#60-1115		
T4	020666	G	16-606	#122-2093		
T4ADR	002300		#21-810			
T5	021122	G	16-606	#124-2158		
T5ADR	002302		#21-811			
T5E0	007411		24-892	#61-1117	127-2265	129-2332
T5E1	007471		24-893	#61-1118		
T5E2	007544		24-894	#62-1120		
T5E3	007607		24-895	#62-1121		
T6	021342	G	16-606	#126-2222		
T6ADR	002304		#21-812			
T6E0	007647		24-906	#63-1123		
T6E1	007745		24-907	#63-1124		
T6E2	010025		24-908	#64-1126		
T6E3	010074		24-909	#64-1127		
T6E4	010154		24-910	#65-1129		
T6E5	010223		24-911	#65-1130		
T6E6	010266		24-912	#66-1132		
T7	021566	G	16-606	#128-2287		
T7ADR	002306		#21-813			
T7E0	010337		25-921	#66-1133	131-2407	133-2478

SYMBOL CROSS REFERENCE CREF V02

SYMBOL	VALUE		REFERENCES	
T7E1	010417		25-922	#67-1135
T7E10	011320		25-931	#71-1148
T7E11	011412		25-932	#72-1150
T7E2	010504		25-923	#67-1136
T7E3	010560		25-924	#68-1138
T7E4	010634		25-925	#68-1139
T7E5	010707		25-926	#69-1141
T7E6	010775		25-927	#69-1142
T7E7	011054		25-928	#70-1144
T7E8	011132		25-929	#70-1145
T7E9	011227		25-930	#71-1147
T8	022024	G	16-606	#130-2356
T9	022304	G	16-606	#132-2431
UAM	= 000200	G	#19-691	
UROM	004127		#35-1037	147-2932
X$ALWA	= 000000		#15-543	147-2934
X$FALS	= 000040		#15-543	
X$OFFS	= 000400		#15-543	147-2934
X$TRUE	= 000020		#15-543	
$PATCH	024572	G	#148-2953	

SEQ 0184

MACRO CROSS REFERENCE CREF V02

MACRO NAME	REFERENCES									
BCOMPL	110-1710	110-1714								
BGNAU	115-1873									
BGNAUT	112-1783									
BGNCLN	113-1806									
BGNDDU	114-1842									
BGNHRD	146-2914									
BGNHW	17-624									
BGNINI	110-1681									
BGNMOD	15-559	16-605	19-690	20-715						
BGNMSG	98-1286	100-1332	100-1336	100-1341	101-1347	101-1353	101-1358	102-1364		
BGNPRO	109-1652									
BGNPTA	149-2975	149-2988	150-3002	150-3015	151-3029	151-3042	152-3056	152-3069	153-3083	153-3096
	154-3110	154-3123	155-3137	155-3150						
BGNRPT	108-1615									
BGNSET	149-2971									
BGNSFT	148-2949									
BGNSRV	143-2828									
BGNSW	18-664									
BGNTST	116-1922	118-1971	120-2029	122-2093	124-2158	126-2222	128-2287	130-2356	132-2431	134-2500
	136-2569	138-2640	140-2715	144-2856						
BNCOMP	110-1716	110-1726								
BREAK	103-1426									
CKLOOP	117-1953	118-1991	119-2014	120-2050	121-2076	122-2117	123-2143	124-2179	125-2205	126-2243
	127-2272	128-2310	129-2341	130-2381	131-2416	132-2456	133-2485	134-2524	135-2553	136-2591
	137-2623	138-2662	139-2699	141-2768	142-2794	143-2807	143-2819	145-2895		
CLRVEC	117-1954	142-2775								
DESCRI	89-1215									
DEVTYP	89-1205									
DISPAT	16-606									
DOCLN	104-1453	105-1469	105-1474	111-1757	116-1942	118-1976	118-1994	120-2035	120-2053	121-2074
	122-2099	122-2120	123-2141	124-2164	124-2182	125-2203	126-2228	126-2246	128-2293	128-2313
	130-2362	130-2384	132-2437	132-2459	134-2506	134-2527	136-2575	136-2594	138-2646	138-2665
	140-2721	143-2809	144-2862	145-2893						
DODU	104-1451	105-1467	105-1472	116-1940	118-1992	120-2051	121-2072	122-2118	123-2139	124-2180
	125-2201	126-2244	128-2311	130-2382	132-2457	134-2525	136-2592	138-2663	145-2891	
ENDAU	115-1900									
ENDAUT	112-1795									
ENDCLN	113-1833									
ENDDU	114-1863									
ENDHRD	147-2935									
ENDHW	17-653									
ENDINI	111-1772									
ENDMOD	15-586	16-607	19-707	27-999						
ENDMSG	99-1329	100-1334	100-1339	100-1345	101-1351	101-1356	101-1361	102-1368		
ENDPRO	109-1658									
ENDPTA	149-2984	149-2997	150-3011	150-3024	151-3038	151-3051	152-3065	152-3078	153-3092	153-3105
	154-3119	154-3132	155-3146	155-3159						
ENDRPT	108-1643									
ENDSET	155-3161									
ENDSFT	148-2951									
ENDSRV	143-2831									
ENDSW	18-674									

MACRO CROSS REFERENCE CREF V02

MACRO NAME	REFERENCES									
ENDTST	117-1955	119-2016	121-2078	123-2145	125-2207	127-2274	129-2343	131-2418	133-2487	135-2555
	137-2625	139-2701	143-2833	145-2897						
EQUALS	19-691									
ERRDF	104-1450	105-1471	116-1939	118-1990	120-2049	121-2071	122-2116	123-2138	124-2178	125-2200
	126-2242	128-2309	130-2380	132-2455	134-2523	136-2590	138-2661	143-2806	145-2890	
ERRHRD	119-2003	119-2012	121-2062	123-2129	125-2191	127-2255	127-2270	129-2322	129-2339	131-2393
	131-2414	133-2468	133-2483	135-2536	135-2551	137-2603	137-2621	139-2674	139-2697	140-2743
	141-2767	142-2793	143-2817	144-2872						
ERRSOF	105-1466									
EXIT	111-1755	113-1817	114-1847	115-1884	127-2267	131-2409	133-2480	135-2548	140-2744	141-2755
	141-2761	141-2769	142-2795	143-2820	147-2934					
GPHARD	110-1725									
GPRMD	146-2916									
GPRML	146-2918	146-2920	146-2923	146-2925	146-2927	147-2930	147-2932			
HEADER	15-585									
LASTAD	148-2956									
M$BYTE	#15-585	15-585	15-585							
M$CHEC	#111-1755	111-1755	#113-1817	113-1817	#114-1847	114-1847	#115-1884	115-1884	#127-2267	127-2267
	#131-2409	131-2409	#133-2480	133-2480	#135-2548	135-2548	#140-2744	140-2744	#141-2755	141-2755
	#141-2761	141-2761	#141-2769	141-2769	#142-2795	142-2795	#143-2820	143-2820	#147-2934	147-2934
M$CNTO	#146-2916	146-2916	#146-2918	146-2918	#146-2920	146-2920	#146-2923	146-2923	#146-2925	146-2925
	#146-2927	146-2927	#147-2930	147-2930	#147-2932	147-2932				
M$COUN	#98-1288	98-1288	98-1288	#98-1300	98-1300	#98-1304	98-1304	#99-1308	99-1308	#99-1320
	99-1320	#99-1328	99-1328	#100-1333	100-1333	#100-1338	100-1338	100-1338	#100-1343	100-1343
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