IEC11-B

IEC11-B PDP-11 DIAG
CZIECAO

AH-T880A-MC

FICHE 01 OF 01

JUL 1984
digital
Made In USA

IDENTIFICATION

PRODUCT CODE: AC-T879A-MC

PRODUCT TITLE: CZIECAO IEC11-B PDP-11 DIAGNOSTIC

PRODUCT DATE: JANUARY 1984

DEPARTMENT: CSS, MUNICH

AUTHOR: J. MOLLER

TABLE OF CONTENTS

1.0 ABSTRACT

THIS PROGRAM IS DESIGNED TO TEST AND EXERCISE AN IEC11-B INTERFACE TOGETHER WITH AN IEC11-A INTERFACE.

2.0 REQUIREMENTS

PDP11 WITH AT LEAST 8K MEMORY,CONSOLE TERMINAL WITH STANDARD ADDRESSES, INTERRUPT LEVEL AND PRIORITY.
IEC11-A INTERFACE
IEC11-B INTERFACE
TESTCABLE (BC08S-XX)

2.1 PRELIMINARY DIAGNOSTICS

ALL DIAGNOSTIC PROGRAMS FOR THE IEC11-A MUST RUN SUCCESSFUL.

3.0 LOADING PROCEDURE

3.1 METHOD

SEE DIAGNOSTIC MONITOR DESCRIPTION

4.0 STARTING PROCEDURE

SEE DIAGNOSTIC MONITOR DESCRIPTION

5.0 OPERATING PROCEDURES

5.1 SWITCH SETTINGS

SEE DIAGNOSTIC MONITOR DESCRIPTION

5.2 P R I N T O U T S

AFTER THE IDENTIFICATION PRINTOUT FOLLOW A FEW
QUESTIONS FOR THE ADDRESSES AND THE VECTORS.
IF THE INTERFACE HAS THE DEFAULT ADDRESSES
AND VECTORS, ENTER JUST A <CR> AND THROUGH ALL THE
TESTS THESE VALUES WILL BE USED. A TYPICAL, ERROR-
FREE PASS WILL BE EXECUTED IN THE FOLLOWING ORDER:

(NOTE THAT USER INPUT IS UNDERLINED)

CDM V3.0 ---CSS DIAGNOSTIC MONITOR---

```
HIGHEST MEMORY ADDRESS :XXXXXXX
IEC11-B  TEST IN CONNECTION
WITH AN IEC11-A INTERFACE
AC-T879A-MC
CSS MUNICH MARCH 1979


ENTER FIRST REGISTER ADDRESS OF IEC11-A
(DEFAULT IS 160010)
CDM><CR>
     ==
ENTER VECTOR ADDRESS OF IEC11-A
(DEFAULT IS 270)
CMD><CR>
     ==
ENTER IEC-BUS ADDRESS OF IEC11-A
(DEFAULT IS 35)
CMD><CR>
     ==
ENTER FIRST REGISTER ADDRESS OF IEC11-B
(DEFAULT IS 160020)
CDM><CR>
     ==
ENTER VECTOR ADDRESS OF IEC11-A
(DEFAULT IS 274)
CMD><CR>
     ==
ENTER IEC-BUS ADDRESS OF IEC11-B
(DEFAULT IS 36)
CMD><CR>
     ==

NEXT TEST TO RUN ?
CMD><CR>
     ==
```

```
TEST 1: REGISTER STATIC TEST

END OF TEST

TEST 2: TALKER AND LISTENER FUNCTION TEST

END OF TEST

TEST 3: GENERAL INTERRUPT AND DMA FUNCTION TEST

END OF TEST

TEST 4: DMA-TRANSFER FROM B TO A  (B IS TALKER)

END OF TEST

TEST 5: DMA-TRANSFER FROM A TO B  (B IS LISTENER)

END OF TEST

TEST 6: MATCH CHARACTER REGISTER TEST (B IS LISTENER)

END OF TEST

TEST 7: SERIAL POLL PROCEDURE TEST

END OF TEST

TEST 1: REGISTER STATIC TEST
<CTRL C>
 ======
CDM>ABO<CR>
    ======

NEXT TEST TO RUN ?
CDM>
;
;
;       THE ABOVE PRINTOUT IS A TYPICAL EXAMPLE FOR AN ERROR FREE RUN.
;
```

6.0 ERRORS

6.1 ERROR FORMAT

THE ERROR FORMAT IS DESCRIBED IN SECTION 10,
DIAGNOSTIC MONITOR.

6.2 ERROR DESCRIPTION

SEE PROGRAM DESCRIPTION (FLOWCHARTS)

ERRORS FROM "REGTST" SUBROUTINE : MAY APPEAR IN TEST 1

ERROR	253:	WRITE AND READ ERROR IN A REGISTER AFTER LOADING THE R/W BITS WITH A RANDOM PATTERN
ERROR	254:	WRITE AND READ ERROR IN A REGISTER AFTER LOADING ALL THE R/W BITS WITH 0
ERROR	255:	WRITE AND READ ERROR IN A REGISTER AFTER LOADING ALL THE R/W BITS WITH 1

7.0 EXECUTION TIME

THE EXECUTION TIME OF ONE SEQUENTIAL PASS DEPENDS ON
THE CONSOLE TERMINAL (BAUD RATE) AND THE TYP OF PROCESSOR.

ONLY TEST 6 TAKES MORE THAN 10 SECONDS AFTER IDENTIFICATION.

SEE PROGRAM DESCRIPTION

8.0 MISCELLANEOUS

8.1 RESTRICTIONS

DON'T USE ADDRESS "0" FOR IEC BUS ADDRESS
ON TEST CONFIGURATION !!

MAKE SURE THAT ALL SWITCHES ON IEC11-A AND IEC11-B
ARE SET CORRECTLY

9.0 PROGRAM DESCRIPTION

THE IEC11-B TEST PROGRAM IS A SET OF
SEVEN INDEPENDENT ROUTINES THAT CAN BE CALLED
FROM A SELECT ROUTINE.
WHEN THE QUESTION OCCURS,

NEXT TEST TO RUN ?

ANYONE OF THE SEVEN TESTS CAN BE SELECTED.

IF <CR> IS PRESSED,THEN ALL TESTS WILL
RUN SEQUENTIALLY.

ALL TESTS CAN BE ABORTED BY PRESSING <CTRL C>
AND TYPING "ABO"

ANY SINGLE SELECTED TEST RUNS IN AN ENDLESS LOOP
WITH NO PRINTOUT (E.G. END OF TEST).

TO RUN A TEST ERROR FREE,ALL PREVIOUS TESTS MUST PROVE
SUCCESSFULL !!

THE FOLLOWING SECTION CONTAINS THE FLOWCHARTS FOR ALL TESTS.

ALL ERROR NUMBERS WHICH ARE MARKED WITH A "*" APPEAR AFTER
A PROGRAMMED DELAY.

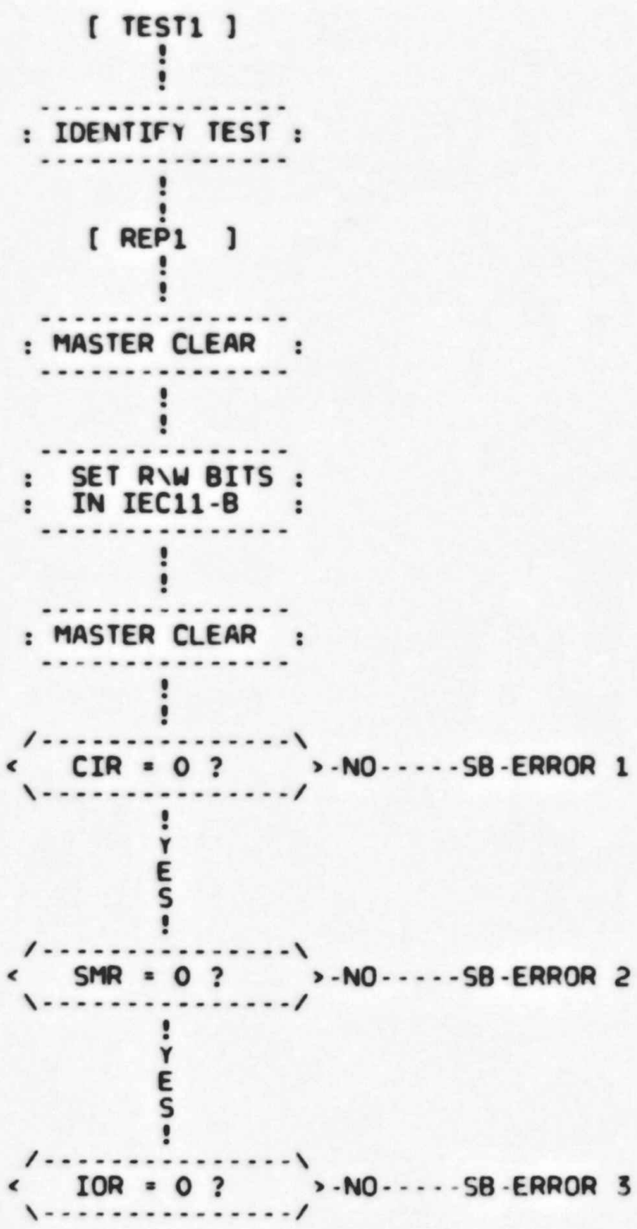
--SB-ERROR 35 : SB STANDS FOR AN ADDITIONAL PRINTOUT BEFORE
ERROR NUMBER PRINT OF THE FORM :

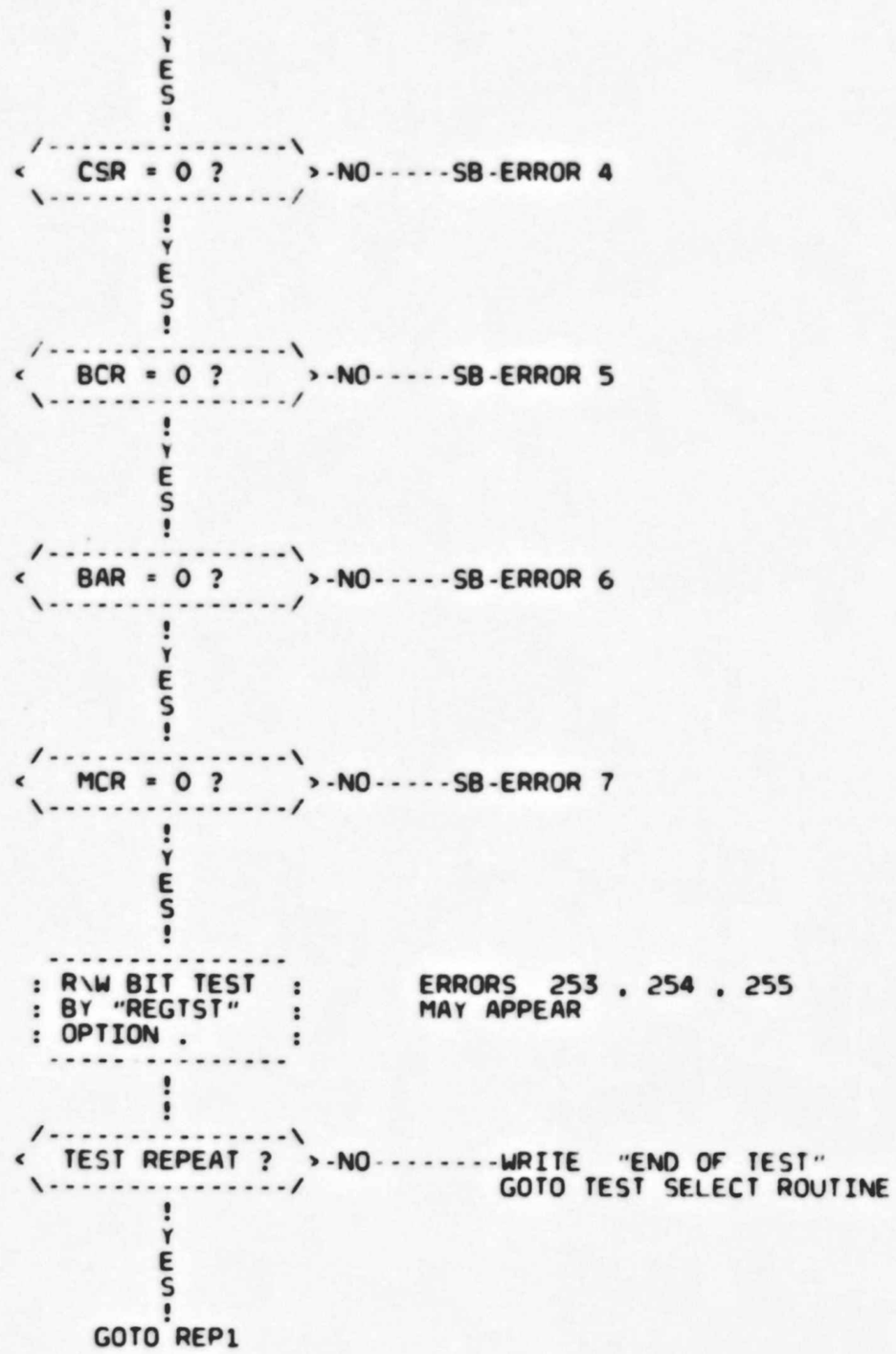
CONTENTS SHOULD BE : 000026 BUT WAS : 000025

[TEST XX] : THESE LABELS REFER TO LABELS IN THE PROGRAM
LISTING.

********** TEST 1: REGISTER STATIC TEST

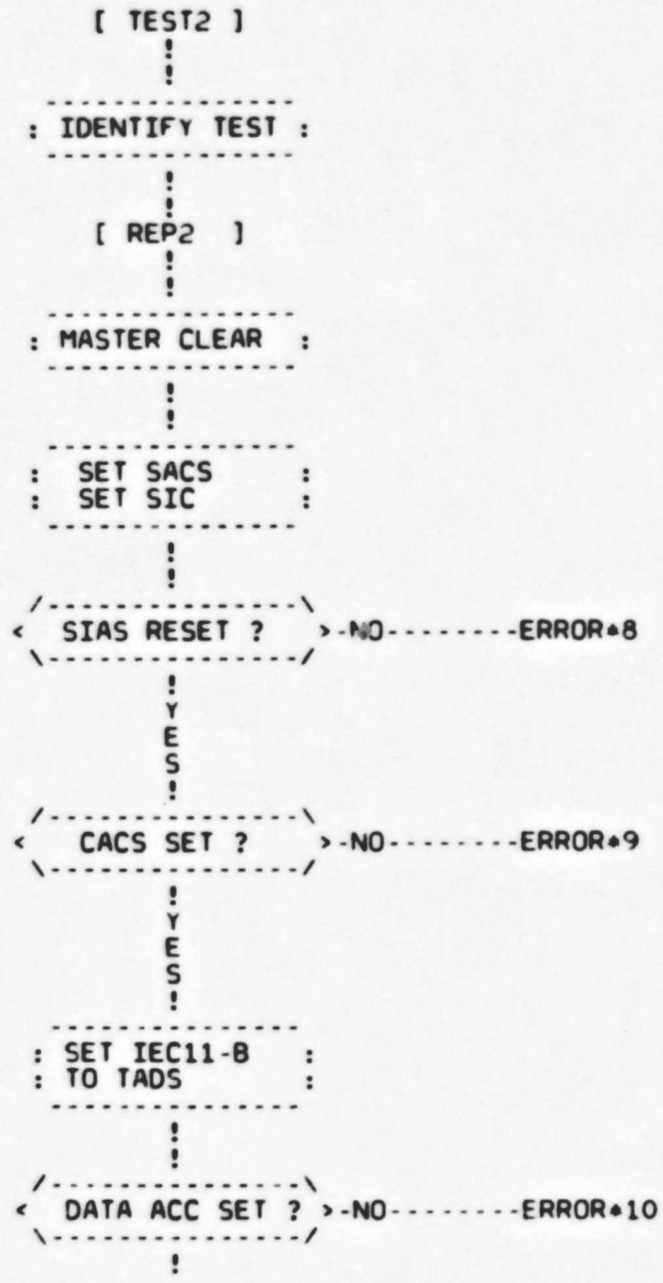
THE MASTER CLEAR FUNCTION OF OF IEC11-A AND IEC11B
IS TESTED.
ALL READ/WRITE BITS IN IEC11-B ARE CHECKED WITH
ALTERNATE PATTERN (EXCEPT BIT 0 IN CSR.)

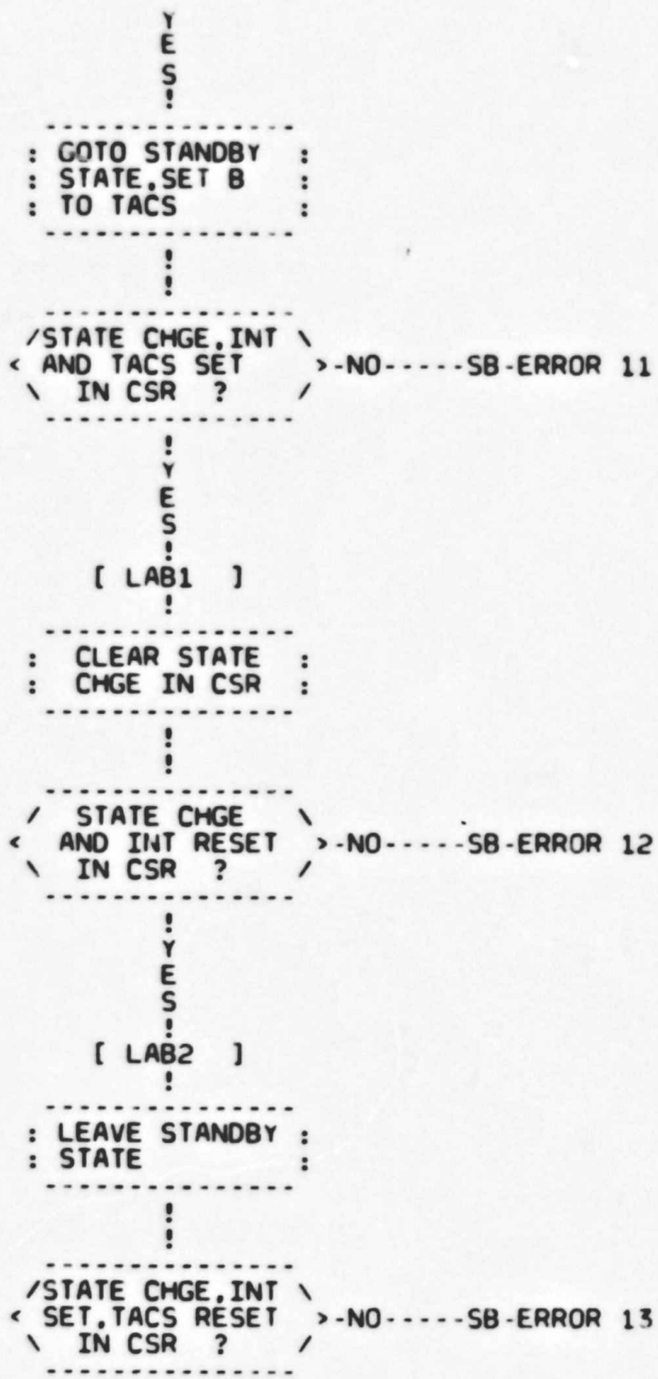


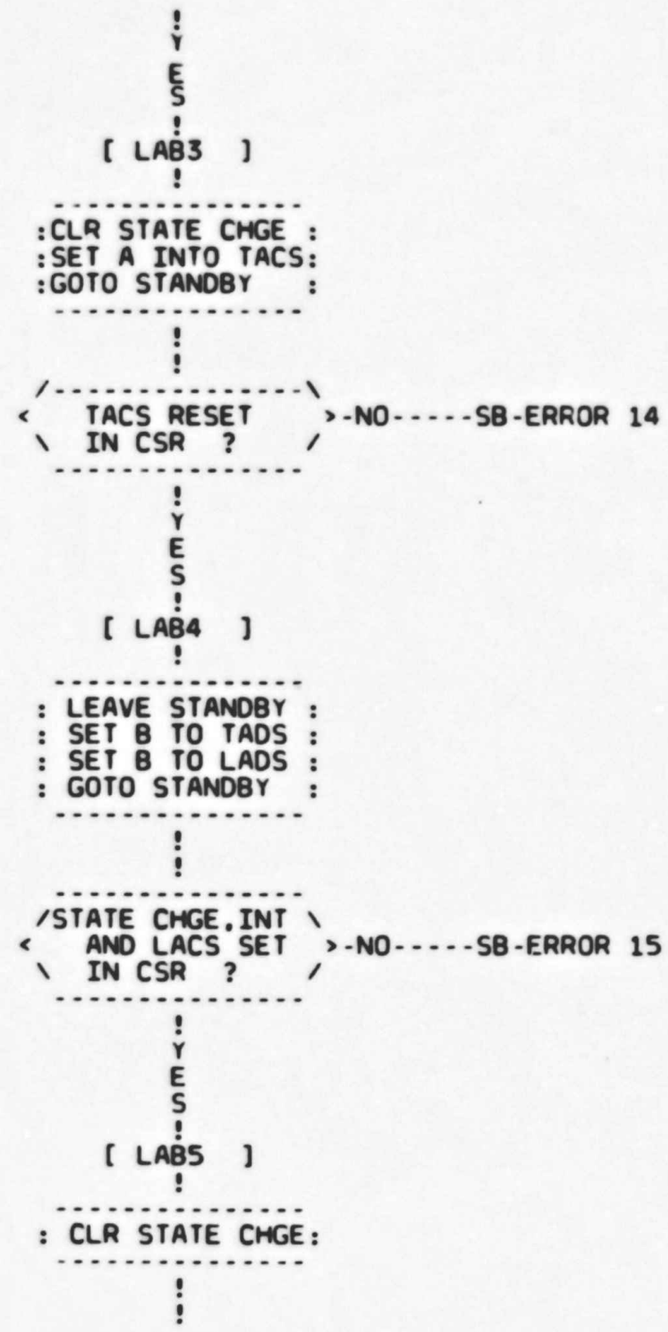

YES
CSR = 0 ?
NO
SB-ERROR 4
YES
BCR = 0 ?
NO
SB-ERROR 5
YES
BAR = 0 ?
NO
SB-ERROR 6
YES
MCR = 0 ?
NO
SB-ERROR 7
YES
R\W BIT TEST BY "REGTST" OPTION .
ERRORS 253 , 254 , 255 MAY APPEAR
TEST REPEAT ?
NO
WRITE "END OF TEST"
GOTO TEST SELECT ROUTINE
YES
GOTO REP1

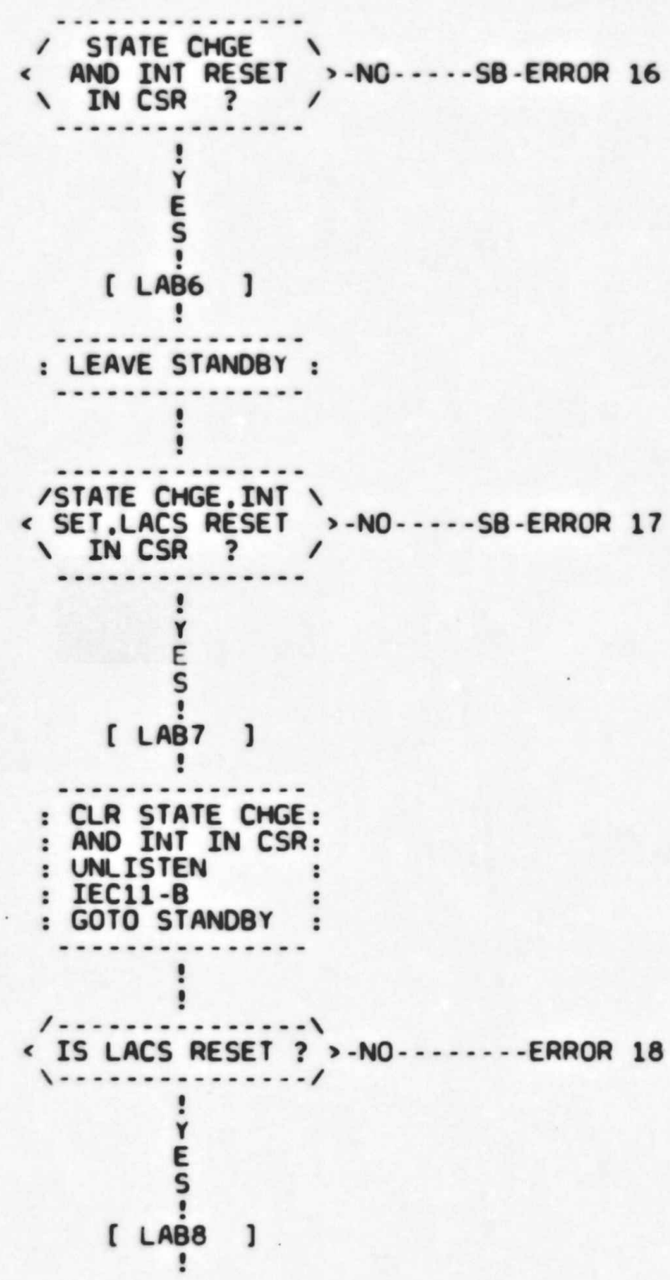
SEQ 10

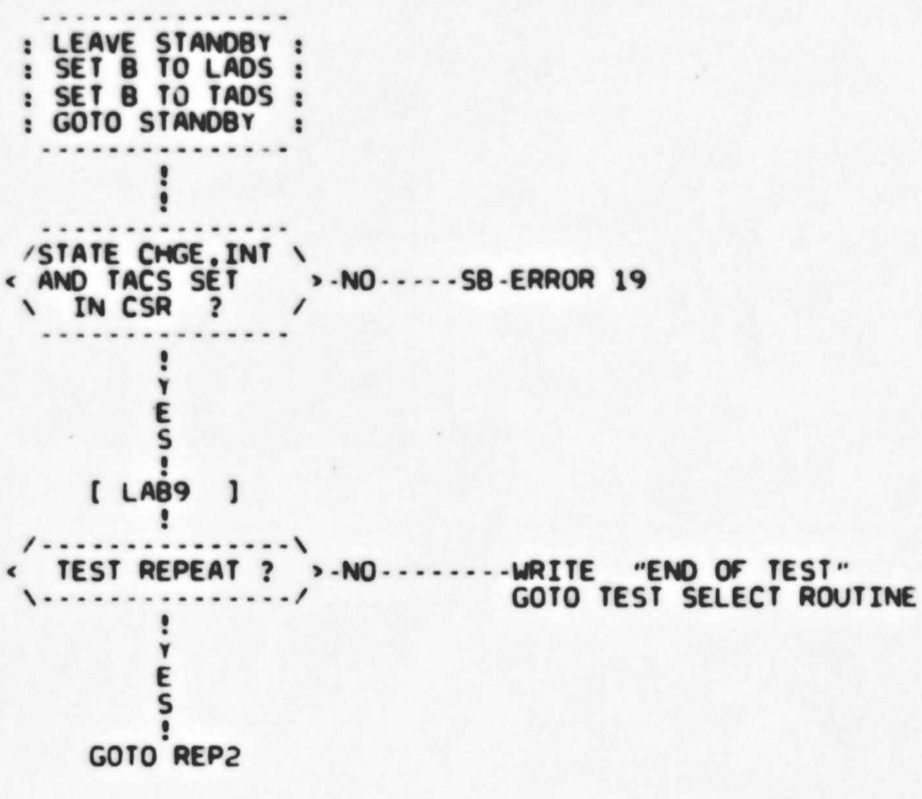
********** TEST 2 : TALKER AND LISTENER FUNCTION TEST




YES
GOTO STANDBY STATE,SET B TO TACS
STATE CHGE,INT AND TACS SET IN CSR ?
NO
SB-ERROR 11
YES
[LAB1]
CLEAR STATE CHGE IN CSR
STATE CHGE AND INT RESET IN CSR ?
NO
SB-ERROR 12
YES
[LAB2]
LEAVE STANDBY STATE
STATE CHGE,INT SET,TACS RESET IN CSR ?
NO
SB-ERROR 13

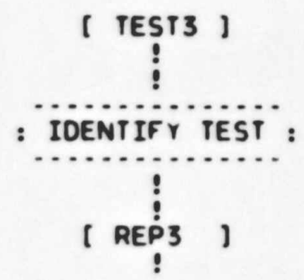

YES
[LAB3]
CLR STATE CHGE
SET A INTO TACS
GOTO STANDBY
TACS RESET IN CSR ?
NO
SB-ERROR 14
YES
[LAB4]
LEAVE STANDBY
SET B TO TADS
SET B TO LADS
GOTO STANDBY
STATE CHGE.INT AND LACS SET IN CSR ?
NO
SB-ERROR 15
YES
[LAB5]
CLR STATE CHGE

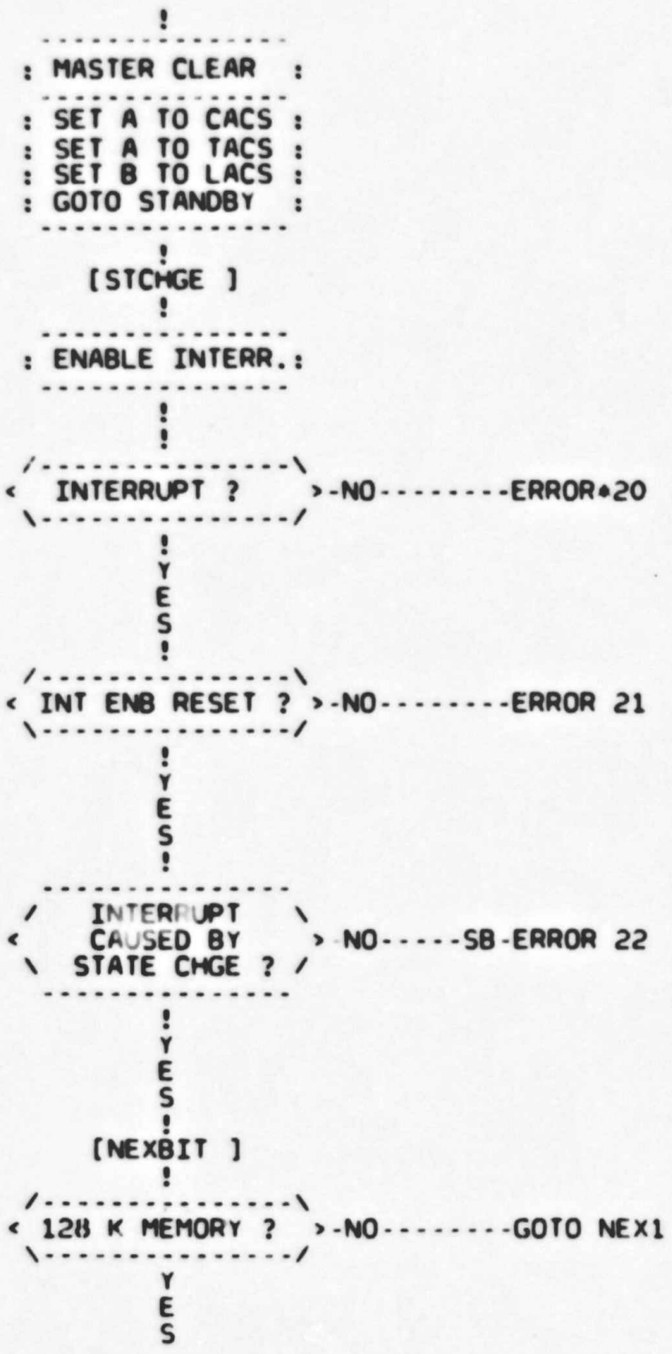

STATE CHGE AND INT RESET IN CSR ?
NO
SB-ERROR 16
YES
LAB6
LEAVE STANDBY
STATE CHGE,INT SET,LACS RESET IN CSR ?
NO
SB-ERROR 17
YES
LAB7
CLR STATE CHGE: AND INT IN CSR: UNLISTEN IEC11-B GOTO STANDBY
IS LACS RESET ?
NO
ERROR 18
YES
LAB8

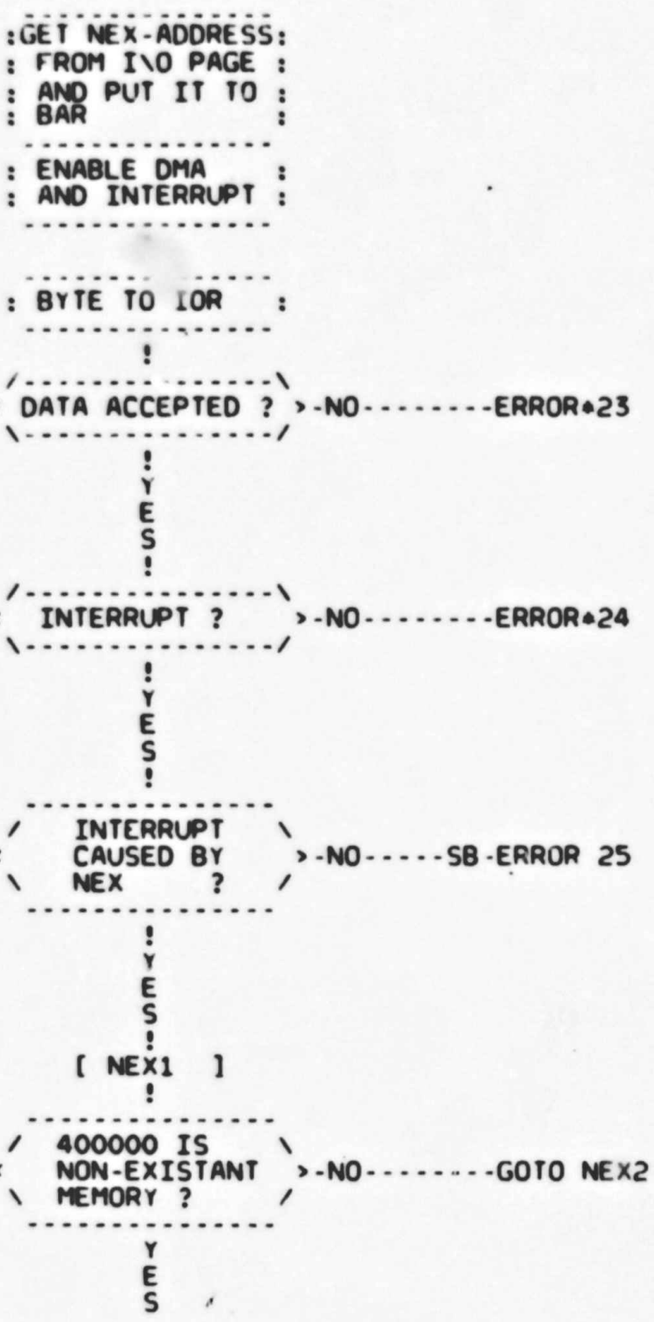


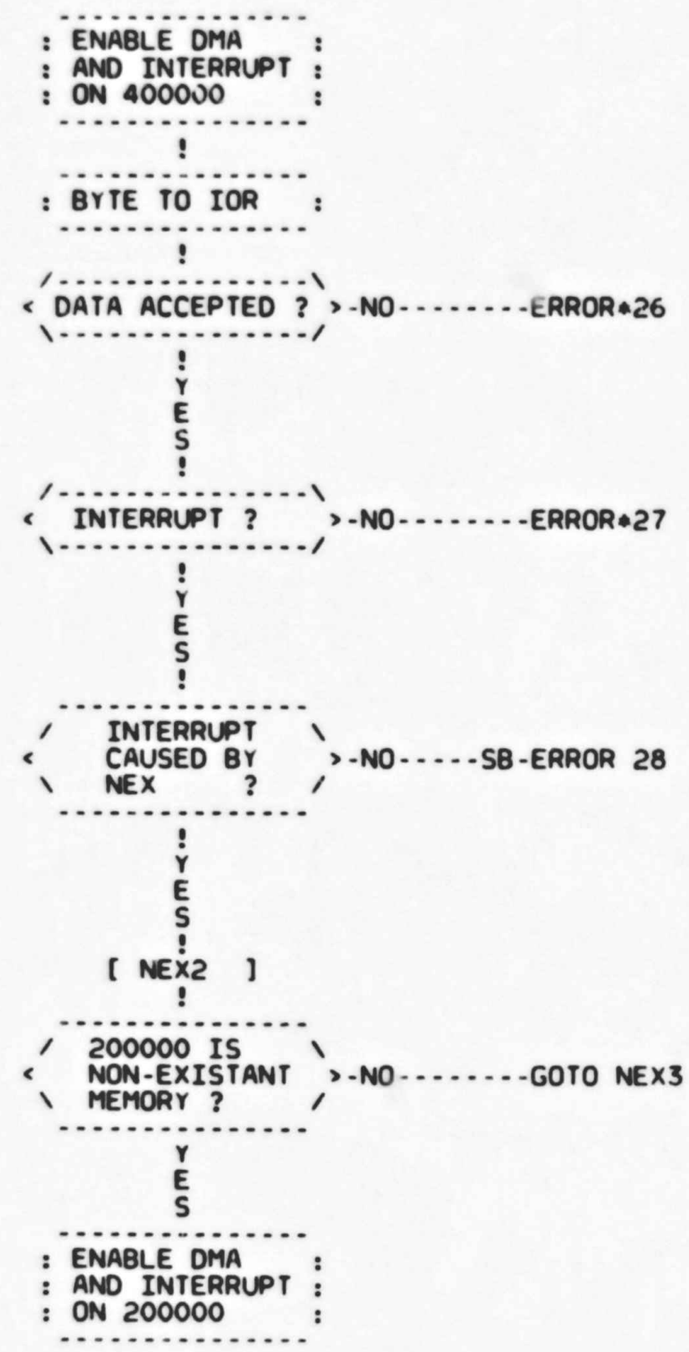
*********** TEST 3 : GENERAL INTERRUPT AND DMA FUNCTION TEST

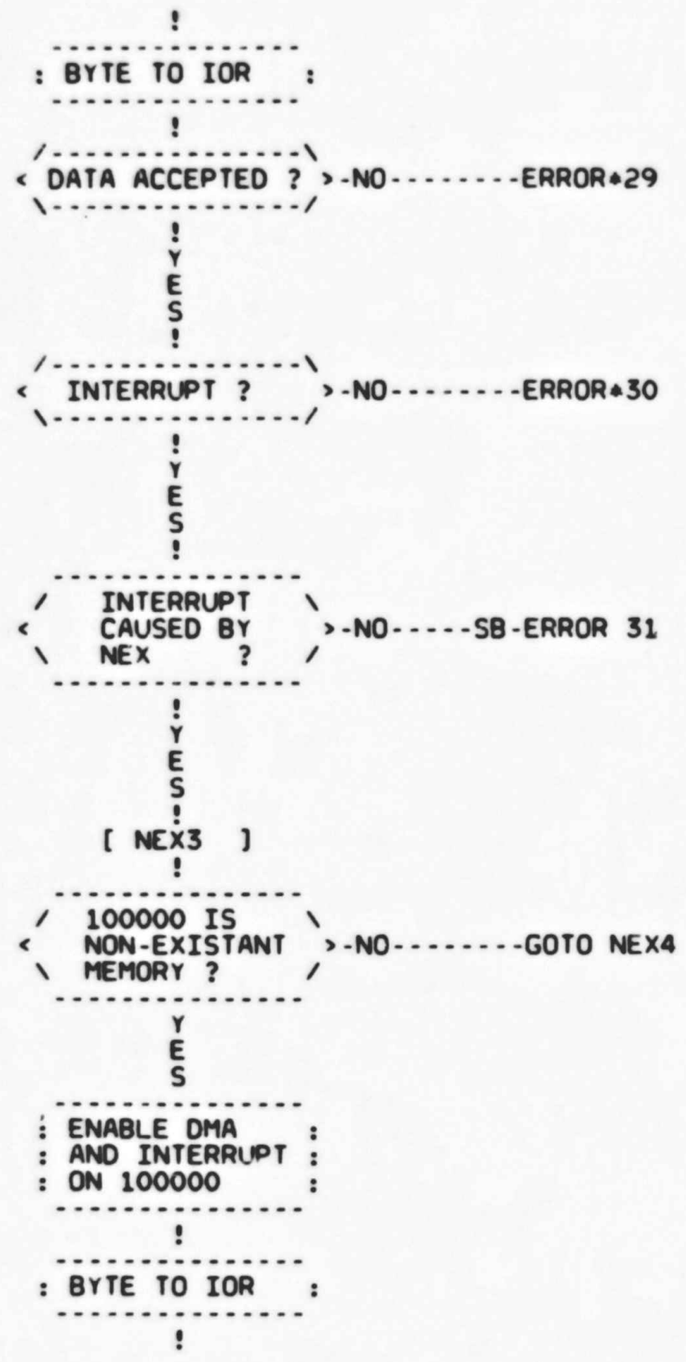
THE FUNCTION OF ALL BITS WHICH CAN AFFECT "INT" IN CSR
IS CHECKED.
THOSE BITS ARE: "STATE CHGE","NEX","BC OVFL","END" IN CSR
ALSO THE BUS REQUEST LEVEL OF IEC11-B IS IDENTIFIED.
IF THE TESTS RUN SEQUENTIALLY.

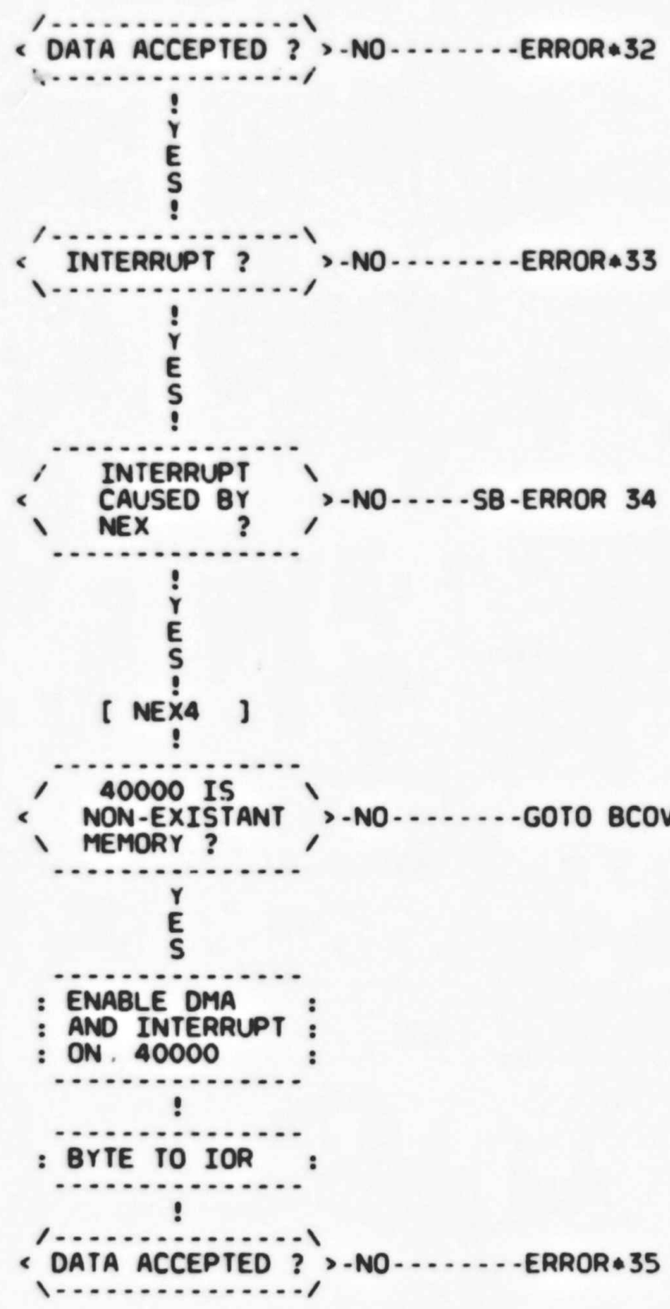


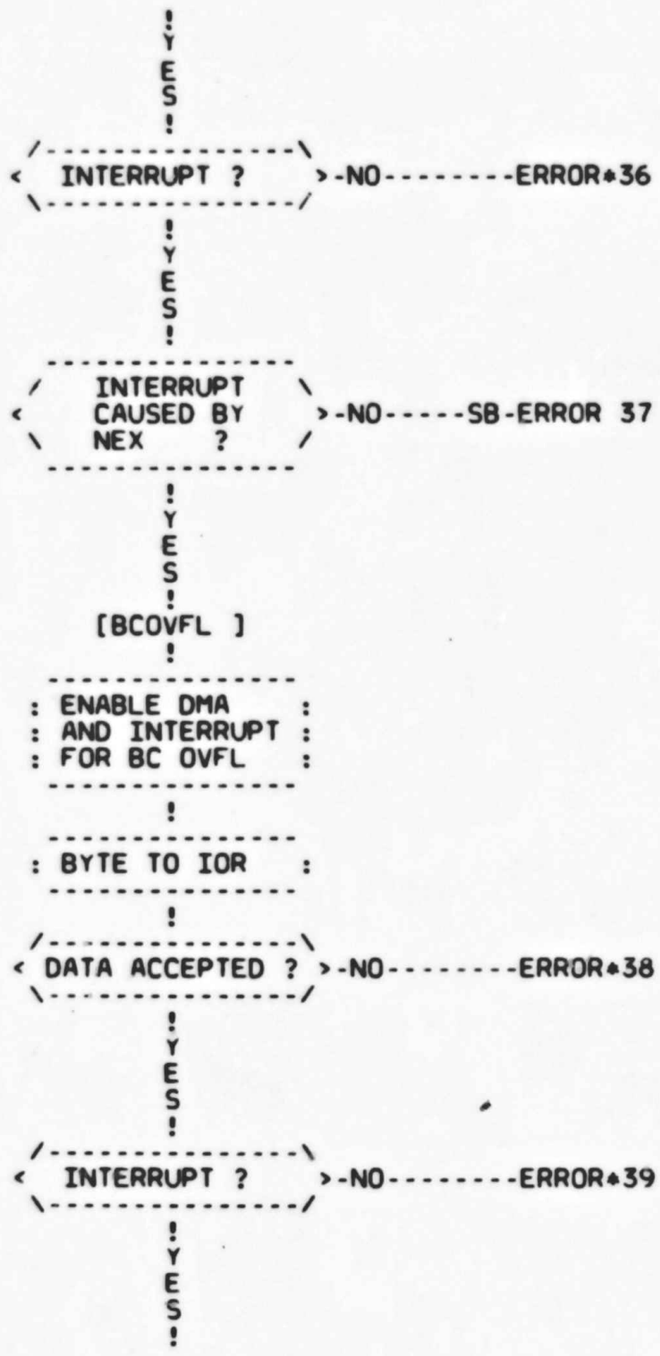

MASTER CLEAR
SET A TO CACS
SET A TO TACS
SET B TO LACS
GOTO STANDBY
[STCHGE]
ENABLE INTERR.
INTERRUPT ?
NO
ERROR*20
YES
INT ENB RESET ?
NO
ERROR 21
YES
INTERRUPT CAUSED BY STATE CHGE ?
NO
SB-ERROR 22
YES
[NEXBIT]
128 K MEMORY ?
NO
GOTO NEX1
YES

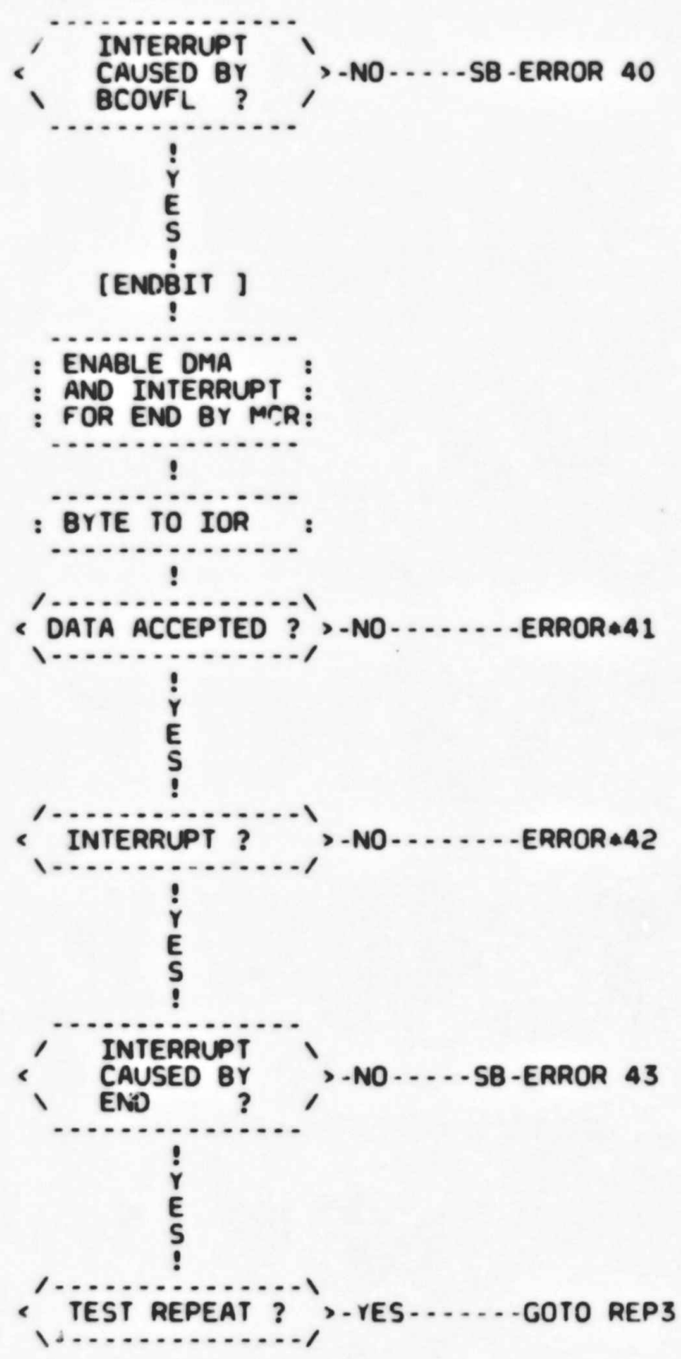

GET NEX-ADDRESS
FROM I\O PAGE
AND PUT IT TO
BAR
ENABLE DMA
AND INTERRUPT
BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR#23
YES
INTERRUPT ?
NO
ERROR#24
YES
INTERRUPT
CAUSED BY
NEX ?
NO
SB-ERROR 25
YES
[NEX1]
400000 IS
NON-EXISTANT
MEMORY ?
NO
GOTO NEX2
YES

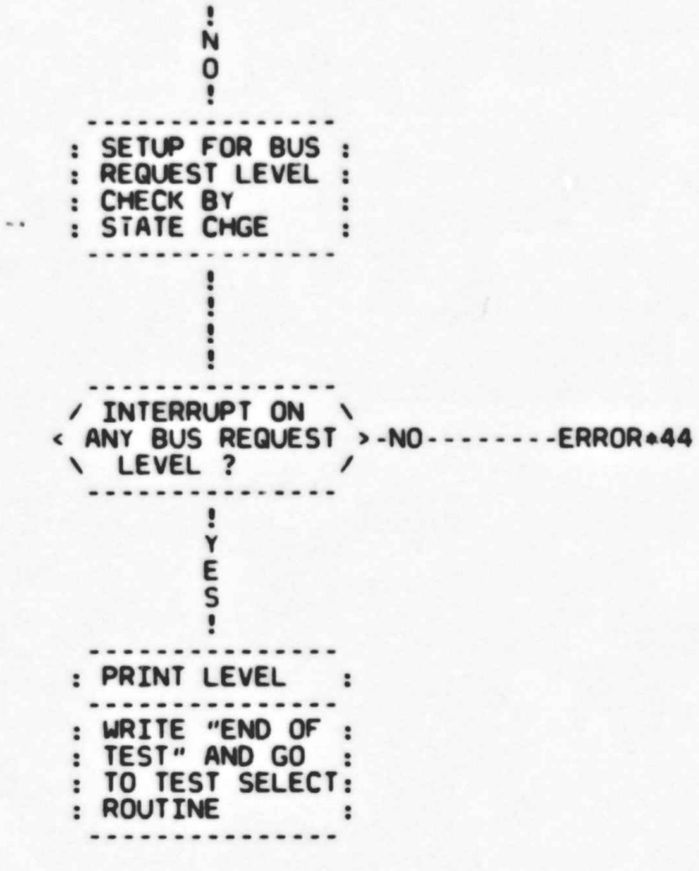

ENABLE DMA AND INTERRUPT ON 400000
BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR#26
YES
INTERRUPT ?
NO
ERROR#27
YES
INTERRUPT CAUSED BY NEX ?
NO
SB-ERROR 28
YES
[NEX2]
200000 IS NON-EXISTANT MEMORY ?
NO
GOTO NEX3
YES
ENABLE DMA AND INTERRUPT ON 200000


BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR+29
YES
INTERRUPT ?
NO
ERROR+30
YES
INTERRUPT CAUSED BY NEX ?
NO
SB-ERROR 31
YES
[NEX3]
100000 IS NON-EXISTANT MEMORY ?
NO
GOTO NEX4
YES
ENABLE DMA AND INTERRUPT ON 100000
BYTE TO IOR

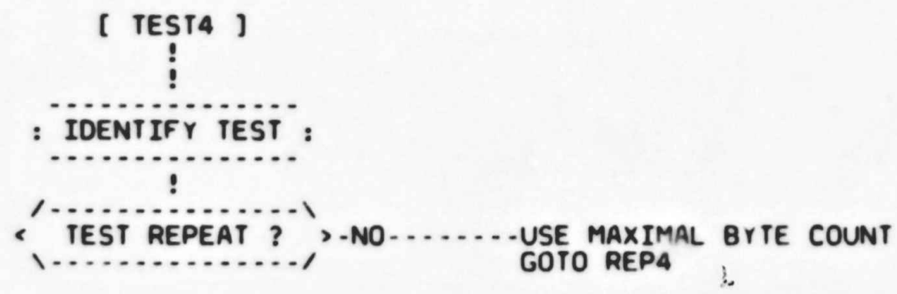

DATA ACCEPTED ?
NO
ERROR*32
YES
INTERRUPT ?
NO
ERROR*33
YES
INTERRUPT CAUSED BY NEX ?
NO
SB-ERROR 34
YES
[NEX4]
40000 IS NON-EXISTANT MEMORY ?
NO
GOTO BCOVFL
YES
ENABLE DMA AND INTERRUPT ON 40000
BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR*35

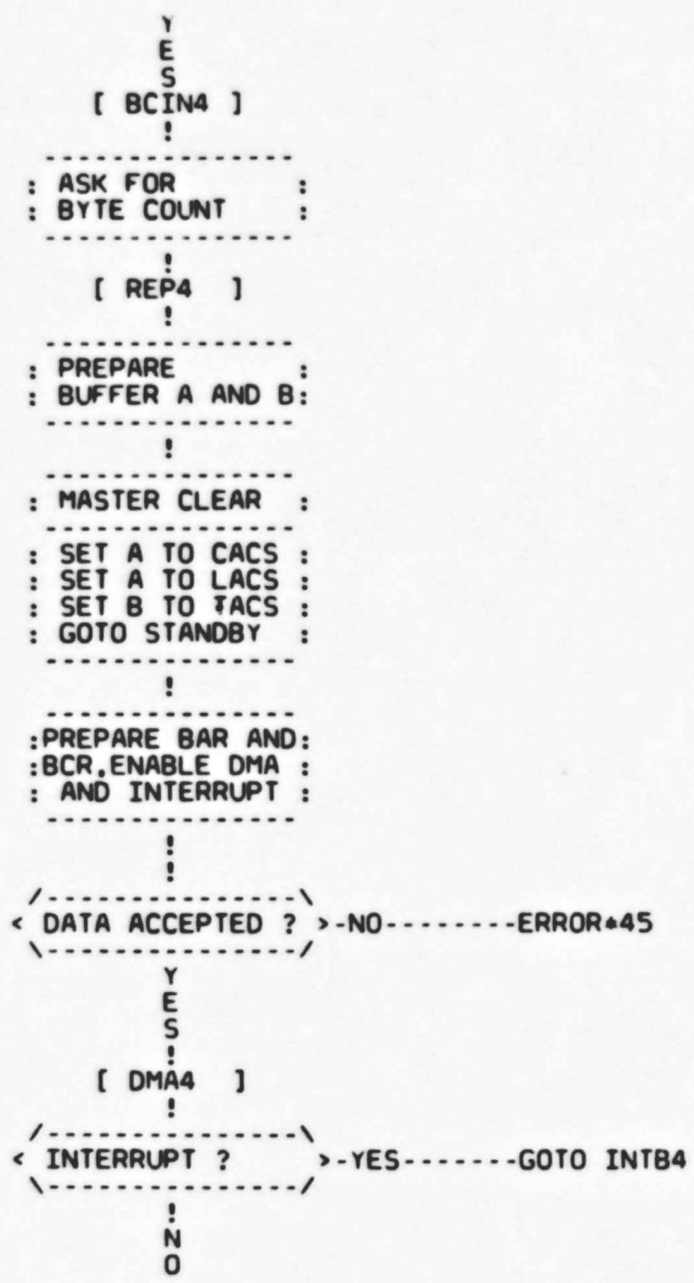

YES
INTERRUPT ?
NO
ERROR*36
YES
INTERRUPT CAUSED BY NEX ?
NO
SB-ERROR 37
YES
[BCOVFL]
ENABLE DMA AND INTERRUPT FOR BC OVFL
BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR*38
YES
INTERRUPT ?
NO
ERROR*39
YES

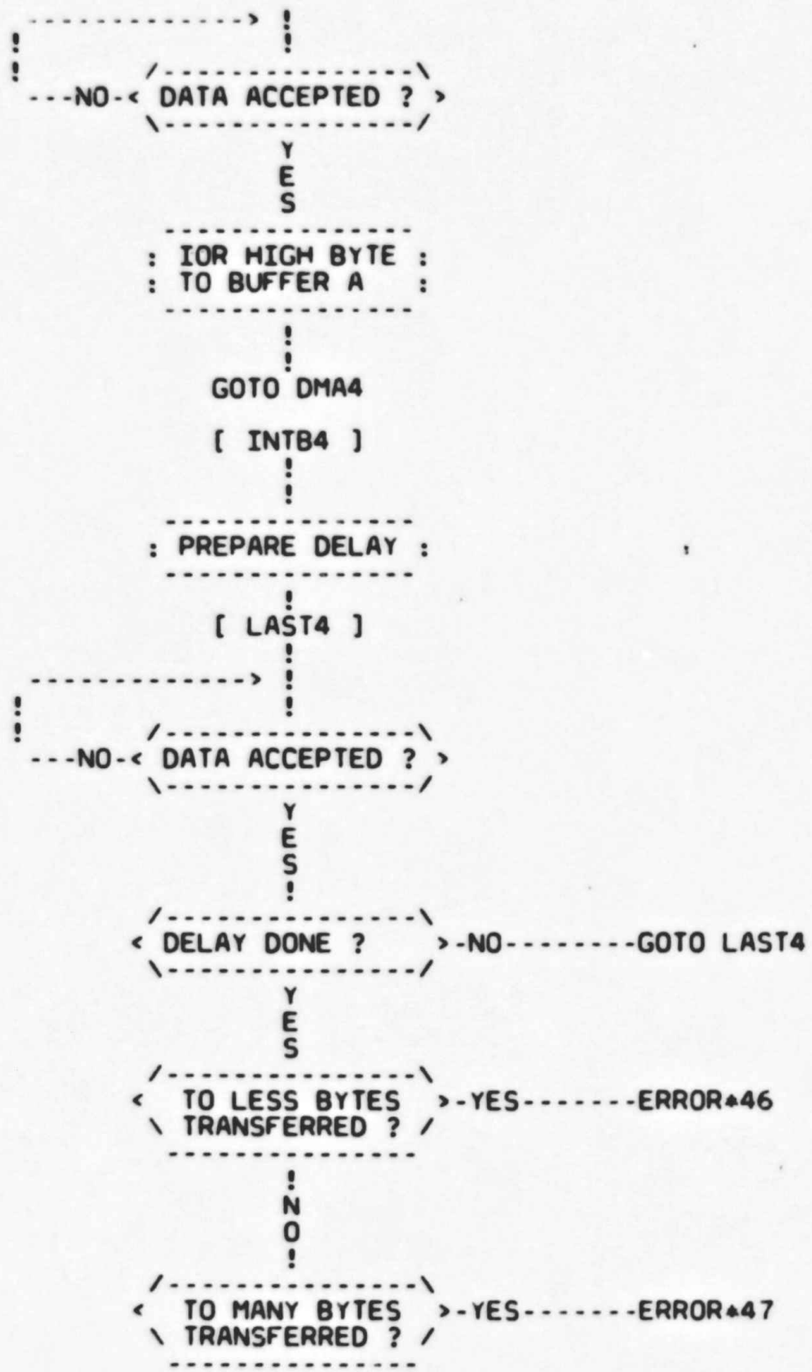

INTERRUPT CAUSED BY BCOVFL ?
NO
SB-ERROR 40
YES
[ENDBIT]
ENABLE DMA AND INTERRUPT FOR END BY MCR
BYTE TO IOR
DATA ACCEPTED ?
NO
ERROR*41
YES
INTERRUPT ?
NO
ERROR*42
YES
INTERRUPT CAUSED BY END ?
NO
SB-ERROR 43
YES
TEST REPEAT ?
YES
GOTO REP3

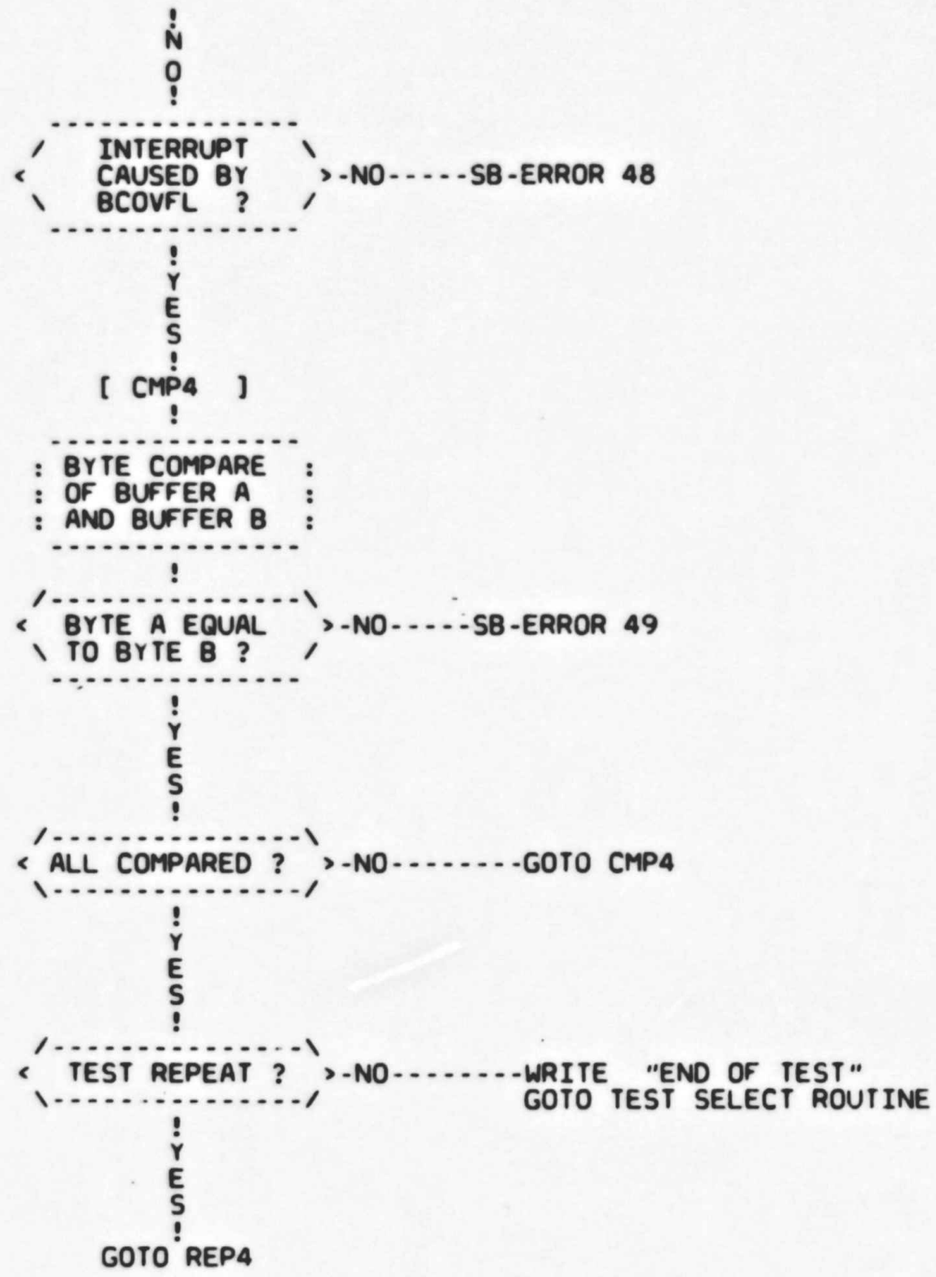


********** TEST 4 : DMA-TRANSFER FROM B TO A (B IS TALKER)

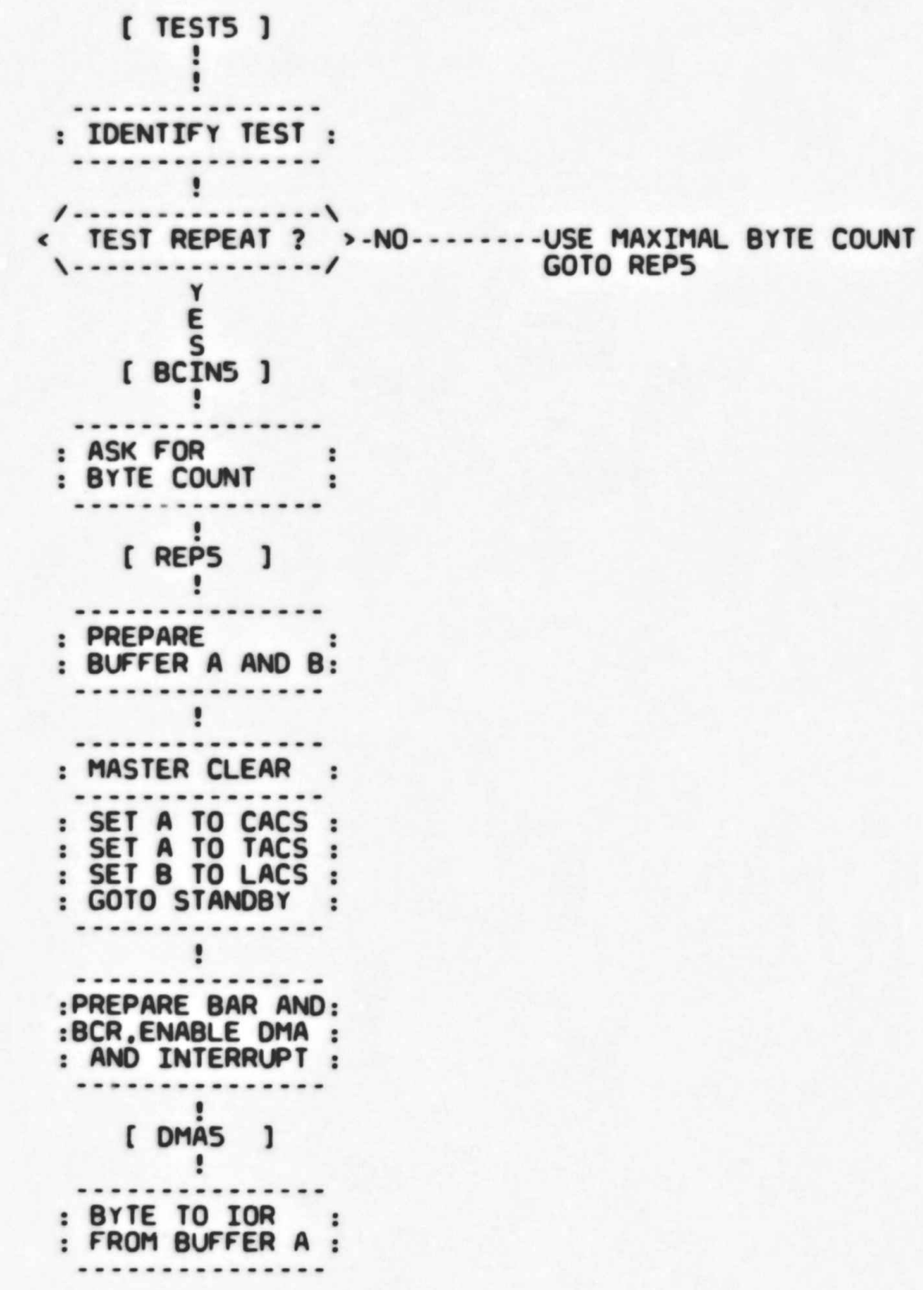


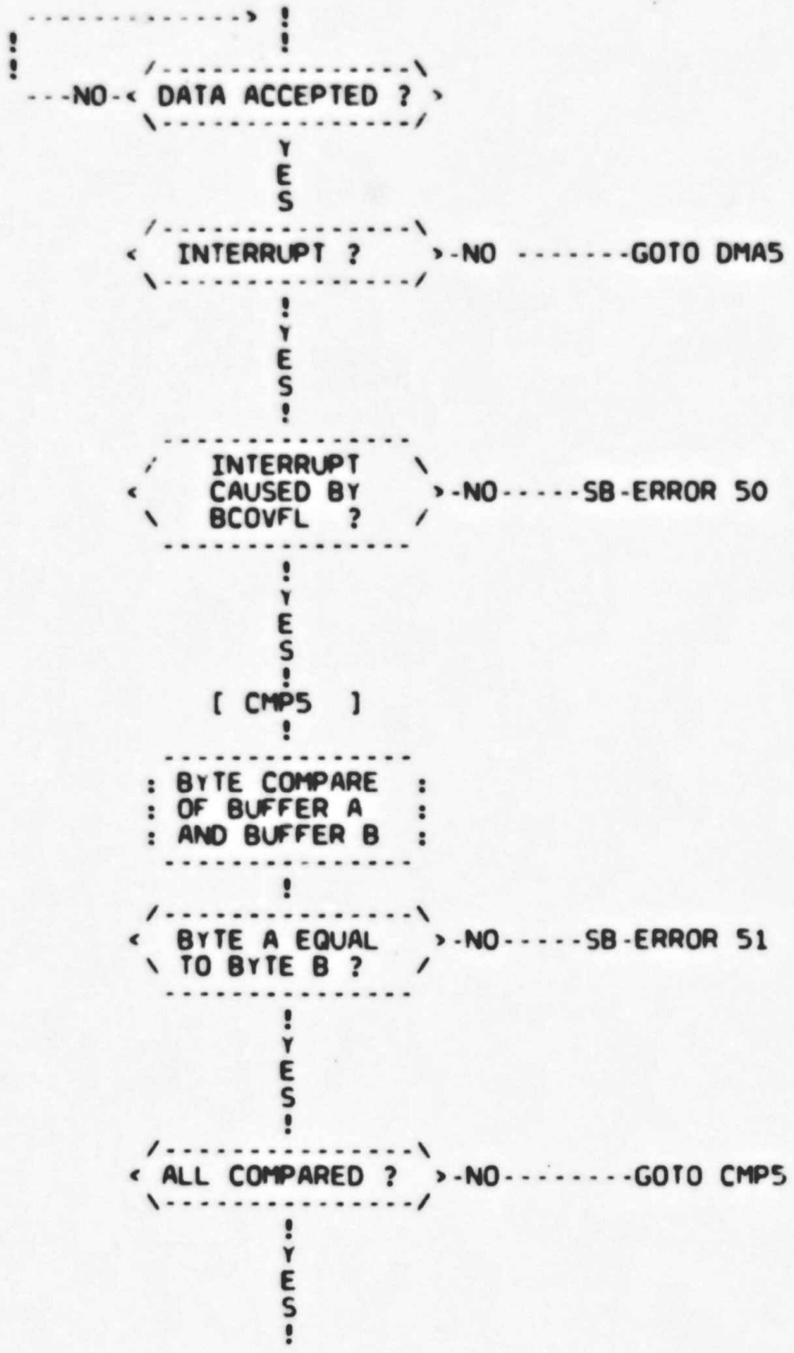

Y
E
S
[BCIN4]
ASK FOR BYTE COUNT
[REP4]
PREPARE BUFFER A AND B
MASTER CLEAR
SET A TO CACS
SET A TO LACS
SET B TO TACS
GOTO STANDBY
PREPARE BAR AND BCR, ENABLE DMA AND INTERRUPT
DATA ACCEPTED ?
NO
ERROR*45
Y
E
S
[DMA4]
INTERRUPT ?
YES
GOTO INTB4
N
O

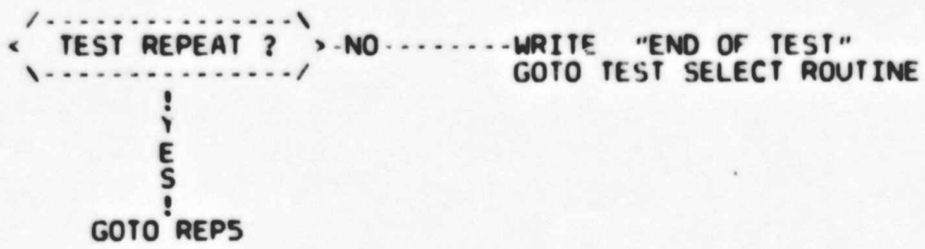

DATA ACCEPTED ?
NO
YES
IOR HIGH BYTE TO BUFFER A
GOTO DMA4
[INTB4]
PREPARE DELAY
[LAST4]
DATA ACCEPTED ?
NO
YES
DELAY DONE ?
NO
GOTO LAST4
YES
TO LESS BYTES TRANSFERRED ?
YES
ERROR*46
NO
TO MANY BYTES TRANSFERRED ?
YES
ERROR*47


NO
INTERRUPT CAUSED BY BCOVFL ?
NO
SB-ERROR 48
YES
[CMP4]
BYTE COMPARE OF BUFFER A AND BUFFER B
BYTE A EQUAL TO BYTE B ?
NO
SB-ERROR 49
YES
ALL COMPARED ?
NO
GOTO CMP4
YES
TEST REPEAT ?
NO
WRITE "END OF TEST"
GOTO TEST SELECT ROUTINE
YES
GOTO REP4

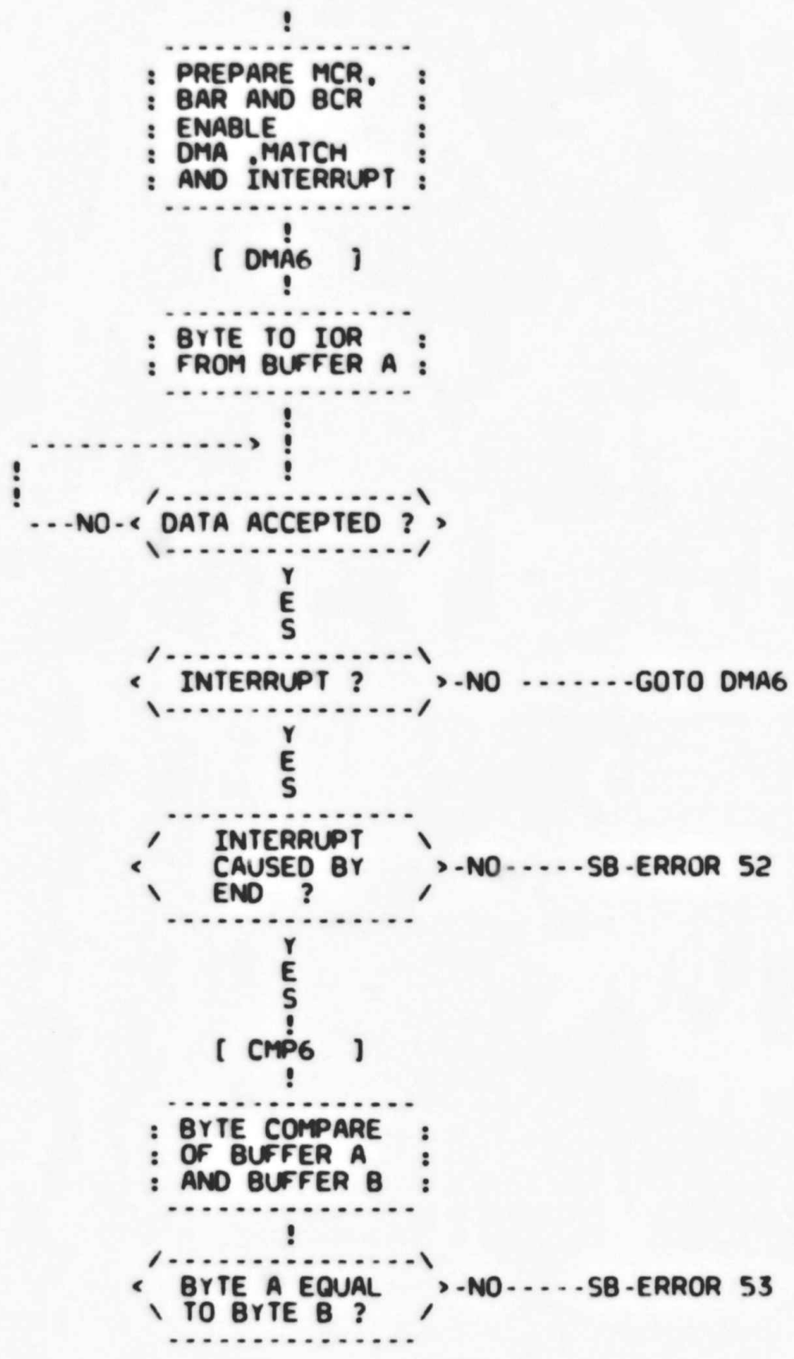
********** TEST 5 : DMA-TRANSFER FROM A TO B (B IS LISTENER)

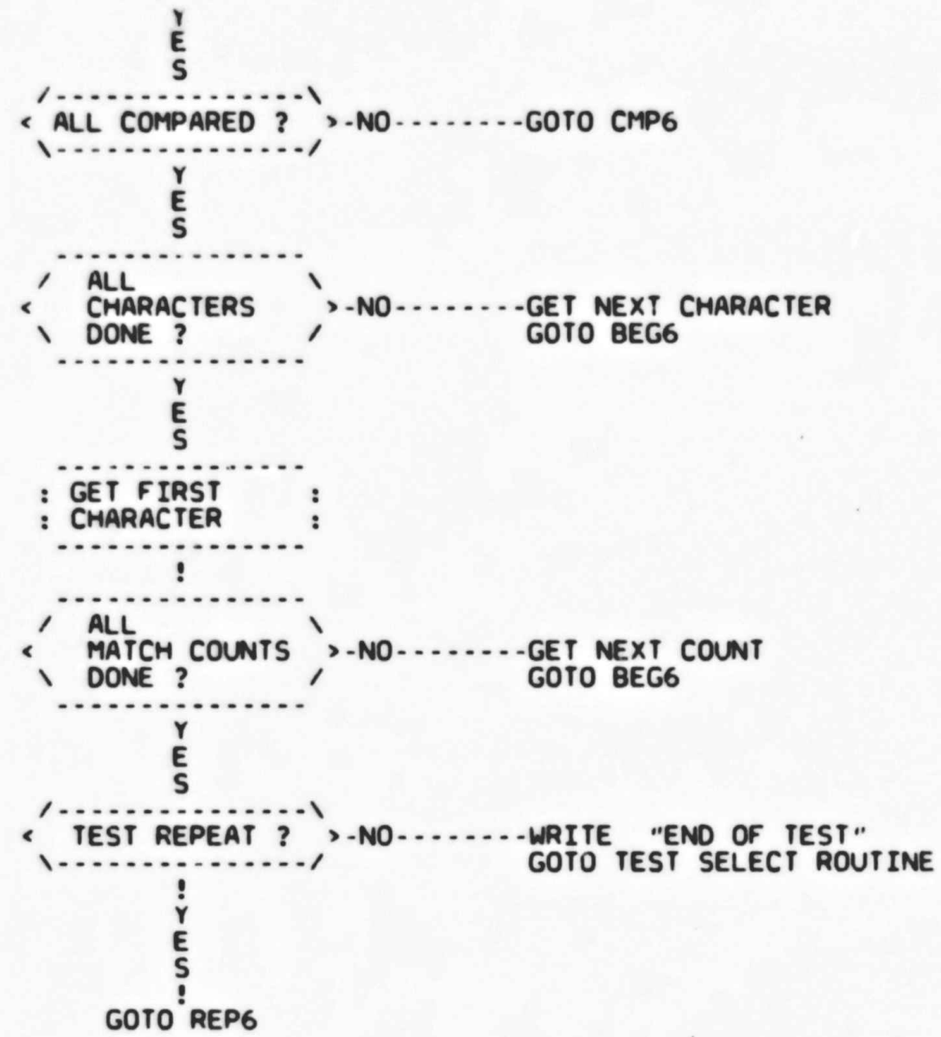



DATA ACCEPTED ?
NO
YES
INTERRUPT ?
NO
GOTO DMA5
YES
INTERRUPT CAUSED BY BCOVFL ?
NO
SB-ERROR 50
YES
[CMP5]
BYTE COMPARE OF BUFFER A AND BUFFER B
BYTE A EQUAL TO BYTE B ?
NO
SB-ERROR 51
YES
ALL COMPARED ?
NO
GOTO CMP5
YES



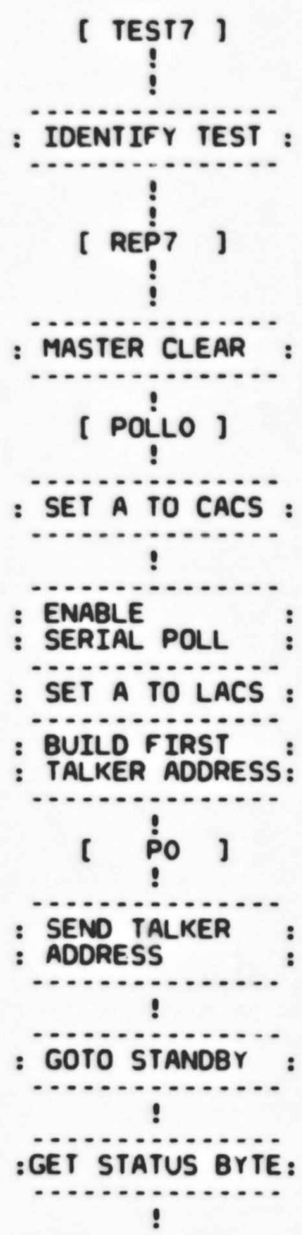
*********** TEST 6 : MATCH CHARACTER REGISTER TEST (B IS LISTENER)

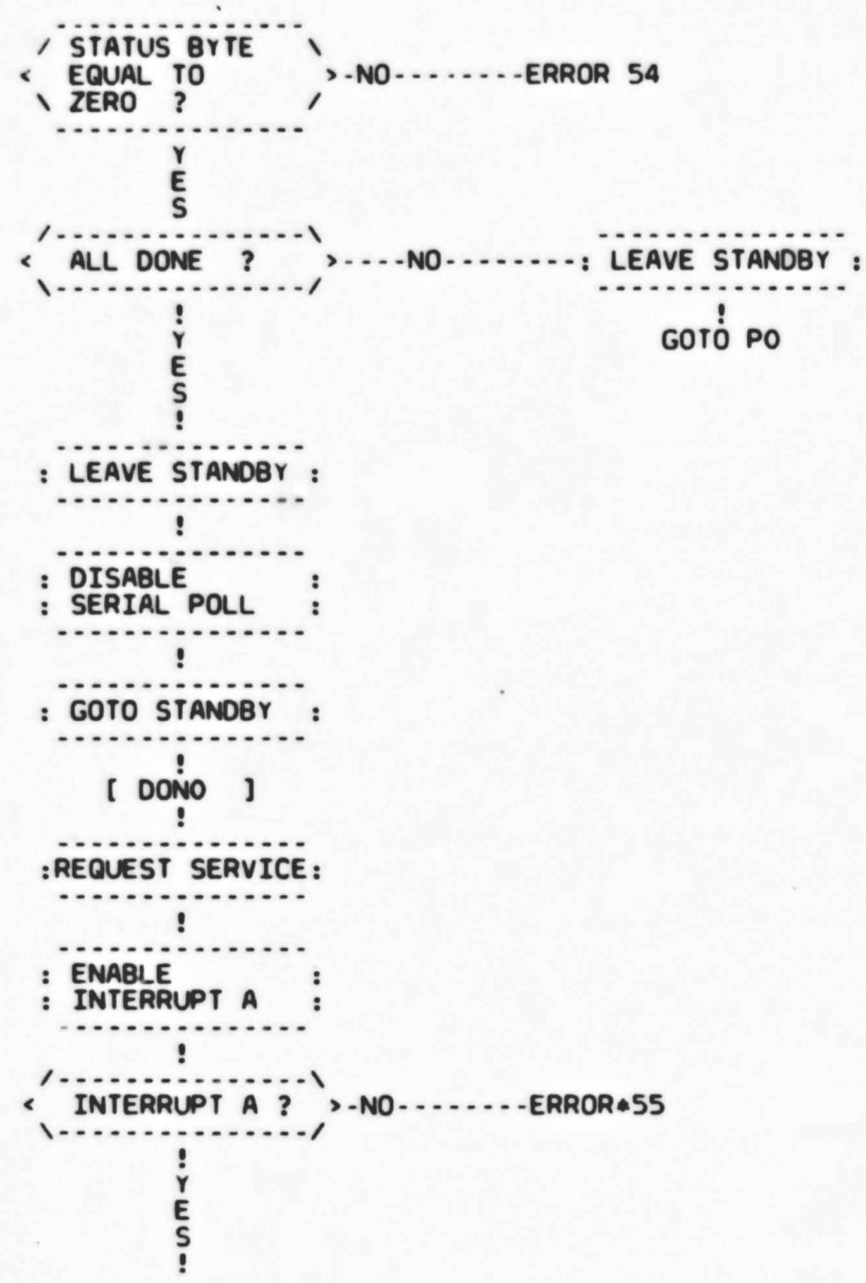

PREPARE MCR, BAR AND BCR ENABLE DMA ,MATCH AND INTERRUPT
[DMA6]
BYTE TO IOR FROM BUFFER A
DATA ACCEPTED ?
NO
YES
INTERRUPT ?
NO
GOTO DMA6
YES
INTERRUPT CAUSED BY END ?
NO
SB-ERROR 52
YES
[CMP6]
BYTE COMPARE OF BUFFER A AND BUFFER B
BYTE A EQUAL TO BYTE B ?
NO
SB-ERROR 53

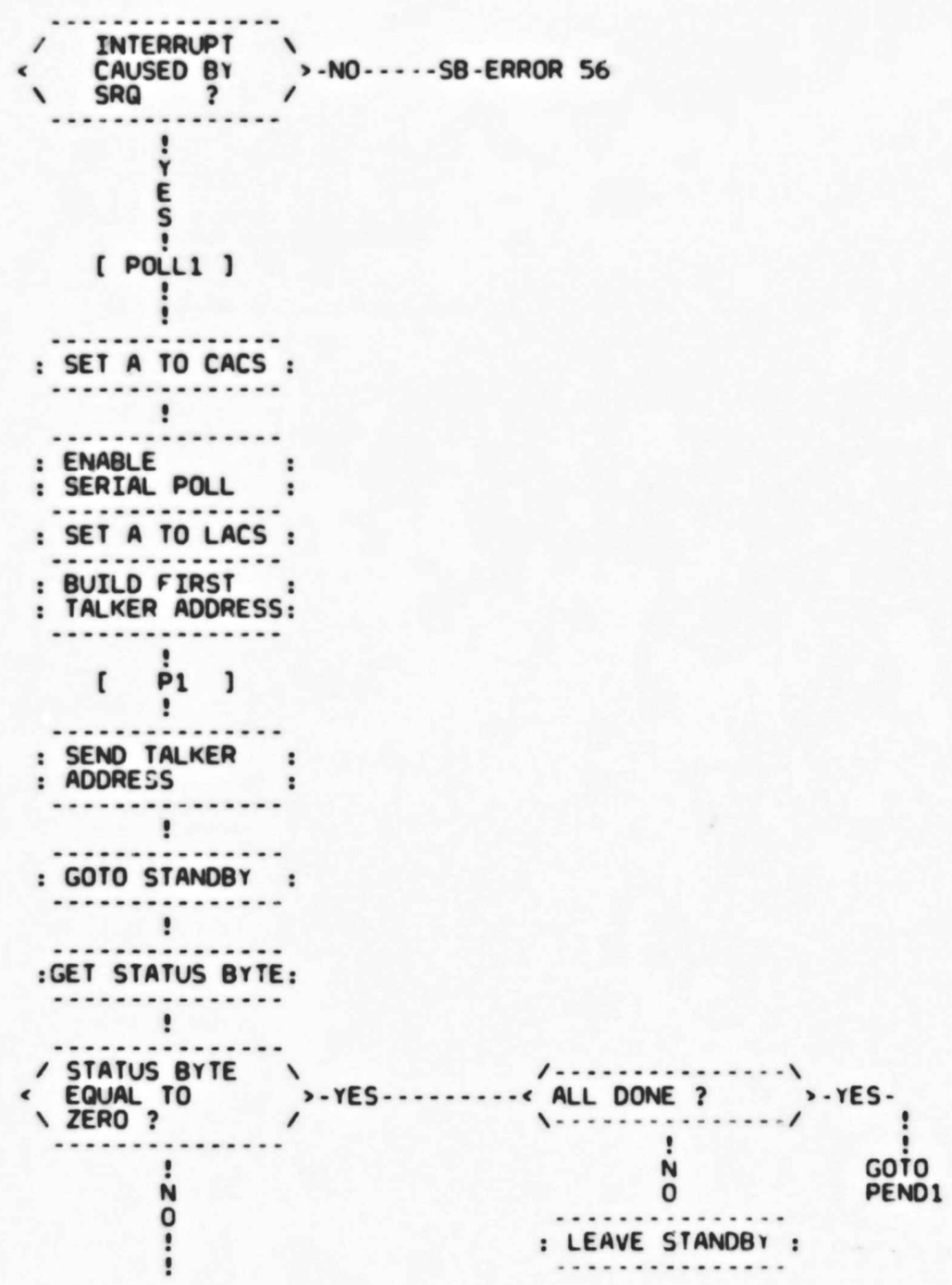

YES
ALL COMPARED ?
NO
GOTO CMP6
YES
ALL CHARACTERS DONE ?
NO
GET NEXT CHARACTER
GOTO BEG6
YES
GET FIRST CHARACTER
ALL MATCH COUNTS DONE ?
NO
GET NEXT COUNT
GOTO BEG6
YES
TEST REPEAT ?
NO
WRITE "END OF TEST"
GOTO TEST SELECT ROUTINE
YES
GOTO REP6

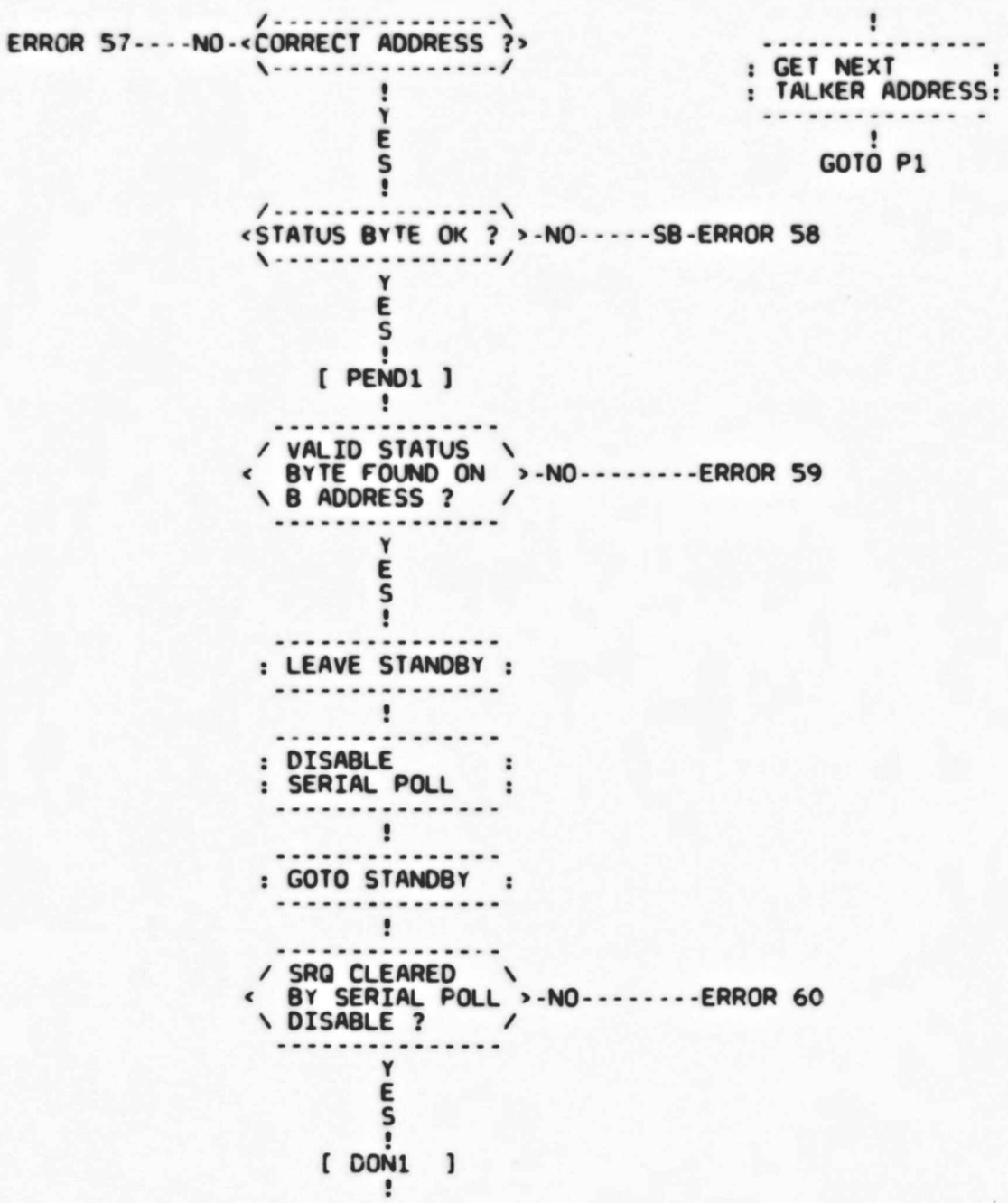
SEQ 31

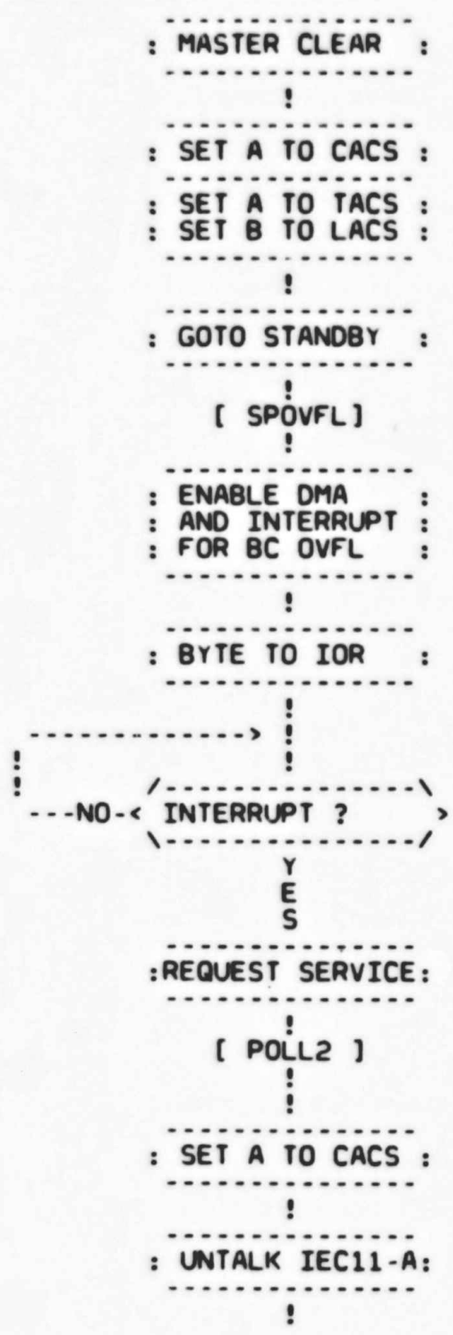
********** TEST 7 : SERIAL POLL PROCEDURE TEST

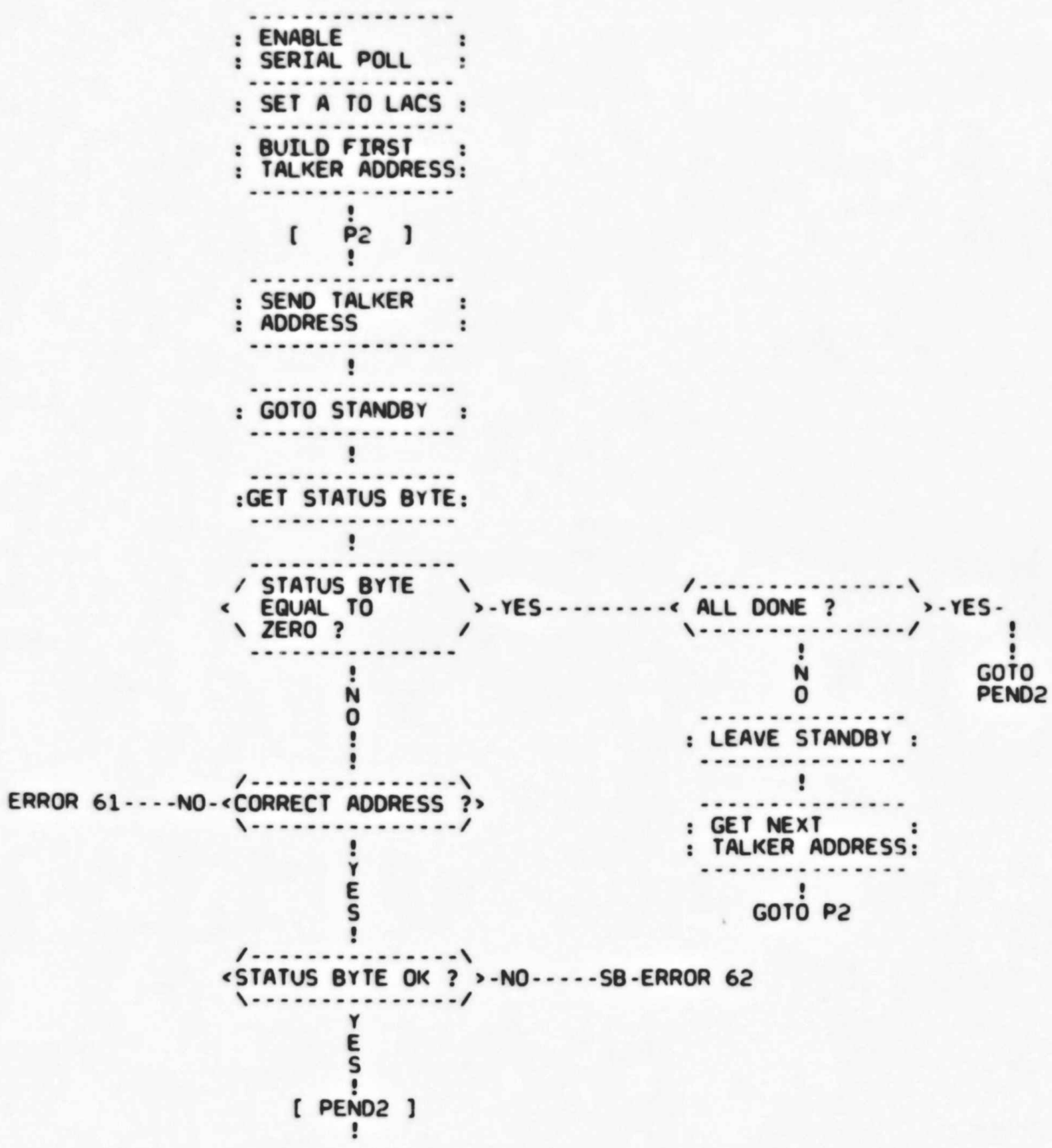


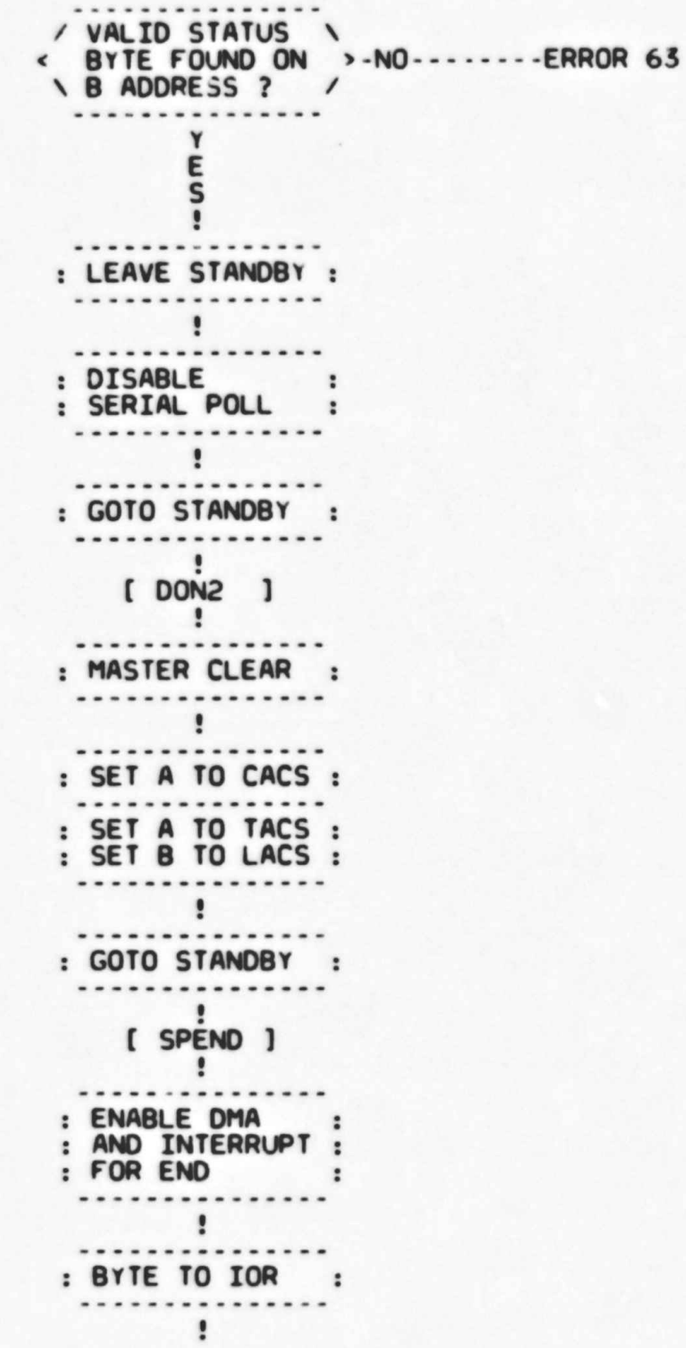

STATUS BYTE EQUAL TO ZERO ?
NO
ERROR 54
YES
ALL DONE ?
NO
LEAVE STANDBY
GOTO PO
YES
LEAVE STANDBY
DISABLE SERIAL POLL
GOTO STANDBY
[DONO]
REQUEST SERVICE
ENABLE INTERRUPT A
INTERRUPT A ?
NO
ERROR*55
YES

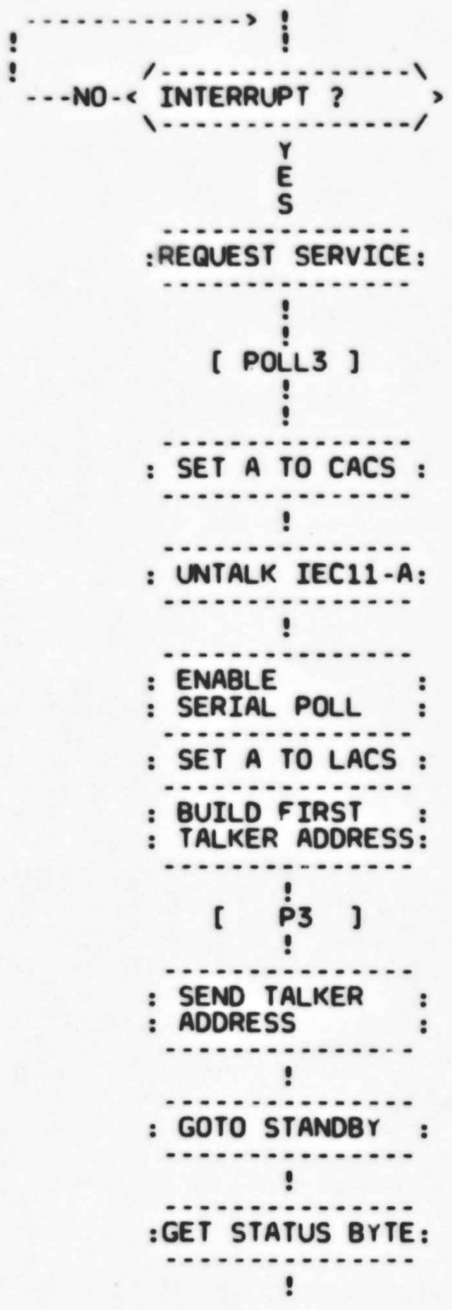

INTERRUPT CAUSED BY SRQ ?
NO
SB-ERROR 56
YES
[POLL1]
SET A TO CACS
ENABLE SERIAL POLL
SET A TO LACS
BUILD FIRST TALKER ADDRESS
[P1]
SEND TALKER ADDRESS
GOTO STANDBY
GET STATUS BYTE
STATUS BYTE EQUAL TO ZERO ?
YES
NO
ALL DONE ?
YES
GOTO PEND1
NO
LEAVE STANDBY

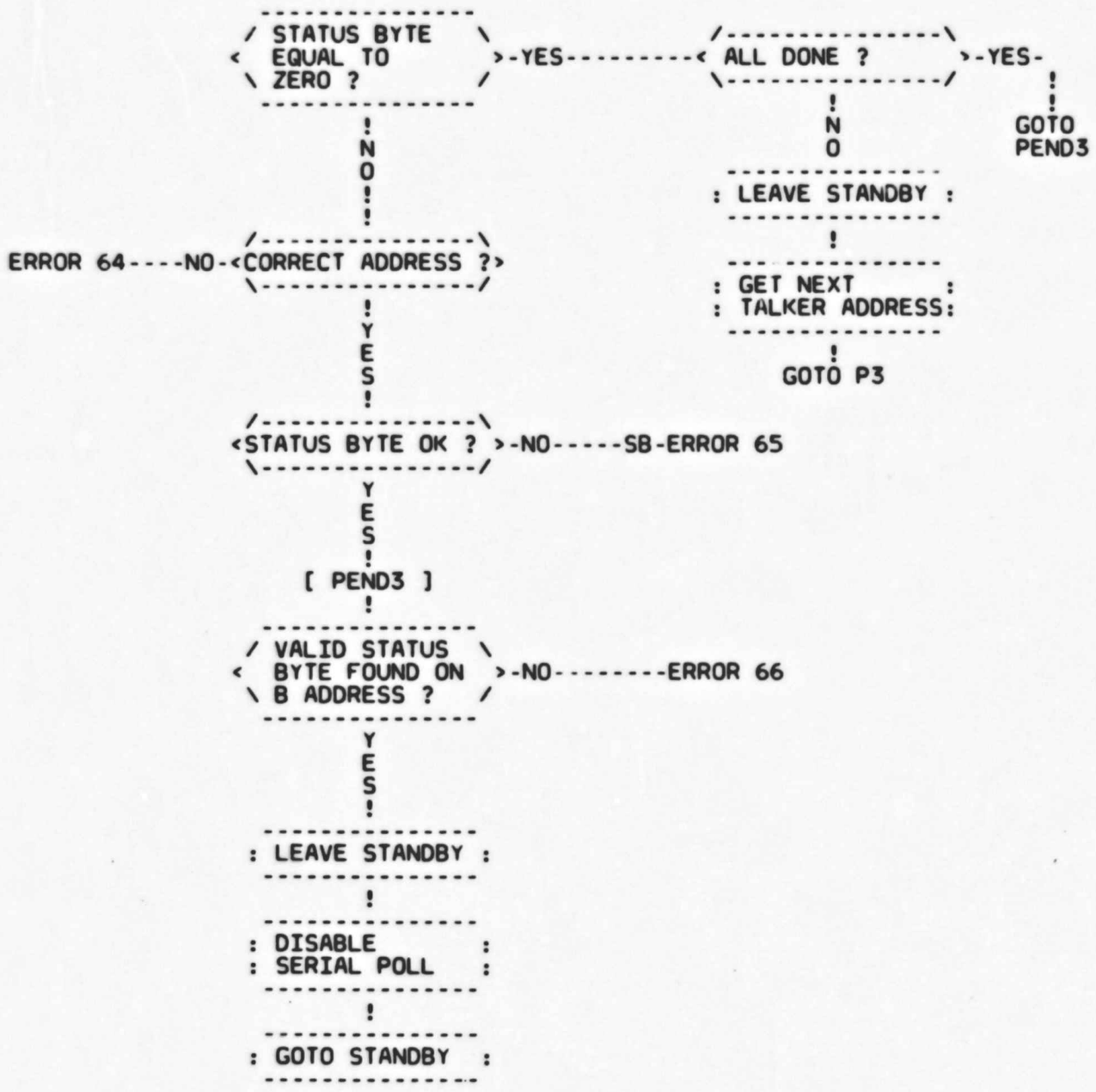

ERROR 57
NO
CORRECT ADDRESS ?
YES
STATUS BYTE OK ?
NO
SB-ERROR 58
YES
[PEND1]
VALID STATUS BYTE FOUND ON B ADDRESS ?
NO
ERROR 59
YES
LEAVE STANDBY
DISABLE SERIAL POLL
GOTO STANDBY
SRQ CLEARED BY SERIAL POLL DISABLE ?
NO
ERROR 60
YES
[DON1]
GET NEXT TALKER ADDRESS
GOTO P1

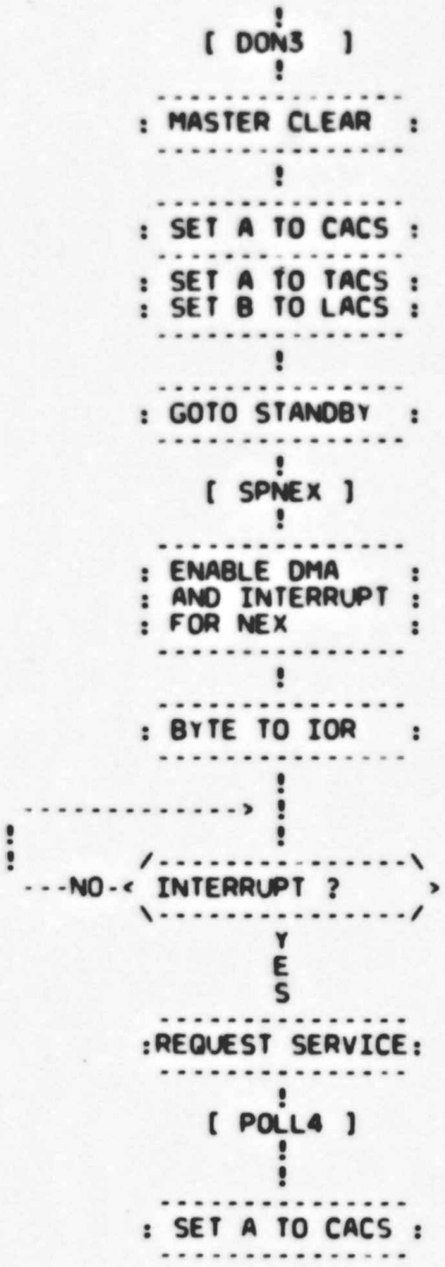

MASTER CLEAR
SET A TO CACS
SET A TO TACS
SET B TO LACS
GOTO STANDBY
[SPOVFL]
ENABLE DMA
AND INTERRUPT
FOR BC OVFL
BYTE TO IOR
INTERRUPT ?
NO
YES
REQUEST SERVICE
[POLL2]
SET A TO CACS
UNTALK IEC11-A

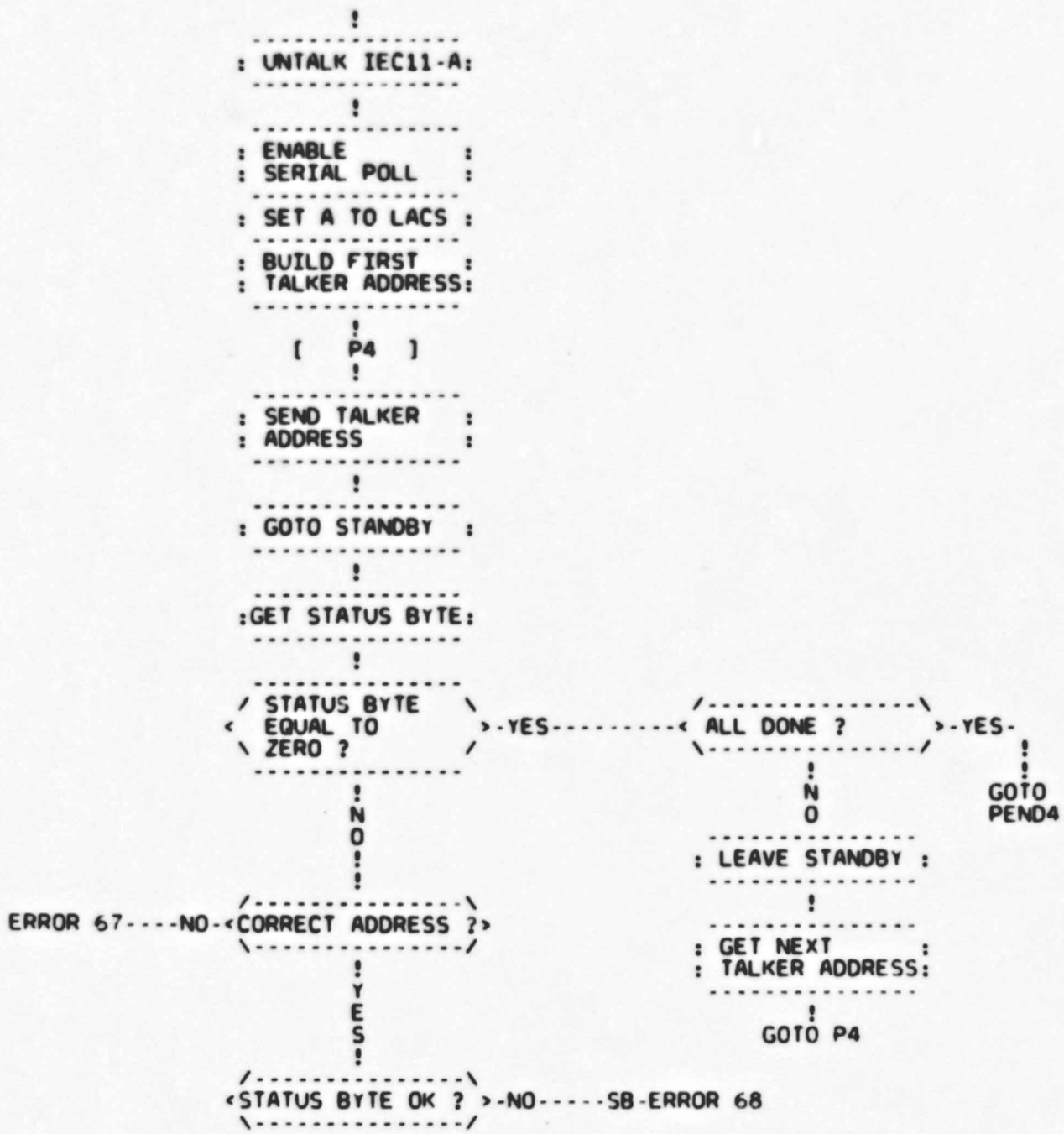

ENABLE SERIAL POLL
SET A TO LACS
BUILD FIRST TALKER ADDRESS
[P2]
SEND TALKER ADDRESS
GOTO STANDBY
GET STATUS BYTE
STATUS BYTE EQUAL TO ZERO ?
YES
ALL DONE ?
YES
NO
GOTO PEND2
0
LEAVE STANDBY
GET NEXT TALKER ADDRESS
GOTO P2
ERROR 61
NO
CORRECT ADDRESS ?
YES
STATUS BYTE OK ?
NO
SB-ERROR 62
YES
[PEND2]

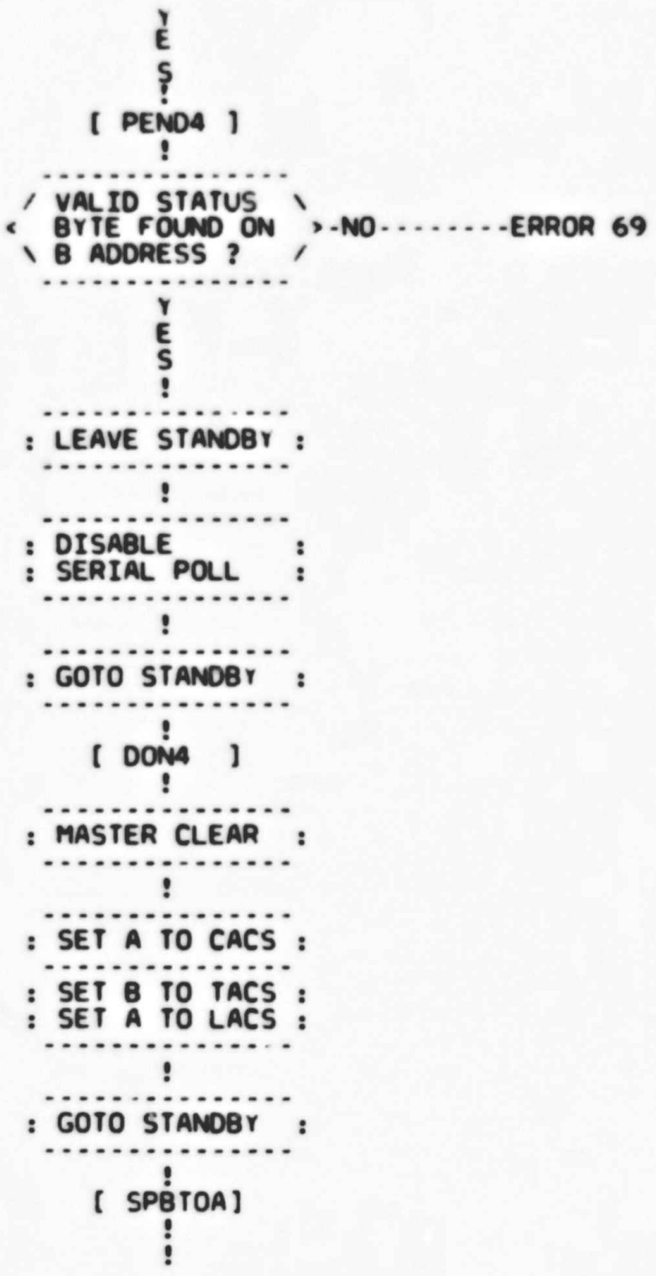

VALID STATUS BYTE FOUND ON B ADDRESS ?
NO
ERROR 63
YES
LEAVE STANDBY
DISABLE SERIAL POLL
GOTO STANDBY
[DON2]
MASTER CLEAR
SET A TO CACS
SET A TO TACS
SET B TO LACS
GOTO STANDBY
[SPEND]
ENABLE DMA AND INTERRUPT FOR END
BYTE TO IOR

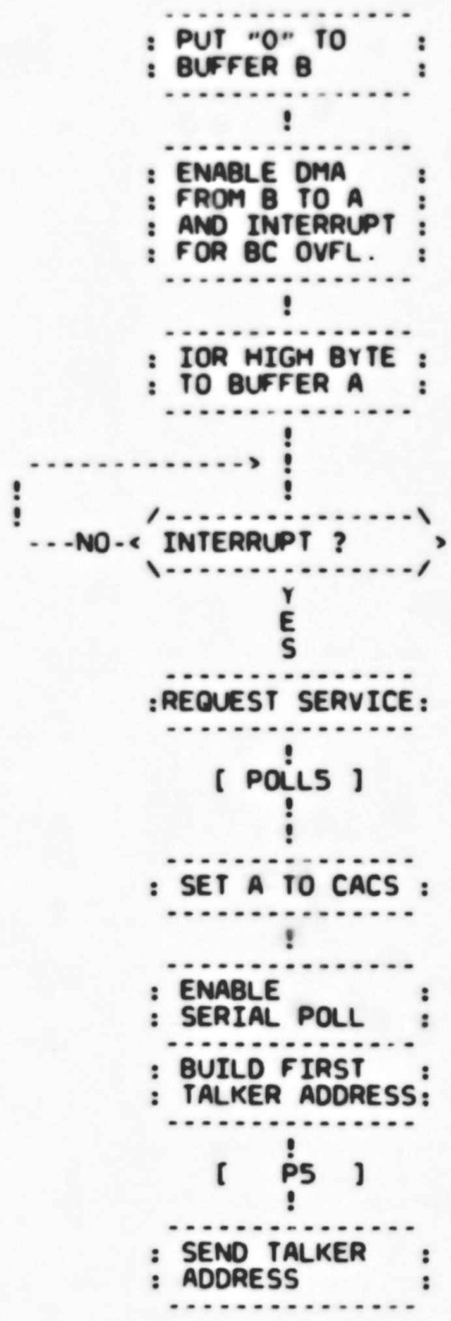

INTERRUPT ?
NO
YES
REQUEST SERVICE
[POLL3]
SET A TO CACS
UNTALK IEC11-A
ENABLE SERIAL POLL
SET A TO LACS
BUILD FIRST TALKER ADDRESS
[P3]
SEND TALKER ADDRESS
GOTO STANDBY
GET STATUS BYTE


STATUS BYTE EQUAL TO ZERO ?
YES
ALL DONE ?
YES
NO
GOTO PEND3
NO
LEAVE STANDBY
ERROR 64
NO
CORRECT ADDRESS ?
GET NEXT TALKER ADDRESS
GOTO P3
YES
STATUS BYTE OK ?
NO
SB-ERROR 65
YES
[PEND3]
VALID STATUS BYTE FOUND ON B ADDRESS ?
NO
ERROR 66
YES
LEAVE STANDBY
DISABLE SERIAL POLL
GOTO STANDBY

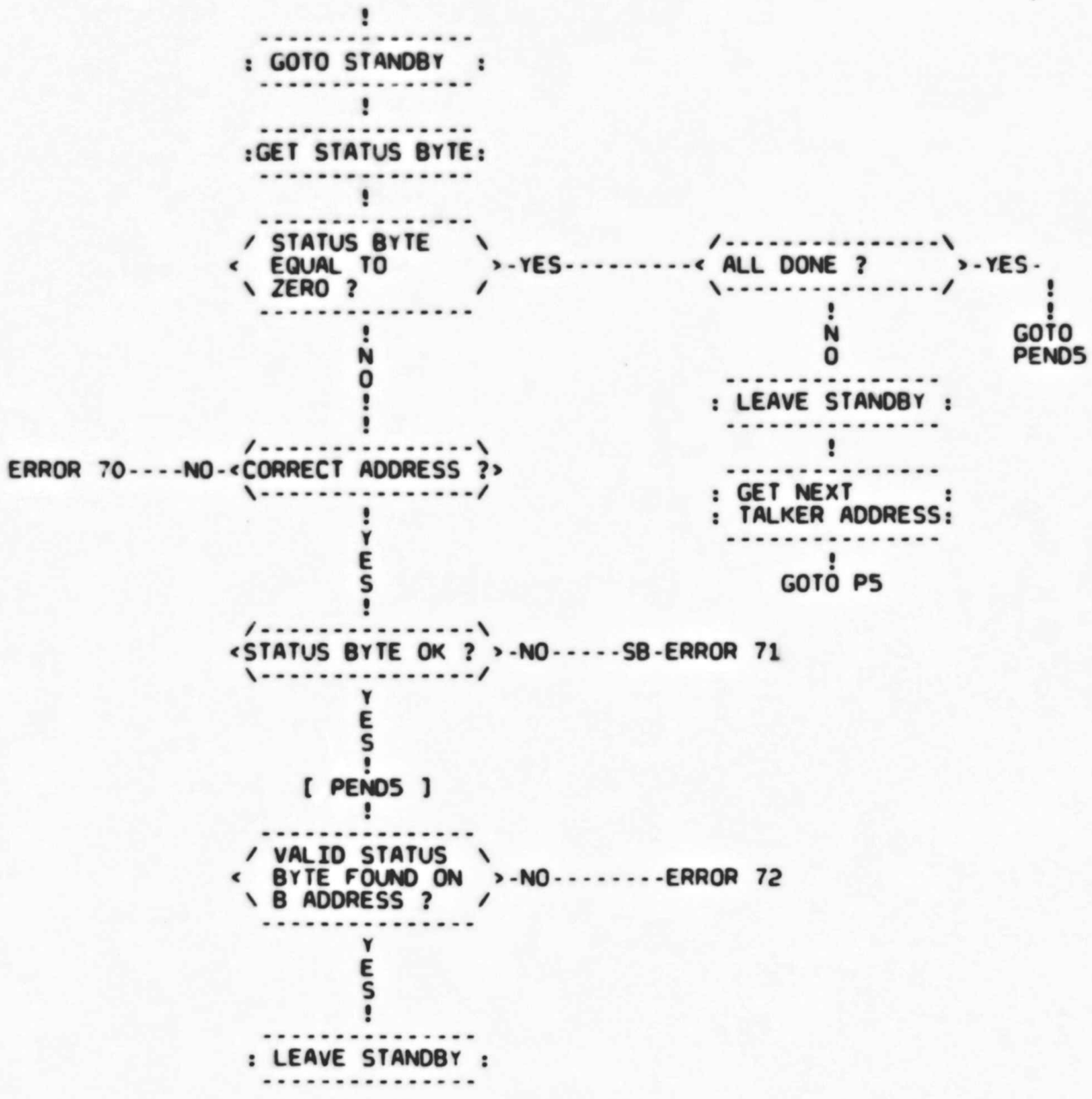

[DON3]
MASTER CLEAR
SET A TO CACS
SET A TO TACS
SET B TO LACS
GOTO STANDBY
[SPNEX]
ENABLE DMA
AND INTERRUPT
FOR NEX
BYTE TO IOR
INTERRUPT ?
NO
YES
REQUEST SERVICE
[POLL4]
SET A TO CACS

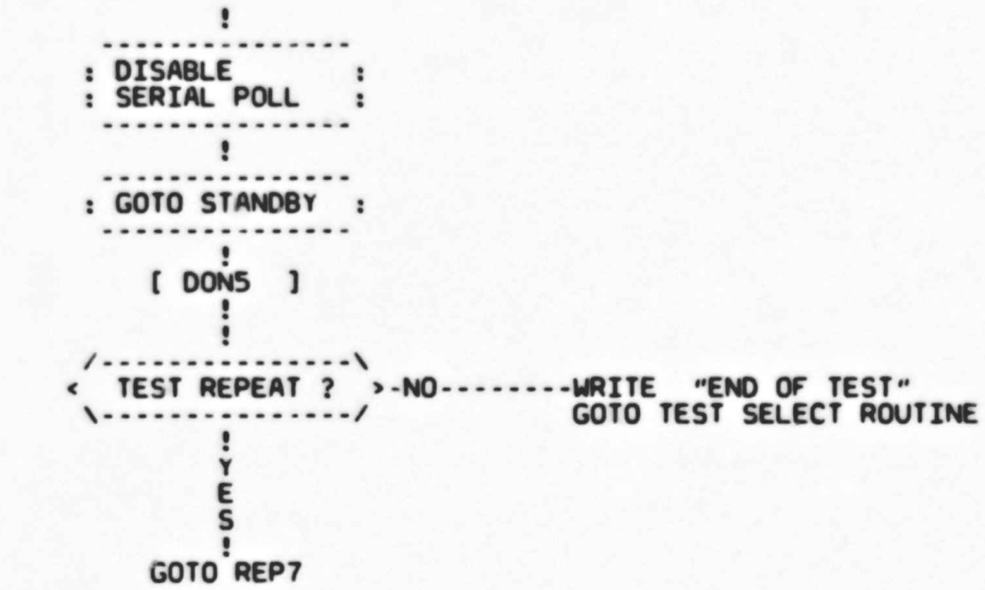

UNTALK IEC11-A
ENABLE SERIAL POLL
SET A TO LACS
BUILD FIRST TALKER ADDRESS
P4
SEND TALKER ADDRESS
GOTO STANDBY
GET STATUS BYTE
STATUS BYTE EQUAL TO ZERO ?
YES
ALL DONE ?
YES
GOTO PEND4
NO
LEAVE STANDBY
GET NEXT TALKER ADDRESS
GOTO P4
NO
ERROR 67
NO
CORRECT ADDRESS ?
YES
STATUS BYTE OK ?
NO
SB-ERROR 68


Y
E
S
[PEND4]
VALID STATUS BYTE FOUND ON B ADDRESS ?
NO
ERROR 69
Y
E
S
LEAVE STANDBY
DISABLE SERIAL POLL
GOTO STANDBY
[DON4]
MASTER CLEAR
SET A TO CACS
SET B TO TACS
SET A TO LACS
GOTO STANDBY
[SPBTOA]


PUT "0" TO BUFFER B
ENABLE DMA FROM B TO A AND INTERRUPT FOR BC OVFL.
IOR HIGH BYTE TO BUFFER A
INTERRUPT ?
NO
YES
REQUEST SERVICE
[POLL5]
SET A TO CACS
ENABLE SERIAL POLL
BUILD FIRST TALKER ADDRESS
[P5]
SEND TALKER ADDRESS

SEQ 44


GOTO STANDBY
GET STATUS BYTE
STATUS BYTE EQUAL TO ZERO ?
YES
ALL DONE ?
YES
GOTO PEND5
NO
LEAVE STANDBY
GET NEXT TALKER ADDRESS
GOTO P5
NO
ERROR 70
CORRECT ADDRESS ?
YES
STATUS BYTE OK ?
NO
SB-ERROR 71
YES
[PEND5]
VALID STATUS BYTE FOUND ON B ADDRESS ?
NO
ERROR 72
YES
LEAVE STANDBY



10.0 DIAGNOSTIC MONITOR DESCRIPTION

L O A D I N G P R O C E D U R E

BOOT XXDP MEDIA, THEN RUN DIAGNOSTIC WITH FOLLOWING COMMAND:

R ZIEC??

NOTE: ?? REFERS TO VERSION AND REV LEVEL.

S T A R T I N G P R O C E D U R E

A) USING A PROCESSOR WITH A SWITCH PANEL

PLACE START ADDRESS INTO SWITCH REGISTER
(START ADDRESS IS 1000 OCTAL)

```
;
;           PRESS "LOAD ADDRESS" SWITCH
;
;           PRESS "START" SWITCH
;
;           PROGRAM SHOULD BEGIN TO PRINT OUT THE IDENTIFICATION-
;           PRINTOUT.
;
;
;       B)USING  A LSI11
;
;           TYPE IN START ADDRESS,  "G"  INTO ONE LINE.
;
;           PRESS "RETURN"-KEY.
;
;           PROGRAM STARTS WITH IDENTIFICATION PRINTOUT.
;
;
;       C)USING A PROCESSOR WITHOUT A CONSOLE
;
;           PRESS "CNTRL" AND "BOOT" BUTTONS. ODT CONSOLE
;           ROUTINE PRINTS A $-SIGN.
;           TYPE IN "L 1000" AND A <CR>.
;           TYPE AFTER THE "$" AN "S". PROGRAM SHOULD BEGIN TO PRINT
;           IDENTIFICATION PRINTOUT.
;
;
;           O P E R A T I N G    P R O C E D U R E S
;           ******************************************
;
;           TO OPERATE AN ERROR SEE UNDER  A)
;           TO MODIFY A LOCATION SEE UNDER  B)
;           TO DUMP A LOCATION SEE UNDER    C)
;           TO ABORT THE RUNNING PROGRAM SEE UNDER  D)
;
;       A)      ALL INPUT/OUPUT OPERATIONS ARE DONE VIA THE DIAGNOSTIC
;               MONITOR. NO SWITCH SETTINGS ARE USED.
;               ALL COMMANDS, REQUIRED WHEN AN ERROR OCCURS, ARE
;               ENTERED VIA THE TERMINAL.
;               THESE COMMANDS SET OR CLEAR BITS IN A MEMORY LOCATION
;               CALLED PSEUDO-SWITCH REGISTER.
;               THE FOLLOWING OPTIONS ARE AVAILABLE:
;
;               /HT     =       HALT AFTER ERROR(DEFAULT)
;               /NH     =       NO HALT AFTER ERROR
;               /PR     =       PRINT ERROR MESSAGE (DEFAULT)
;               /NP     =       NO ERROR PRINTOUT
;               /CT     =       COUNT ERRORS
;               /NC     =       NO ERROR COUNT (DEFAULT)
;               /SC     =       SCOPE LOOP ON THIS ERROR
;               /NS     =       NO SCOPE LOOP (DEFAULT)
;               /CONT   =       CONTINUE-SWITCH
```

```
;
;               WHEN AN ERROR OCCURS, THE FOLLOWING TEXT IS PRINTED:
;
;               ERROR   000XXX
;               AT LOCATION:    XXXXXX
;...            HALT AFTER ERROR   ...
;
;               THE ERROR NUMBER CAN BE IN THE RANGE 0 - 377.
;               THE LOCATION ADDRESS IS ABSOLUTE.
;
;               WHEN AN ERROR IS FOUND, THE PROGRAM IS INTERRUPTED.
;               THE ERROR NUMBER, ERROR LOCATION AND PSEUDO STOP MESSAGE
;               ARE PRINTED. THEN THE DIGNOSTIC MONITOR WAITS FOR
;               INPUT OF OPTIONS.
;
;               PRESS <CNTRL. C> AND THE "PROMPT STRING" IS PRINTED AT
;               THE BEGINNING OF A NEW LINE.
;
;               CDM>
;               ***     (PROGRAM PRINTS WILL BE UNDERLINED FROM NOW)
;
;               NOW YOU CAN SELECT THE OPTIONS YOU NEED TO FIND THE ERROR.
;               THE SYNTAX OF A COMMAND LINE IS AS FOLLOWS:
;
;               CDM>ERR=/OPT1/OPT2/OPT3/...OPTN/CONT <CR>
;               ****
;
;               IF THERE IS A ERROR IN THE INPUT LINE THE FOLLOWING
;               MESSAGE IS PRINTED:
;
;               SYNTAX ERROR !
;               **************
;
;               YOU CAN NOW REPEAT  THE INPUT.
;
;               ANY COMBINATION OF OPTIONS IS LEGAL, BUT PROBABLY NOT USEFUL.
;               WHEN YOU TYPE   /SC/NS   THE FIRST OPTION IS OVER-
;               WRITTEN. THE COMMAND LINE IS INTERPRETED FROM LEFT TO RIGHT.
;
;                THE LAST OPTION IN A LINE MUST BE  /CONT.
;               @@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
;
;               THEN THE MONITOR RETURNS CONTROL TO THE POINT OF PROGRAM
;               WHERE THE ERROR WAS ENCOUNTERED AND THE PROGRAM CONTINUES
;               WITH THE INPUTED OPTIONS.
;
;       B)      OPTION          :       DMP
;               THIS OPTION CAN BE USED TO CHECK THE CONTENT OF A
;               MEMORY LOCATION OR A REGISTER.
;               IT CAN ONLY BE CALLED AFTER AN ERROR OR WHEN YOU INTERRUPTED
;               THE RUNNING PROGRAM BY PRESSING "CNTRL C".
```

EXAMPLE:
AFTER AN ERROR PRINTOUT YOU PRESSED "CNTRL C" AND THE MONITOT
RETURNED THE PROMPT STRING:

```
CDM>
****
```

IF YOU WANT TO CHECK LOCATION 1000 AND IT CONTAINS
E.G. 012767, SO YOU HAVE TO TYPE AFTER THE PROMPT STRING

```
CDM>DMP/001000
****
```

AND A RETURN. THE MONITOR WILL PRINT AT THE BEGINNING OF
THE NEXT LINE THE CONTENT OF LOCATION 1000:

```
CDM>DMP/001000
****
012767
```

THE MONITOR RETURNS NOW INTO ITS WAIT ROUTINE AND WAITS
FOR FURTHER INPUTS.

C) OPTION : SET

THIS OPTION CAN BE USED TO MODIFY THE CONTENT OF A
MEMORY LOACTION OR OF A REGISTER.
IT CAN BE CALLED ONLY AFTER AN ERROR OR WHEN YOU INTERRUPT
THE RUNNING PROGRAM. TO CALL THE MONITOR PRESS "CNTRL C" AND THE
MONITOR ANSWERS, AS PREVIOUS SEEN, BY PRINTING

```
CDM>
****
```

IF YOU WANT TO CHANGE LOCATION 1000, YOU HAVE TO
TYPE ON THE SAME LINE

```
CDM>SET/1000/000000
****
```

AND PRESS THE "RETURN" KEY. THE LOCATION CONTAINS NOW
ZERO. INPUT OF NEW MEMORY LOCATION CONTENT MUST BE SIX
OCTAL DIGITS LONG WITH LEADING ZERO'S.

D) OPTION : ABO

THIS OPTION CAN BE USED ONLY AFTER AN ERROR OR WHEN YOU
INTERRUPTED THE RUNNING PROGRAM BY PRESSING "CNTRL C" .
USING THIS OPTION ALLOWS TO ABORT THE PROGRAM AT CURRENT
POINT OF TEST AND EITHER TO GO TO BEGIN OF TEST , OR IF
SUPPORTED, TO CALL A SUBTEST.
AFTER PRESSING "CNTRL C" THE MONITOR RETURNS WITH

```
;
;               CDM>
;               ****
;
;               TYPE NOW ON THE SAME LINE
;
;
;               CDM>ABO
;               ****
;
;               AND THE PROGRAM WILL GO TO BEGIN OF TEST OR TO A
;               ROUTINE WHERE YOU CAN SELECT A SUBTEST .
;
;
;
;       11.0    LISTING
;               *******
```

TABLE OF CONTENTS

```
                        .ENABL  AMA
                        .ENABL  ABS
                        .LIST   ME
                        .SBTTL   LOW-CORE
                        .MCALL INIT
000000                  INIT
                .LIST   ME
                ;
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```

```
                                        .PSECT  CSSMON
                                ;
                                ;       MZ001
                                ;       *****
                                ;       THIS CHANGE ALLOWS TO USE A MACRO THAT EITHER CLEARS
                                ;       THE PSW BY A "CLR" OR A "MTPS".
                                ;
                                ;       GS001
                                ;       *****
                                ;       THIS CHANGE ALLOWS TO START THE PROGRAM AT LOC. 200
                                ;
                                ;
000000                                  .ASECT
        000000                          .=0
        000004                          .REPT   4
                                        .+2                     ;POINT TO VECTOR +2
                                        IOT                     ;HANDLE ILLEGAL TRAP
                                        .ENDR                   ;
000020  003056                          $..IOT                  ;ILLEGAL TRAP-HANDLER
000022  000000                          0                       ;PRIORITY = 0
000024  003126                          $..PWR                  ;POWERFAIL-RESTART-HANDLER
000026  000000                          0                       ;PRIORITY = 0
000030  002326                          $..EMT                  ;EMT-HANDLER
000032  000000                          0                       ;PRIORITY = 0
000034  002524                          $..TRP                  ;TAP-HANDLER
000036  000000                          0                       ;PRIORITY = 0
        000030                          .REPT   30              ;                       ;**GS001**
                                        .+2                     ;POINTER TO VECTOR +2   ;**GS001**
                                        IOT                     ;HANDLE ILLEGAL TRAP    ;**GS001**
                                        .ENDR                   ;                       ;**GS001**
000200  000137  001000                  JMP     10$             ;INITIALIZE SYSTEM      ;**GS001**
        000137                          .REPT   137             ;                       ;**GS001**
                                        .+2                     ;POINTER TO VECTOR +2   ;**GS001**
                                        IOT                     ;HANDLE ILLEGAL TRAP    ;**GS001**
                                        .ENDR                   ;                       ;**GS001**
001000  000137  001204          10$:    JMP     START           ; INITIALIZE SYSTEM
        000100                          .REPT   100
                                        0                       ;STACK-AREA
                                        .ENDR
```

```
                                ;
                                ;       MZ001
                                ;       *****
                                ;       AS VERY FIRST INSTRUCTION DO A "RESET" TO CLEAR
                                ;       ALL HARDWARE THAT IS IN AN UNDEFINED STATE
                                ;
                                        .SBTTL  INITIALISATION
001204  000005                START:  RESET                   ;CLEAR THE WORLD         ;MZ001
001206  012706  001204                MOV     @START,SP               ;SETUP SP
001212  012737  001242  000004        MOV     @$..TYP,4       ;PREP FOR TEST
001220  005037  000006                CLR     6               ;
001224  005037  177776                CLR     @@PS            ;IS IT A PDP OR A LSI ?
001230  000240                        NOP                     ;
001232  012737  177777  007016        MOV     @-1,$$PTYP      ;IT IS A PDP
001240  000404                        BR      TYP..E          ;SKIP LSI PART
001242  005037  007016        $..TYP: CLR     $$PTYP          ;INDICATE A LSI
001246                                STCKUP
001252  012737  000006  000004 TYP..E: MOV     @6,4            ;REBUILD
001260  012737  000004  000006        MOV     @4,6            ;
001266  012737  003424  000060        MOV     @$..KBI,@060    ;SETUP KEYBOARD VECTOR
001274  012737  000340  000062        MOV     @340,@062       ;       "       "
001302  012700  007026                MOV     @KBBUFF,R0      ;RESET ALL FLAGS
001306  005020                1$:     CLR     (R0)+           ;       "
001310  020027  007202                CMP     R0,@PROMES      ;       "
001314  001374                        BNE     1$              ;       "
001316  012737  001000  007172        MOV     @1000,SCOPAD    ;IF NO SCOPE LABEL IS SET IN THE PROGRAM
                                                              ;THEN GOTO START AFTER ERR*/SC
001324                                PSET    @0              ;SET PS TO 0    ;MZ001
001350                                WRITE   MVERSN          ;SAY HELLO TO EVERYBODY
001360  012737  007026  007146        MOV     @KBBUFF,KBBPNT  ;SETUP INPUT-BUFFER-POINTER
001366  004737  001516                JSR     PC,M..TST       ;CALL MEM. TEST WITH MEM. MANAGEM. SETUP ;BB001
001372  000414                        BR      M..SAV          ;GO TO SAVE HIGHEST MEMORY ADDRESS       ;BB001
001374                          M..TSE:                       ;HERE IF NO MEMORY MANAGEMENT FOUND      ;BB001
001374  012700  160000                MOV     @160000,R0      ;SETUP MAXIMUM CORE-ADDRESS
001400  005001                        CLR     R1              ;SETUP FOR MEMEND+2 FOR UNMAPPED PROC.   ;BB001
001402  012737  001410  000004        MOV     @.+6,@04        ;SETUP TRAPHANDLING
001410  012706  001204                MOV     @START,SP       ;REBUILD STACKPOINTER
001414  005740                        TST     -(R0)           ;TOP OF CORE?
001416                                REMVEC  @2              ;REBUILD TRAP TO 4 VECTOR
001424                          M..SAV:                       ;HERE IF HIGHEST MEMORY ADDRESS FOUND    ;BB001
001424  010037  007022                MOV     R0,MEMEND       ;SAVE HIGHEST MEMORY ADDR.
001430  010137  007024                MOV     R1,MEMEND+2     ;SAVE EXTENSION BITS
001434  006201                        ASR     R1              ;PUT ADDR16 INTO CARRY                   ;BB001
001436  006000                        ROR     R0              ;ROTATE ADDR16 INTO MSB OF R0            ;BB001
001440  006201                        ASR     R1              ;PUT ADDR17 INTO CARRY                   ;BB001
001442  006000                        ROR     R0              ;ROTATE ADDR17 INTO MSB OF R0            ;BB001
001444  000241                        CLC                     ;RESET CARRY                             ;BB001
001446  006000                        ROR     R0              ;SHIFT OUT THE LS-OCT-DIGIT OF PHYS ADDR ;BB001
001450                                DUMP    OCT,R0          ;DUMP ADDRESS
001460                                WRITE   NO6             ;PRINT LS-OCT-DIGIT ALWAYS AS "6"        ;BB001
001470  052737  000100  177560        BIS     @BIT6,@@TKS     ;ENABLE TTY INTERRUPTS
001476  012737  000042  000040        MOV     @42,@040        ;PREP THIS LOCATION FOR USING XXDP
001504  005737  007152                TST     OUTFLG          ;SYNCHRONISE OUTPUT
001510  001375                        BNE     .-4             ;"
001512  000137  010614                JMP     CDM..E          ; NOW WE ARE ON THE AIR
```

```
                        .SBTTL  MEMORY TEST WITH MEMORY MANAGEMENT UNIT SETUP
                ;
                ;  SUBROUTINE:  M..TST
                ;  ***********  ******
                ;
                ;THIS ROUTINE CHECKS THE AVAILABILITY OF A MEMORY MANAGEMENT UNIT
                ;IN PDP-11 PROCESSORS AND SETS KISAR0...KISAR5 TO THE LOW 24K-WORDS
                ;OF THE COMPUTER MEMORY .
                ;KISAR7 IS USED TO MAP THE SO-CALLED I/O PAGE .
                ;KISAR6 IS USED TO MAP THE HIGHEST MEMORY ADDRESS CHECK POINTER .
                ;
                ;INPUT:          (SP)    *RETURN ADDRESS
                ;
                ;OUTPUT:         R0      *LOW 16 ADDRESS BITS OF HIGHEST MEMORY ADDRESS
                ;                R1      *BITS 0,1 ADDRESS BITS 16,17
                ;
                ;AUTHOR:         BERNHARD BAUDISCH CSS/DP MUNICH 19-DEC-78
                ;
                ;
001516          M..TST:                         ;REFERENCE LABEL
001516  012737  001776  000250        MOV     #M..TRP,@#250   ;SETUP SEGMENTATION TRAP CATCHER
001524  005037  000252                CLR     @#252           ;...
001530  012737  001776  000004        MOV     #M..TRP,@#4     ;SETUP TRAP-4 CATCHER
001536  005037  000006                CLR     @#6             ;...
001542  004737  002006                CALL    M..MMM          ;SETUP DEFAULT MAPPING,ENABLE MM
001546  012737  007400  172354        MOV     #7400,KISAR6    ;MAP WITH KISAR6 THROUGH MEMORY
001554  012737  000001  007020        MOV     #1,$$MTYP       ;REMEMBER THAT WE HAVE MEMORY MANAGEMENT!
001562  012700  157776                MOV     #157776,R0      ;GET HIGHEST ADDRESS WITHIN APR6 RANGE
001566  012737  001766  000004        MOV     #M..HIM,@#4     ;SET UP TRAP 4 CATCHER
001574  005710                20$:    TST     @R0             ;SEE IF ADDRESS PRESENT
001576  103031                        BCC     M..DET          ;CC IF ADDRESS FOUND
001600  162737  000200  172354        SUB     #200,KISAR6     ;MAP TO NEXT LOWER 4K WORD BANK
001606  002401                        BLT     30$             ;THIS CASE SHOULD NEVER HAPPEN
001610  000771                        BR      20$             ;CHECK NEXT LOWER 4-K WORDS
001612                          30$:                    ;HERE ONLY IF MAIN PROCESSOR HARDWARE ERROR
001612                                  PSET    #0              ;SET PRIORITY TO 0
001636                                  WRITE   MEMDEF          ;MEMORY MANAGEMENT DEFECT
001646  012716  001374                MOV     #M..TSE,(SP)    ;MODIFY RETURN ADDRESS TO UNMAPPED SYSTEM
001652  042737  000001  177572        BIC     #BIT0,@R0       ;DISABLE MM
001660  000422                        BR      M..RET          ;AND GO AHEAD LIKE UNMAPPED SYSTEM
001662                          M..DET:                 ;HIGHEST MEMORY ADDRESS FOUND
001662                                  PUSH    KISAR6          ;GET MAP REGISTER CONTENTS
                000005                  .REPT   5               ;
                                        ASL     (SP)            ;PUT ADDRESS BIT 17 INTO PSW CARRY
                                        .ENDR                   ;
001700  103402                        BCS     40$             ;CS IF ADDRESS BIT 17 SET
001702  005001                        CLR     R1              ;HERE IF BIT17 NOT SET
001704  000402                        BR      45$             ;...
001706  012701  000001        40$:    MOV     #BIT0,R1        ;FLAG BIT 17 FOUND
001712  006316                45$:    ASL     (SP)            ;GET ADDRESS BIT 16
001714  006101                        ROL     R1              ;INSERT BIT IN MEMORY EXTENSION MASK
001716  042700  160000                BIC     #160000,R0      ;MASK OUT APR SELECTION BITS
001722  050016                        BIS     R0,(SP)         ;BUILD 16 BIT BASE ADDRESS
001724  012600                        MOV     (SP)+,R0        ;-->R0 FOR OUTPUT TO CALLER
001726  012737  000252  000250  M..RET: MOV    #252,@#250      ;RESET SEGMENTATION TRAP CATCHER
001734  012737  000004  000252        MOV     #4,@#252        ;...
001742  012737  000006  000004        MOV     #6,@#4          ;RESET TRAP-4 CATCHER
```

```
                                                        ;...
001750  012737  000004  000006            MOV     #4,@#6
001756  000207                            RTS     PC              ;RETURN TO CALLER
001760                          U..DET:                           ;HERE IF MEMORY MANAGEMENT ADDRESS NOT FOUND
001760  012716  001374                    MOV     #M..TSE,(SP)    ;MODIFY RETURN ADDRESS
001764  000760                            BR      M..RET          ;RETURN COMMON
001766                          M..MIM:                           ;TRAP-4 AND SEGMENTATION TRAP CATCHER
001766  052766  000001  000002            BIS     #BIT0,2(SP)     ;SET CARRY IN RETURN PSW SETUP
001774  000002                            RTI                     ;RETURN WITH CARRY SET INDICATOR
                                ;
001776                          M..TRP:
001776  022626                            CMP     (SP)+,(SP)+     ;CLEAN STACK OF INT. VALUES
002000  005726                            TST     (SP)+           ;CLEAN STACK FROM RETURN ADDRESS
002002  000137  001760                    JMP     U..DET          ;NO MEMORY MANAGEMENT UNIT AVAILABLE
                                ;
                                ;
                                ;       SUBROUTINE M..MMM
                                ;       ****************
                                ;
                                ;       THIS ROUTINE IS CALLED TO SET UP THE APR AND PDR
                                ;       REGISTER WITH DEFAULT VALUES AND TO ENABLE MEMORY
                                ;       MANAGEMENT.
                                ;
                                ;       INPUT:  NONE
                                ;       OUTPUT: ALL PDRS ARE PRESET WITH 77406
                                ;               APR0 IS PRESET WITH 0
                                ;               APR1    "          200
                                ;               APR2    "          400
                                ;                .
                                ;                .
                                ;               APR7    "          7600
                                ;
                                ;               MM IS ENABLED
                                ;
                                ;
002006                          M..MMM:
002006                                  PUSH    R0,R1,R2        ;SAVE
002014  012700  077406                  MOV     #77406,R0       ;GET PAGE DESCRIPTOR REGISTER SETUP
002020  012701  000010                  MOV     #8.,R1          ;SETUP FOR 8 PDR'S
002024  012702  172300                  MOV     #KISDR0,R2      ;GET KISDR0 ADDRESS
002030  010022                  10$:     MOV     R0,(R2)+        ;SETUP NEXT PDR
002032  005301                          DEC     R1              ;COUNT SETUPS
002034  001375                          BNE     10$             ;NE IF MORE TO DO
002036  012702  172340                  MOV     #KISAR0,R2      ;GET KISAR BASE ADDRESS
002042  005022                          CLR     (R2)+           ;SETUP KISAR 0
002044  012722  000200                  MOV     #200,(R2)+      ;SETUP KISAR 1
002050  012722  000400                  MOV     #400,(R2)+      ;SETUP KISAR 2
002054  012722  000600                  MOV     #600,(R2)+      ;SETUP KISAR 3
002060  012722  001000                  MOV     #1000,(R2)+     ;SETUP KISAR 4
002064  012722  001200                  MOV     #1200,(R2)+     ;SETUP KISAR 5
002070  012722  001400                  MOV     #1400,(R2)+     ;SETUP KISAR 6
002074  012712  007600                  MOV     #7600,@R2       ;SETUP KISAR 7 TO I/O PAGE
002100  052737  000001  177572          BIS     #BIT0,SR0       ;ENABLE MEMORY MANAGEMENT
002106                                  POP     R2,R1,R0        ;RESTORE REGS.
002114  000207                          RETURN                  ;BACK TO CALLER
                                .SBTTL  $..MAP MAPPING ROUTINE
```

```
                                ;
                                ; SUBROUTINE:   $..MAP
                                ; ******************
                                ;
                                ;
                                ;       THIS ROUTINE IS USED TO MAP WITH APR6 TO THE PHYSICAL MEMORY
                                ;       ABOVE 28. K AND COMPARE DMA READ AND WRITE DATA
                                ;
                                ;       INPUT:  (SP)    =RETURN ADDRESS
                                ;             2(SP)     =100 OCTAL BYTE BLOCK OFFSET
                                ;             4(SP)     =MAPPING POINTER
                                ;
                                ;       OUTPUT: KERNEL APR6 IS MAPPED TO BUFFER START ADDRESS
                                ;               MAPPING POINTER IS SET TO BASE ADDRESS OF APR6=140000
                                ;               CARRY IS SET IF NO MEMORY AVAILABLE
                                ;               BREAKPOINT TRAP, IF YOU TRY TO MAP TO CDM (0-4.K)
                                ;
                                ;       AUTHOR: ALBERT BREM CSS MUC 16-JAN-79
                                ;
                                ;
002116                          $..MAP: PUSH    R0,R1           ;SAVE REGISTERS
002122                                  IF 6(SP) GE #200 GOTO 10$;DONT MAP TO SYSTEM AREA
002136  000003                         BPT                     ;DONT MAP TO SYSTEM AREA
002140  000137  002316                 JMP     2$              ;LEAVE
002144  004737  002006          10$:   CALL    M..MMM          ;ENABLE MM,SETUP DEFAULT MAPPING
002150  013700  007022                 MOV     MEMEND,R0       ;SAVE HIGHEST MEMORY LOCATION
        000006                          .REPT   6
                                        ROR     R0              ;COMPUTE 100 OCTAL BYTE BLOCKS
                                        .ENDR
002170  042700  176000                  BIC     #176000,R0      ;"
002174  013701  007024                  MOV     MEMEND+2,R1     ;SAVE MEMORY EXTENSION
        000012                          .REPT   10.
                                        ASL     R1              ;COMPUTE ADDITIONAL BLOCKS
                                        .ENDR
002224  060001                          ADD     R0,R1           ;TOTAL BLOCKS OF 32.WORDS MEMORY
002226  042737  000001  177776          BIC     #BIT0,@#PS      ;CLEAR CARRY
002234  020166  000006                  CMP     R1,6(SP)        ;IS MEMORY AVAILABLE?
002240  002023                          BGE     1$              ;YES
002242                                  PREAD   R0              ;SAVE CURRENT PSW
002262  052700  000001                  BIS     #BIT0,R0        ;SET CARRY FOR ERROR INDICATION
002266                                  PSET    R0              ;"
002306  000403                          BR      2$              ;DONT TOUCH APR6
002310  016637  000006  172354  1$:     MOV     6(SP),@#KISAR6  ;MAP TO BUFFER AREA
002316                          2$:     POP     R1,R0           ;RESTORE REGISTERS
002322  012616                          MOV     (SP)+,(SP)      ;CLEAN STACK OF ARGUMENT
002324  000207                          RETURN                  ;BACK TO CALLER
                                ;
                                ;
                                ;
```

```
                                .SBTTL  $..EMT
                        ;
                        ;  SUBROUTINE:  $..EMT
                        ;  ***********  ******
                        ;
                        ;THIS ROUTINE HANDLES ALL EMT-TRAPS THAT MIGHT OCCUR
                        ;IN A DIAGNOSTIC PROGRAM, AND DIRECTS THE PROGRAM TO
                        ;CONTINUE AT THE APPROPRIATE FUNCTION SUBROUTINES.
                        ;
                        ;INPUT:         2(SP) = PS
                        ;               (SP) = PC
                        ;OUTPUT:        NONE
                        ;
                        ;AUTHOR:        BERT HUBER CSS/DP MUNICH 14-JULI-76
                        ;
                        ;
                                .ENABL LSB
002326  012746  177776  $..EMT: MOV     #-2,-(SP)       ;REBUILD EMT-ADDR.
002332  066616  000002          ADD     2(SP),(SP)      ;       "
002336  017616  000000          MOV     @(SP),(SP)      ;GET EMT-CODE
002342  042716  177400          BIC     #177400,(SP)    ;EXTRACT EMT-NR.
002346  006316                  ASL     (SP)            ;CONVERT TO TABLE-OFFSET
002350  021627  000004          CMP     (SP),#EMTTND-EMTTBL-2;VALID EMT-NR.?
002354  101413                  BLOS    1$              ;IF LOS, YES
002356                          WRITE MILEMT            ;ILLEGAL EMT
002366                          DUMP    OCT,2(SP)       ;
002400  000137  001000          JMP     @#1000          ;RESTART PROGRAM
002404  062716  002416  1$:     ADD     #EMTTBL,(SP)    ;GET FUCTION CODE ADDR.
002410  017616  000000          MOV     @(SP),(SP)      ;       "
002414  000136                  JMP     @(SP)+          ;ENTER FUCTION SUBROUTINE
002416  002424  EMTTBL: EMT0
002420  002432          EMT1
002422  002470          EMT2
002424                  EMTTND:
                        ;
                        ;SUBROUTINE TO SAVE SCOPE-LOOP ADDR.
                        ;
002424  011637  007172  EMT0:   MOV     (SP),SCOPAD     ;SAVE ADDR. OF SCOPE-LOOP
002430  000002          RTI                             ;RETURN TO CALLER
                        ;
                        ;SUBROUTINE TO SETUP A VECTOR
                        ;
002432  017646  000010  EMT1:   MOV     @10(SP),-(SP) ;GET POINTER TO VECTOR ADDR.
002436  016676  000010  000000  MOV     10(SP),@(SP)    ;SETUP VECTOR
002444  062716  000002          ADD     #2,(SP)         ;POINT TO NEW PS
002450  016636  000006          MOV     6(SP),@(SP)+    ;SETUP NEW PS
002454  012666  000004          MOV     (SP)+,4(SP)     ;CLEAN UP STACK
002460  012666  000004          MOV     (SP)+,4(SP)     ;       "
002464  005726                  TST     (SP)+           ;       "
002466  000002                  RTI                     ;RETURN TO CALLER
                        ;
                        ; SUBROUTINE TO RESET A VECTOR
                        ;
002470  017646  000004  EMT2:   MOV     @4(SP),-(SP)    ;GET POINTER TO VECTOR A
002474  011646                  MOV     (SP),-(SP)      ;DUPLICATE IT
002476  062716  000002          ADD     #2,(SP)         ;BUILD ADDRESS OF VECTOR
002502  012636                  MOV     (SP)+,@(SP)+    ;RESET VECTOR
```

```
$..EMT
    324 002504  012776  000004  177774          MOV     #4,@-4(SP)      ;RESET VECTOR +2
    325 002512  016666  000002  000004          MOV     2(SP),4(SP)     ;CLEAN STACK
    326 002520  012616                           MOV     (SP)+,(SP)      ;       "
    327 002522  000002                           RTI                     ;RETURN TO CALLER
```

```
                                .SBTTL  $..TRP
                              ;*
                              ; SUBROUTINE:   $..TRP
                              ; ***********   ******
                              ;
                              ; THIS ROUTINE HANDLES ALL TRAPS TO LOC 34 THAT MIGHT
                              ; OCCUR IN A CSS-DIGNOSTIC PROGRAM.
                              ; AS THE TRAP INSTRUCTION IN THIS DIAGNOSTICS IS ONLY USED TO
                              ; INDICATE AN ERROR CONDITION, THIS TRAP-HANDLER IS A (PSEUDO-)
                              ; SWITCH-REGISTER CONTROLLED ERROR HANDLER. FOR THE DEFINITION
                              ; OF ALL AVAILABLE 'SWITCH'-OPTIONS, REFER TO SUBROUTINE "$..IAE"
                              ; LATER IN THIS LISTING.
                              ;
                              ; INPUT:        2(SP)   =       PS
                              ;                (SP)   =       PC
                              ;   LOW ORDER BYTE OF TRAP INSTRUCTION = ERROR NUMBER
                              ;
                              ; OUTPUT:       DEPENDING ON OPTIONS SELECTED
                              ; AUTHOR:       BERT HUBER, CSS/DP MUNICH   14-JUL-76
                              ;-
                                ;.PSECT CSSMON
                                .ENABL  LSB
002524  012746  177776      $..TRP: MOV     #-2,-(SP)       ;REBUILD TRAP ADDRESS
002530  066616  000002              ADD     2(SP),(SP)      ;       "       "
002534  017616  000000              MOV     @(SP),(SP)      ;GET TRAP CODE
002540  042716  177400              BIC     #177400,(SP)    ;EXTRACT ERROR NUMBER
002544  005737  007166              TST     $..ER           ;FIRST ERROR OCCURENCE ?
002550  001421                      BEQ     2$              ;IF EQ, FIRST PASS
002552  005737  007160              TST     PSDSWR          ;SCOPE LOOP ?
002556  100020                      BPL     3$              ;
002560  021637  007166              CMP     (SP),$..ER      ;SAME SCOPE LOOP ?
002564  001415                      BEQ     3$              ;IF EQ, YES
002566                              WRITE   MILSCP          ;ILLEGAL SCOPE LOOP
002576                              DUMP    OCT,2(SP)       ;DUMP ADDRESS OF ERROR -2
002610                              GOTO    START           ;RESTART PROGRAM
002614  011637  007166          2$: MOV     (SP),$..ER      ;STORE ERROR NUMBER
002620  032737  040000  007160  3$: BIT     #BIT14,PSDSWR   ;INHIBIT PRINTOUT ?
002626  001022                      BNE     4$              ;IF NE, YES
002630                              WRITE   MERROR          ;PRINT ERROR MESSAGE PART 1
002640                              DUMP    DEC,(SP)        ;DUMP ERROR NUMBER
002652                              WRITE   MERRP2          ;PRINT ERROR MESSAGE PART 2
002662                              DUMP    OCT,2(SP)       ;DUMP ERROR PC -2
002674  032737  020000  007160  4$: BIT     #BIT13,PSDSWR   ;COUNT ERRORS ?
002702  001414                      BEQ     5$              ;IF EQ, NO
002704  005276  000002              INC     @2(SP)          ;COUNT !
002710  001011                      BNE     5$              ;IF EQ, OVERFLOW
002712                              WRITE   MERCOV          ;ERROR COUNTER OVERFLOW
002722                              DUMP    DEC,(SP)        ;DUMP ERROR NUMBER
002734  032737  040000  007160  5$: BIT     #BIT14,PSDSWR   ;PRINT ? ?
002742  001014                      BNE     6$              ;IF NE, NO
002744  032737  100000  007160      BIT     #BIT15,PSDSWR   ;SCOPE LOOP ?
002752  001010                      BNE     6$              ;IF SCOPE, NO PRINT
002754  032737  010000  007160      BIT     #BIT12,PSDSWR   ;HALT AFTER ERROR SELECTED
002762  001004                      BNE     6$              ;IF NE, YES
002764                              WRITE   MERHLT          ;STOP MESSAGE
002774  032737  010000  007160  6$: BIT     #BIT12,PSDSWR   ;HALT ?
003002  001004                      BNE     7$              ;IF EQ, YES
```

$..TRP

```
386 003004  032737  004000  007160          BIT     #BIT11,PSDSWR   ;IMMEDIATE CONTINUE ?
387 003012  001770                          BEQ     6$              ;IF NE,YES
388 003014  042737  004000  007160  7$:     BIC     #BIT11,PSDSWR   ;SCOPE LOOP ?
389 003022  005737  007160                  TST     PSDSWR          ;
390 003026  100005                          BPL     8$              ;IF PL, NO
391 003030                                  STCKUP
392 003034  005726                          TST     (SP)+           ;ADJUST STACKPOINTER
393 003036  000177  004130                  JMP     @SCOPAD         ;ENTER SCOPE LOOP
394 003042  005037  007166          8$:     CLR     $..ER           ;RESET ERROR NUMBER
395 003046  005726                          TST     (SP)+           ;READJUST STACK
396 003050  062716  000002                  ADD     #2,(SP)         ;BUILD RETURN ADDRESS
397 003054  000002                          RTI                     ;RETURN TO CALLER
```

```
                        .SBTTL  $..IOT
                ;*
                ; SUBROUTINE:   $..IOT
                ; ***********   *******
                ;
                ; THIS SUBROUTINE HANDLES ILLEGAL TRAPS OR INTERRUPTS.
                ;
                ; IF SUCH A TRAP OR INTERRUPT OCCURS, A MESSAGE IS
                ; PRINTED, SHOWING THE VECTOR TRAPPED TO, AND THE PROGRAMS PC
                ; WHERE IT WAS INTERRUPTED.
                ; THE PROGRAM HALTS THEN, AND MUST BE RESTARTED.
                ;
                ; INPUT:        6(SP)   =       PS OF PROGRAM
                ;               4(SP)   =       PC OF PROGRAM
                ;               2(SP)   =       PS OF VECTOR
                ;                (SP)   =       PC OF VECTOR +2
                ;
                ; OUTPUT:       MESSAGE TO THE OPERATOR
                ;
                ; AUTHOR:       BERT HUBER, CSS/DP MUNICH   22-JUL-76
                ;-
                        ;.PSECT CSSMON
                        .ENABL  LSB
003056          $..IOT: WRITE   MILTR1          ;SEND FIRST MESSAGE PART
003066  162716  000002          SUB     #2,(SP)         ;COMPUTE VECTOR
003072                          DUMP    OCT,(SP)        ;DUMP VECTOR ADDRESS
003102                          WRITE   MILTR2          ;SEND SECOND MESSAGE PART
003112                          DUMP    OCT,4(SP)       ;DUMP PROGRAM PC
003124  000777                  BR      .               ;HANG UP SYSTEM
                                .DSABL  LSB
```

```
                                        .SBTTL  $..PWR
                                ;
                                ;SUBROUTINE:    $..PWR
                                ;***********    ******
                                ;
                                ;THIS ROUTINE IS DIRECTLY ENTERED AFTER EACH POWER-FAIL TO
                                ;HANDLE THE NECESSARY REGISTER SAVE OPERATIONS, AND IS USED
                                ;AFTER THE POWER-UP INTERRUPT TO RESTORE THE SAVED REGISTERS
                                ;AFTER A SUCCESFULL POWER-FAIL RESTART, A SHORT MESSAGEW IS PRINTED.
                                ;
                                ;AUTHOR:         BERT HUBER, CSS/DP MUNICH 27-JULY-76
                                ;       MZ001    SAVE THE OUTFLAG IN 3$ AND RESTORE IT
                                ;       *****    AFTER PRINTOUT OF THE POWERFAIL MESSAGE
                                ;-
                                        ;.PSECT CSSMON
                                        .ENABL  LSB
003126                          $..PWR: PUSH    R0,R1,R2,R3,R4,R5
003142  010627                          MOV     SP,(PC)+        ;SAVE STACK-POINTER
003144  000000                  1$:     .WORD   0               ;STACKPOINTER-SAVE-AREA
003146  012737  003172  000024          MOV     #2$,@#24        ;SETUP VECTOR FOR RESTART
003154  013727  007152                  MOV     OUTFLG,(PC)+    ;SAVE PRINT FLAG        ;MZ001
003160  000000                  3$:     .WORD   0               ;SAVE FOR FLAG  ;MZ001
003162  013727  007150                  MOV     INFLAG,(PC)+    ;SAVE INPUT FLAG
003166  000000                  5$:     .WORD   0               ;SAVE WORD FOR INPUT FLAG
003170  000777                          BR      .               ;WAIT FOR POWER DOWN
003172  005002                  2$:     CLR     R2              ;DELAI
003174  005202                          INC     R2              ;THE
003176  020227  177777                  CMP     R2,#177777      ;POWER UP START
003202  001374                          BNE     .-6             ;FOR 1SECOND
003204  013706  003144                  MOV     1$,SP           ;REBUILD STACKPOINTER
003210  005037  007152                  CLR     OUTFLG          ;ALLOW PRINTOUT OF PWFRL MES.   ;MZ001
003214  005037  007150                  CLR     INFLAG          ;               "
003220  012737  003126  000024          MOV     #$..PWR,@#24    ;REBUILD VECTOR SETUP
003226                                  POP     R5,R4,R3,R2,R1,R0
003242  013727  005700                  MOV     $..MSP,(PC)+    ;SAVE OLD MESSAGE POINTER
003246  000000                  8$:     .WORD   0               ;SAVE WORD FOR OLD MESSAGE POINTER
003250                                  WRITE   MPWRFL          ;SEND POWER-FAIL-MESSAGE        ;MZ001
003260  005737  007152          4$:     TST     OUTFLG          ;WAIT FOR OUTPUT COMPLETE       ;MZ001
003264  001375                          BNE     4$              ;       ;MZ001
003266                                  SET6    @#TKS           ;ENABLE FURTHER TTY-INTERRUPTS
003274  013737  003160  007152          MOV     3$,OUTFLG       ;RESTORE FLAG IF IT WAS SET     ;MZ001
003302  005737  007152                  TST     OUTFLG          ;IF AN OUTPUT BEFORE PWRFL WAS RUNNING
003306  001411                          BEQ     7$              ;
003310  013737  003246  005700          MOV     8$,$..MSP       ;THEN RESTORE OLD MESSAGE POINTER
003316                                  SET6    @#TPS           ;AND ENABLE INT IN TPS
003324  112737  000012  177566          MOVB    #12,@#TPB       ;AND START INTERRUPT
003332  005737  003166          7$:     TST     5$              ;IF AN INP FLG BEFORE PWRFL WAS NOT SET
003336  001407                          BEQ     6$              ;GOTO 6$
003340                                  WRITE   PROMES          ;ELSE WRITE >
003350  013737  003166  007150          MOV     5$,INFLAG       ;RESTORE INPUT FLAG IF IT WAS SET
003356  000002                  6$:     RTI                     ;CONTINUE WITH PROGRAM
                                        .DSABL  LSB
                                        .SBTTL  $..RSV
                                ;+
                                ; SUBROUTINE:   $..RSV
                                ; ***********   ******
                                ;
```

```
                                ; THIS ROUTINE SAVES R0-R5 ONTO THE STACK
                                ;
                                ;
                                ; INPUT:        (SP)    =       CALLER PC
                                ;
                                ; OUTPUT:         (SP)  =       R5 CONTENT
                                ;                2(SP)  =       R4 CONTENT
                                ;                4(SP)  =       R3 CONTENT
                                ;                6(SP)  =       R2 CONTENT
                                ;               10(SP)  =       R1 CONTENT
                                ;               12(SP)  =       R0 CONTENT
                                ;               14(SP)  =       CALLER PC
                                ;
                                ; AUTHOR:       BERT HUBER, CSS/DP MUNICH   12-APR-76
                                ;-
                                        ;.PSECT CSSMON
                                        .ENABL  LSB
003360                          $..RSV: PUSH    R0,R1,R2,R3,R4,R5
003374  000176  000014                JMP     @14(SP)         ;RETURN TO CALLER
                                        .DSABL  LSB
```

```
                        .SBTTL  $..RRS
                ;*
                ; SUBROUTINE:   $..RRS
                ; ***********   ******
                ;
                ; THIS SUBROUTINE RESTORES R5-R0 FROM THE STACK
                ;
                ; INPUT:          (SP)  =       CALLER PC
                ;                2(SP)  =       SAVED R5
                ;                4(SP)  =       SAVED R4
                ;                6(SP)  =       SAVED R3
                ;               10(SP)  =       SAVED R2
                ;               12(SP)  =       SAVED R1
                ;               14(SP)  =       SAVED R0
                ;               16(SP)  =       OLD CALLER PC
                ;
                ; OUTPUT:       REGISTERS ARE RESTORED AND STACK IS CLEANED
                ;
                ; AUTHOR:       BERT HUBER, CSS/DP MUNICH   12-APR-76
                ;-
                        ;.PSECT CSSMON
                        .ENABL  LSB
003400  005726         $..RRS: TST     (SP)+           ;POINT TO SAVED R5
003402                  POP     R5,R4,R3,R2,R1,R0
003416  005726                 TST     (SP)+           ;SKIP OLD CALLER PC
003420  000176  177760         JMP     @-20(SP)        ;RETURN TO CALLER
                        .DSABL  LSB
```

$..KBI

```
                                        .SBTTL  $..KBI
                                ;+
                                ; SUBROUTINE:   $..KBI
                                ; ***********   ******
                                ;
                                ; THIS ROUTINE IS ENTERED IMMEDIATELY AFTER AN INTERRUPT
                                ; FROM TTY-KEYBOARD. ALL REGISTERS ARE SAVED ACROSS CALL.
                                ;
                                ; INPUT:        2(SP)=  PS
                                ;                (SP)   =       PC
                                ;
                                ; OUTPUT:       NONE
                                ;
                                ; AUTHOR:       BERT HUBER, CSS/DP MUNICH  5-APR-76
                                ;-
                                ;       .PSECT CSSMON
                                        .ENABL  LSB
003424  005737  007152          $..KBI: TST     OUTFLG          ;;;OUTPUT RUNNING ?
003430  001422                          BEQ     4$              ;;;IF NE, IGNORE INTERRUPT
003432                                  PUSH    R0              ;;SAVE
003434  005037  177560                  CLR     @#TKS           ;;;INHIBIT INTERRUPT
003440  013700  177562                  MOV     @#TKB,R0        ;;;GET CHARACTER
003444  012737  000100  177560          MOV     #100,@#TKS      ;;RE-ENABLE
003452  042700  000200                  BIC     #200,R0         ;;;MASK OUT ASCII
003456  022700  000003                  CMP     #3,R0           ;;; IS IT <CNTRL C> ?
003462  001003                          BNE     13$             ;;;IF NOT, RETURN
003464  012737  007777  007170          MOV     #7777,SPEFLG    ;;;SET A SPECIAL FLAG
                                                                ;;;THIS FLAG IS USED TO FINISH
                                                                ;;;A RUNNING PRINTOUT AND THEN TO
                                                                ;;;REMEMBER THAT <CNTRL C> WAS HIT
003472                          13$:    POP     R0              ;;;REBUILD
003474  000436                          BR      3$              ;;; RETURN TO CALLER
003476  004737  003360          4$:     CALL    $..RSV          ;;;SAVE ALL REGISTERS
003502  013700  177562                  MOV     @#TKB,R0        ;;;GET INPUT BYTE
003506  042700  000200                  BIC     #200,R0         ;;;BUILD REAL ASCII
003512  122700  000003                  CMPB    #3,R0           ;;;<CNTRL C> FUNCTION ?
003516  001003                          BNE     1$              ;;;IF NE, NO
003520                          $$SPE:
003520  004737  006136                  CALL    $..PRO          ;;;SEND PROMPT STRING
003524  000420                          BR      2$              ;;;RETURN
003526  005737  007150          1$:     TST     INFLAG          ;;;INPUT FLAG SET ?
003532  001415                          BEQ     2$              ;;;IF EQ, NO
003534  004737  003574          5$:     CALL    $..INP          ;;;PROCESS INPUT
003540  020027  000015                  CMP     R0,#15          ;;;WAS IT A <CR> ?
003544  001010                          BNE     2$              ;;;IF NE, NO
003546  005037  007150                  CLR     INFLAG          ;;;RESET INPUT MODE FLAG
003552  012701  007026                  MOV     #KBBUFF,R1      ;;;REBUILD BUFFER POINTER
003556  010137  007146                  MOV     R1,KBBPNT       ;;;     "       "       "
003562  004737  004010                  CALL    $..IAY          ;;;ANALYZE INPUT
003566  004737  003400          2$:     CALL    $..RRS          ;;;RESTORE REGISTERS
003572  000002                  3$:     RTI                     ;;;RETURN TO CALLER
                                        .DSABL  LSB
```

```
                        .SBTTL  $..INP
                ;*
                ;SUBROUTINE:    $..INP
                ;***********    ******
                ;
                ;THIS SUBROUTINE IS THE INPUT-HANDLER FOR ALL TERMINALS
                ;USED IN ALL CSS-MUNICH DIAGNOSTIC SOFTWARE GENERATED NOW
                ;AND LATER.
                ;THE SPECIAL FUCTIONS HANDLED BY THIS ROUTINE ARE:
                ;       <CNTRL U> FOR LINE RUBOUT
                ;       <DELETE> FOR CHARACTER RUBOUT
                ;ALL OTHER INPUT IS HANDLED AS NORMAL ASCI-TEXT AND STORED
                ;IN THE KEYBOARD INPUT BUFFER.
                ;
                ;INPUT:         (SP)    =       CALLER PC
                ;               R0      =       CURRENT INPUT CHARACTER
                ;
                ;OUTPUT:        NONE
                ;
                ;AUTHOR:        BERT HUBER CSS/DP MUNICH
                ;-
                        .IDENT  /V1.0/
                    ;   .PSECT  CSSMON
                        .ENABL  LSB
003574  013701  007146  $..INP: MOV     KBBPNT,R1               ;;;GET CURRENT BUFFER-POINTER
003600  012702  006122          MOV     #$..KBO,R2      ;;;POINT TO KEYBOARD-ECHO
003604  022701  007146          CMP     #KBBEND,R1      ;;;INPUT-BUFFER FULL?
003610  001015                  BNE     1$              ;;;IF NE, NO
003612  022700  000025          CMP     #25,R0          ;;;<CNTRL U>?
003616  001415                  BEQ     2$              ;;;IF EQ, YES.
003620  122700  000177          CMPB    #177,R0         ;;;<DELETE>?
003624  001407                  BEQ     1$              ;;;IF EQ, YES.
003626  005037  007150          CLR     INFLAG          ;;;RESET INPUTFLAG
003632                          WRITE   #KBOVF          ;;;PRINT OVERFLOW-MESS.
003642  000451                  BR      7$              ;;;PROMPT FOR INPUT
003644  122700  000025  1$:     CMPB    #25,R0          ;;;<CNTL U>?
003650  001436                  BEQ     6$              ;;;IF NE, NO
003652  122700  000177  2$:     CMPB    #177,R0         ;;;<DELETE>?
003656  001016                  BNE     4$              ;;;IF NE, NO
003660  005737  007162          TST     RUBFLG          ;;;FIRST RUBOUT?
003664  001005                  BNE     3$              ;;;IF NE, NO
003666  010637  007162          MOV     SP,RUBFLG       ;;;FLAG RUBOUT MODE
003672  012700  000057          MOV     #'/,R0          ;;;PRINT "/"
003676  004712                  CALL    @R2             ;;;     "
003700  020127  007026  3$:     CMP     R1,#KBBUFF      ;;;FULL LINE DELETED?
003704  001434                  BEQ     INP..E          ;;;IF EQ, YES
003706  114100                  MOVB    -(R1),R0                ;;;NO, REMOVE CHARACTER
003710  004712                  CALL    @R2             ;;;AND ECHO IT
003712  000431                  BR      INP..E          ;;;WAIT FOR NEXT INPUT
003714  005737  007162  4$:     TST     RUBFLG          ;;;RUBOUT MODE?
003720  001407                  BEQ     5$              ;;;IF EQ, NO
003722                          PUSH    R0              ;;;YES, SAVE CURRENT INPUT
003724  012700  000057          MOV     #'/,R0          ;;;ND OF RUBOUT
003730  004712                  CALL    @R2             ;;;ECHO "/"
003732  005037  007162          CLR     RUBFLG          ;;;RESET RUBOUT MODE FLAG
003736                          POP     R0              ;;;GET CURRENT INPUT AGAIN
003740  004712          5$:     CALL    @R2             ;;;ECHO IT
```

```
647 003742  110021                        MOVB    R0,(R1)+        ;;;SAVE IN IPUT BUFFER
648 003744  000414                        BR      INP..E          ;;;WAIT FOR NEXT INPUT
649 003746  012700  000136          6$:   MOV     #136,R0         ;;;ECHO "^"
650 003752  004712                        CALL    @R2             ;;;
651 003754  012700  000125                MOV     #'U,R0          ;;;ECHO "U"
652 003760  004712                        CALL    @R2             ;;;     "
653 003762  005037  007162                CLR     RUBFLG          ;;;LEAVE RUBOUT MODE
654 003766  012701  007026          7$:   MOV     #KBBUFF,R1      ;;;RESET INPUT BUFFER POINTER
655 003772  004737  006136                CALL    $..PRO          ;;;PROMPT FOR INPUT
656 003776  010137  007146          INP..E: MOV   R1,KBBPNT       ;;;SAVE POINTER
657 004002  116100  177777                MOVB    -1(R1),R0       ;;;SAVE LAST CHARACTER
658 004006  000207                        RETURN                  ;;;RETURN TO CALLER
659                                       .DSABL  LSB
```

```
                                        .SBTTL  $..IAY
                                ;+
                                ;SUBROUTINE:    $..IAY
                                ;***********    ******
                                ;
                                ;LEGAL INPUT TYPES ARE:
                                ;
                                ;       ERR=            FOR ERROR-HANDLING
                                ;       DMP=            FOR CORE-DUMP OPTIONS
                                ;       SET=            FOR DEBUGGING OPTIONS
                                ;       NONFORMATTED INPUT FOR SPECIAL REQ.
                                ;
                                ;INPUT: (SP)=   RETURN PC
                                ;OUTPUT:        NONE
                                ;
                                ;AUTHOR:        BERT HUBER, CSS/DP MUNICH       28-JUN 76
                                ;-
                                        ;.PSECT CSSMON
                                        .ENABL  LSB
004010  122711  000015         $..IAY: CMPB    #15,(R1)        ;;;<CR>?
004014  001440                          BEQ     IAY..E          ;;;IF EQ., SKIP ANALIZATION
004016  005737  007174         3$:     TST     $.$ASF          ;;;DONT ANALYZE IF ASCII INPUT RUNNING
004022  001035                          BNE     IAY..E          ;;;IF NE, YES.
004024  122711  000104                  CMPB    #'D,(R1)        ;;;'DMP" REQUESTED?
004030  001003                          BNE     1$              ;;;IF NE, NO
004032  004737  004210                  CALL    $..IAD          ;;;ANALIZE DUMP REQUEST
004036  000427                          BR      IAY..E          ;;;RETURN TO CALLER
004040  122711  000123         1$:     CMPB    #'S,@R1         ;;;'SET" REQUESTED?
004044  001003                          BNE     2$              ;;IF NE, NO
004046  004737  004402                  CALL    $..IAS          ;;;ANALYZE SET REQUEST
004052  000421                          BR      IAY..E          ;;;RETURN TO CALLER
004054  122711  000105         2$:     CMPB    #'E,@R1         ;;;"ERR"-REQUEST?
004060  001003                          BNE     4$              ;;;IF NE, NO
004062  004737  004472                  CALL    $..IAE          ;;;ANALYZE ERROR REQUEST
004066  000413                          BR      IAY..E          ;;;RETURN TO CALLER
004070  122711  000101         4$:     CMPB    #'A,@R1         ;;;"ABO" REQUESTED ?
004074  001003                          BNE     5$              ;;;IF NE, NO
004076  004737  004120                  CALL    $..IAA          ;;;ANALYZE ABO-REQUEST
004102  000405                          BR      IAY..E          ;;;RETURN TO CALLER
004104  005737  007156         5$:     TST     INPREQ          ;;;NO SYNTAX ERROR IF SPECIAL INPUT RUNNING
004110  001002                          BNE     IAY..E          ;;;"
004112  004737  006262                  CALL    $..STX          ;;;SYNTAX-ERROR
004116  000207                 IAY..E: RETURN                  ;;;RETURN TO CALLER
                                        .DSABL  LSB
```

```
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                                .SBTTL  $..IAA
                        ;+
                        ;SUBROUTINE:    $..IAA
                        ;-----------    ------
                        ;
                        ;LEGAL INPUT IS "ABO"
                        ;
                        ;       INPUT:  NONE
                        ;       OUTPUT: IF IN THE PROGRM THE LABEL ""$..SPC"" IS USED,
                        ;               THE STACK WILL BE INITIALIZED AND A JUMP TO
                        ;               THIS LABEL IN THE DEVICE TEST PROGRAM IS PERFORMED.
                        ;               IF THIS LABEL IS NOT USED, THE STACK IS INITIALIZED
                        ;               AND A JUMP TO THE BEGIN OF THE DEVICE-TEST PROGRAM
                        ;               IS PERFORMED.
                        ;       MZ001
                        ;       -----
                        ;       THE MACRO "PSET"ALLOWS TO RUN THE CDM EITHER ON PDP
                        ;       OR ON LSI.
                        ;
                        ;
                        ;AUTHOR:        M. ZILLER,      CSS/DP MUNICH   OCT. 1976
                        ;-
                                ;.PSECT CSSMON
                                .ENABL  LSB
004120  000005          $..IAA: RESET                   ;STOP ANY ACTIONS
004122                          SET6    @@TKS           ;SWITCH ON TTY-INT.
004130  012706  001204          MOV     @START,SP       ;INITIALIZE STACK
                                .IF DF $..SPC
004134  012746  012010          MOV     @$..SPC,-(SP)   ;SET THE LABEL ""$..SPC"" FOR DESTINATION
                                .ENDC
                                .IF NDF $..SPC
                                MOV     @CDM..E,-(SP)   ;SET END OF MONITOR FOR DESTINATION
                                .ENDC
004140                          PSET    @0              ;CLEAR PS       ;MZ001
004164  012700  007026          MOV     @KBBUFF,R0      ;RESET BUFFERS
004170  005020          1$:     CLR     (R0)+           ;       "
004172  020027  007202          CMP     R0,@PROMES      ;       "
004176  001374                  BNE     1$              ;       "
004200  012737  007026  007146  MOV     @KBBUFF,KBBPNT  ;REBUILD BEGIN ADDRESS
004206  000207                  RETURN                  ;GOTO POINT OF CONTINUATION
                                .DSABL  LSB
```

```
                                        ;.PSECT CSSMON
                                ;
                                ;
                                ;
                                ;
                                        .SBTTL  $..IAD
                                ;
                                ;SUBROUTINE     :       $..IAD
                                ;**********             ******
                                ;
                                ;       MZ001
                                ;       *****
                                ;       MODIFICATION TO ALLOW THE <CR> AFTER INPUT
                                ;       TO COMPLETE.
                                ;
                                ;       THIS SUBROUTINE IS ENTERED WHEN A DUMP-REQUEST IS ANALYZED.
                                ;       DEPENDING ON HOW THE REQUEST IS TERMINATED, THERE ARE TWO
                                ;       WAYS FOR RETURN:
                                ;
                                ;       A)      WHEN TERMINATED BY <CR> THE CONTENT OF A LOCATION IS
                                ;               PRINTED AND THE RETURN IS PERFORMED
                                ;       B)      WHEN INPUT IS TERMINATED BY A ""/""THE MONITOR WAITS
                                ;               FOR INPUT AND LOADS THIS INPUT INTO THE EXAMINED LOCATION.
                                ;
                                ;INPUT  :       (SP)    =RETURN ADDRESS
                                ;OUTPUT :       MODIFIED LOCATION IF REQUESTED
                                ;
                                ;AUTHOR:        M. ZILLER, SS/DP MUNICH         OCTOBER 1976
                                ;
                                ;-
                                        ;.PSECT CSSMON
                                        .ENABL  LSB
004210  005201                  $..IAD: INC     R1              ;POINT TO "M"
004212  122127  000115                  CMPB    (R1)+,#'M       ;IS IT A "M"
004216  001027                          BNE     77$             ;NO IF NE
004220  122127  000120                  CMPB    (R1)+,#'P       ;IS IT A "P"
004224  001024                          BNE     77$             ;NO IF NE
004226  122127  000057                  CMPB    (R1)+,#'/       ;IS IT A "/"
004232  001021                          BNE     77$             ;NO IF NE
004234  004737  004304                  CALL    $..NOR          ;RETRIEFE INPUT
004240  103416                          BCS     77$             ;IS CS, INPUT FORMAT ERROR
004242  105737  177564          11$:    TSTB    @#TPS           ;IS THE <CR> FINISHED ? ;MZ001
004246  100375                          BPL     11$             ;                       ;MZ001
004250  012737  000012  177566          MOV     #12,@#TPB       ;PRINT A <LF
004256  105737  177564          12$:    TSTB    @#TPS           ;DONE ?
004262  100375                          BPL     12$             ;WAIT FOR COMLETION
004264                                  DUMP    OCT,(R0)                ;AND PRINT
004274  000402                          BR      IAD..E          ;GO TO END
004276  004737  006262          77$:    CALL    $..STX          ;WRITE SYNTAX ERROR MESSAGE
004302  000207                  IAD..E: RETURN                  ;RETURN TO MAIN
                                ;
```

```
                                        ;+
                                        ;       THIS IS THE ROUTINE GET THE OCTAL VALUE OF THE ADDRESS
                                        ;
                                        ;-
004304  005000          $..NOR: CLR     R0              ;CLEAR STORAGE OF NUMBER
004306  012702  000006          MOV     #6,R2           ;CLEAR DIGIT COUNTER
004312  121127  000015  1$:     CMPB    @R1,#15         ;IS IT A TERMINATOR ?
004316  001425                  BEQ     NOR..E          ;IF EQ. YES
004320  121127  000057          CMPB    @R1,#'/         ;
004324  001422                  BEQ     NOR..E          ;
004326  142711  000060          BICB    #60,@R1         ;BUILD REAL BINARY
004332  100421                  BMI     NOR.ER          ;IF MI. IT WAS LOWER THAN 60
004334  121127  000007          CMPB    @R1,#7          ;IS IT REAL OCTAL ?
004340  101016                  BHI     NOR.ER          ;IF HI,NO REAL OCTAL
004342  006300                  ASL     R0              ;MULTIPLY
004344  006300                  ASL     R0              ;WITH 10 IN
004346  006300                  ASL     R0              ;OCTAL
004350  152100                  BISB    (R1)+,R0        ;SET THE TRUE BITS
004352  005302                  DEC     R2              ;COUNT DIGITS BUILT
004354  001356                  BNE     1$              ;ALL DONE?
004356  121127  000015          CMPB    @R1,#15         ;IS THE LAST + 1 BYTE A TERMINATOR?
004362  001403                  BEQ     NOR..E          ;IF YES THEN SYNTAX OK
004364  121127  000057          CMPB    @R1,#'/         ;TERMINATOR IN SET COMMAND?
004370  001002                  BNE     NOR.ER          ;IF NOT THEN SYNTAX ERROR
004372  000241          NOR..E: CLC                     ;INDICATE SUCCESSFUL OPERATION
004374  000207                  RETURN                  ;
004376  000261          NOR.ER: SEC                     ;INDICATE FAILURE
004400  000207                  RETURN                  ;
                                        ;
                                        ;+
                                        ;SUBROUTINE:    $..IAS
                                        ;***********    ******
                                        ;
                                        ;THIS SUBROUTINE IS ENTERED IF THE INPUT ANALYZER DETECTS A SET-COMMAND
                                        ;
                                        ;       INPUT:  (SP) = RETURN ADDRESS
                                        ;               R1      =       BEGIN OF INPUT STRING
                                        ;
                                        ;       OUTPUT:         =       MODIFIED LOCATION
                                        ;
                                        ;-
004402  005201          $..IAS: INC     R1              ;POINT TO "E"
004404  122127  000105          CMPB    (R1)+,#'E       ;CORRECT
004410  001024                  BNE     76$             ;NO IF NE
004412  122127  000124          CMPB    (R1)+,#'T       ;CORRECT SYNTAX ?
004416  001021                  BNE     76$             ;NO IF NE
004420  122127  000057          CMPB    (R1)+,#'/       ;CORRECT SYNTAX ?
004424  001016                  BNE     76$             ;NO IF NE
004426  004737  004304          CALL    $..NOR          ;BUILD ADDRESS TO MODIFY
004432  103413                  BCS     76$             ;IF CS, FORMAT ERROR
004434  010037  004470          MOV     R0,2$           ;SAVE
004440  122127  000057          CMPB    (R1)+,#'/       ;CORRECT SYNTAX ?
004444  001006                  BNE     76$             ;NO IF NE
004446  004737  004304          CALL    $..NOR          ;BUILD DATA TO INSERT
004452  103403                  BCS     76$             ;IF CS, FORMAT ERROR
004454  010077  000010          MOV     R0,@2$          ;AND LOAD
```

```
    864 004460  000402                      BR      IAS..E          ;GO TO END
    865 004462  004737  006262      76$:    CALL    $..STX          ;WRITE  ERROR MESSAGE
    866 004466  000207              IAS..E: RETURN                  ;RETURN
    867 004470  000000              2$:     .WORD   0               ;SORAGE FOR ADDRESS TO MODIFY
    868                                     .DSABL  LSB
```

```
                        ;
                        ;
                        ;
                                .SBTTL  $..IAE
                        ;+
                        ;SUBROUTINE:    $..IAE
                        ;***********    ******
                        ;
                        ;THIS ROUTINE CHECKS THE CORRECT SYNTAX OF
                        ;AN"ERR"- INPUT STRING AND PROCESSES THE
                        ;REQUESTED 'SWITCHREGISTER-OPTIONS'.
                        ;
                        ;LEGAL SWITCH OPTIONS ARE:
                        ;
                        ;       /HT     -       HALT AFTER ERROR (DEFAULT)
                        ;       /NH     -       NO HALT AFTER ERROR
                        ;       /PR     -       DRINT ERROR MESSAGE (DEFAULT)
                        ;       /NP     -       INHIBIT ERROR PRINTOUT
                        ;       /CT     -       COUNT ERROR
                        ;       /NC     -       NO ERROR COUNTING (DEFAULT)
                        ;       /SC     -       SCOPE LOOP ON THIS ERROR
                        ;       /NS     -       NO SCOPE LOOP (DEFAULT)
                        ;       /CONT   -       IMMEDIATE CONTINUE SWITCH
                        ;
                        ;
                        ;INPUT:         R1      -START ADDR.OF TEXT STRING
                        ;OUTPUT:        BIT-SETUP IN SOFTWARE-SWITCH-REGISTER
                        ;
                        ;AUTHOR:        BERT HUBER, CSS/DP MUNICH  28-JULY-76
                        ;-
                                ;.PSECT CSSMON
                                .ENABL  LSB
004472  010602          $..IAE: MOV     SP,R2           ;;;FLAG FOR VERY FIRST CHARACTER
004474  012703  007160          MOV     @PSDSWR,R3      ;;;GET 'SWR" ADDRESS
004500  005004                  CLR     R4              ;;;USE AS 'CHARACTER 1'
004502  062701  000003          ADD     #3,R1           ;;;SKIP IDENTIFYER
004506  122127  000075          CMPB    (R1)+,#'=       ;;;CORRECT SYNTAX?
004512  001137                  BNE     77$             ;;;BRANCH IF NOT
004514  122127  000057  1$:     CMPB    (R1)+,#'/       ;;;IS NEXT CHAR. A '/'
004520  001403                  BEQ     2$              ;;;IF EQ. YES
004522  005702                  TST     R2              ;;;VERY FIRST?
004524  001132                  BNE     77$             ;;;IF YES: SYNTAX ERROR
004526  000526                  BR      11$             ;;;ASSUME END OF STRING
004530  005002          2$:     CLR     R2              ;;;NO LONGER VERY FIRST
004532  005204                  INC     R4              ;;;SET FOR 'C1'-FLAG
004534  121127  000116          CMPB    (R1),#'N        ;;;IS IT THE '/N"-OPTION?
004540  001002                  BNE     3$              ;;;BRANCH IF NOT
004542  005201                  INC     R1              ;;;ADVANCE TO NEXT CHARACTER
004544  005004                  CLR     R4              ;;;RESET 'C1'-FLAG
004546  121127  000123  3$:     CMPB    (R1),#'S        ;;;IS IT A 'S'?
004552  001426                  BEQ     5$              ;;;BRANCH IF YES
004554  121127  000103          CMPB    (R1),#'C        ;;;IS IT A 'C' ?
004560  001437                  BEQ     7$              ;;;     BRANCH IF YES
004562  121127  000110          CMPB    (R1),#'H        ;;;IS IT A 'H' ?
004566  001472                  BEQ     9$              ;;; BRANCH IF YES
004570  121127  000120          CMPB    (R1),#'P        ;;;IS IT A 'P' ?
004574  001106                  BNE     77$             ;;;IF NO: SYNTAX ERROR
```

```
927 004576  005704                        TST     R4              ;;;IS IT A 'P' ?
928 004600  001004                        BNE     4$              ;;;BRANCH IF YES
929 004602  052713  040000                BIS     #BIT14,(R3)     ;;;SET SR-BIT FOR /NP
930 004606  005201                30$:    INC     R1              ;;;ADVANCE TO NEXT CHARACTER
931 004610  000741                        BR      1$              ;;;CHECK FOR NEXT SWITCH
932 004612  005201                4$:     INC     R1              ;;;NEXT CHARACTER
933 004614  122127  000122                CMPB    (R1)+,#'R       ;;;IS IT A '/PR' ?
934 004620  001074                        BNE     77$             ;;;IF NO: SYSNTAX ERROR
935 004622  042713  040000                BIC     #BIT14,(R3)     ;;;SET '/PR'-OPTION
936 004626  000732                        BR      1$              ;;;CHECK NEXT SWITCH
937 004630  005704                5$:     TST     R4              ;;;IS IT 'S/' ?
938 004632  001003                        BNE     6$              ;;;BRANCH IF YES
939 004634  042713  100000                BIC     #BIT15,(R3)     ;;;SETUP FOR '/NS' OPTION
940 004640  000762                        BR      30$             ;;;TRY NEXT
941 004642  005201                6$:     INC     R1              ;;;NEXT CHARACTER
942 004644  122127  000103                CMPB    (R1)+,#'C       ;;;IS IT A'/SC' ?
943 004650  001060                        BNE     77$             ;;;IF NO: SYNTAX ERROR
944 004652  052713  100000                BIS     #BIT15,(R3)     ;;;SETUP FOR '/SC'-OPTION
945 004656  000716                        BR      1$              ;;;CHECK NEXT SWITCH
946 004660  126127  000001  000117  7$:   CMPB    1(R1),#'O       ;;;CHECK FOR '/CONT'
947 004666  001016                        BNE     70$             ;;;IF NE , OTHER
948 004670  126127  000002  000116        CMPB    2(R1),#'N       ;;;CHECK FOR ;/CONT'
949 004676  001045                        BNE     77$             ;;;IF NO: SYNTAX ERROR
950 004700  126127  000003  000124        CMPB    3(R1),#'T       ;;;CHECK FOR '/CONT'
951 004706  001041                        BNE     77$             ;;;IF NO: SYSNTAX ERROR
952 004710  052737  004000  007160        BIS     #BIT11,PSDSWR   ;;;SET 'IMMEDIATE CONTINUE'
953 004716  062701  000005                ADD     #5,R1           ;;;ADJUST POINTER
954 004722  000430                        BR      11$             ;;;END THIS SCAN
955 004724  005704                70$:    TST     R4              ;;;IS IT A '/CT' ?
956 004726  001003                        BNE     8$              ;;;BRANCH IF YES
957 004730  042713  020000                BIC     #BIT13,(R3)     ;;;SETUP FOR '/NC'-OPTION
958 004734  000724                        BR      30$             ;;;TRY NEXT SWITCH
959 004736  005201                8$:     INC     R1              ;;;ADVANCE TO NEXT CHARACTER
960 004740  122127  000124                CMPB    (R1)+,#'T       ;;;IS IT A'/CT'-OPTION ?
961 004744  001022                        BNE     77$             ;;;IF NO: SYNTAX ERROR
962 004746  052713  020000                BIS     #BIT13,(R3)     ;;;SETUP FOR '/CT' OPTION
963 004752  000660                        BR      1$              ;;;CHECK NEXT SWITCH
964 004754  005704                9$:     TST     R4              ;;;IS IT '/HT' ?
965 004756  001003                        BNE     10$             ;;;BRANCH IF YES
966 004760  052713  010000                BIS     #BIT12,(R3)     ;;;SETUP FOR '/NP'-OPTION
967 004764  000710                        BR      30$             ;;;TRY NEXT SWITCH
968 004766  005201                10$:    INC     R1              ;;;ADVANCE TO NEXT CHARACTER
969 004770  122127  000124                CMPB    (R1)+,#'T       ;;;IS IT A '/HT' ?
970 004774  001006                        BNE     77$             ;;;IF NO: SYNTAX ERROR
971 004776  042713  010000                BIC     #BIT12,(R3)     ;;;SETUP FOR '/HT'-OPTION
972 005002  000644                        BR      1$              ;;;TRY NEXT SWITCH
973 005004  124127  000015        11$:    CMPB    -(R1),#15       ;;;WAS LAST BYTE A <CR>?
974 005010  001402                        BEQ     IAE..E          ;;;BRANCH IF YES
975 005012  004737  006262        77$:    CALL    $..STX          ;;;SYNTAX ERROR
976 005016  000207                IAE..E: RETURN                  ;;;RETURN TO CALLER
977                                       .DSABL LSB
```

```
                        .SBTTL  $..RED
                ;*
                ;SUBROUTINE     $..RED
                ;**********     ******
                ;
                ;
                ;**** ABOO
                ;       THE CARRY BIT IS SET IF A ZERO OCTAL INPUT (ONLY CR,NO DATA)
                ;       HAPPENS
                ;
                ;
                ;THIS SUBROUTINE HANDLES ALL TYPES OF SPECIAL INPUT REQUESTS
                ;SETUP BY THE PROGRAMMER THROUGH A ' READ ' MACRO.
                ;LEGAL INPUT TYPES THAT CAN BE HANDLED ARE:
                ;
                ;BINARY FORMAT (EX: 1001101101010001)
                ;-----------------------------------
                ;INPUT CAN BE UP TO 16-DIGITS OF THE FORM 0 OR 1.
                ;LESS THAN 16 DIGIT INPUT IS FILLED UWITH LEADING ZEROES
                ;INPUT IS RETURNED IN R0.
                ;THE PREVIOUS CONTEND OF R0 WILL BE OVERWRITTEN.
                ;
                ;OCTAL FORMAT (EX:176523)
                ;-----------------------
                ;INPUT CAN BE UP TO 6 DIGITS OF THE FORM 0-7.
                ;IN CASE OF A 6-DIGIT-WIDE INPUT,THE LEFTMOST(HIGH ORDER)
                ;DIGIT IS TRUCTATED TO THE RIGHTMOST (LOW ORDER)BIT.
                ;IN CASE OF LESS THAN 6 DIGITS INPUT, LEADING ZERO DIGITS
                ;ARE INSERTED.
                ;THE RESULT IS RETURNED IN R0,HEREBY OVERWRITING
                ;THE PREVIOUS CONTENT OF R0.
                ;
                ;DECIMAL FORMAT (EX: 96003)
                ;-------------------------
                ;INPUT CAN BE UP TO 5 DIGITS OF THE FORM 0-9.
                ;LESS THEN FIVE DIGITS INPUT ARE FILLED UP WITH
                ;LEADING ZEROE DIGITS.
                ;MAXIMUM NUMBER ALLOWED IS 32656.
                ;INPUT IS RETURNED IN R0, HEREBY OVERWRITING THE
                ;PREVIOUS CONTENT OF R0.
                ;
                ;ASCI FORMAT (EX: B6T%&L)
                ;-----------------------
                ;
                ;INPUT CAN BE ANY LEGAL ASCII CHARACTER.
                ;IF INPUT INTO A BUFFER IS REQUESTED, UP TO 80
                ;CHARACTERS CAN BE INPUT.
                ;IF INPUT RETURN IN R0 IS REQUESTED,ONLY THE FIRST
                ;CHARACTER WILL BE RETURNED IN THE LOW ORDER BYTE
                ;OF R0.
                ;OLD CONTEND OF R0 IS OVERWRITTEN IN THIS CASE.
                ;IF THE ONLY INPUT IS <CR>, ZERO WILL BE RETURNED IN R0
                ;AS WELL AS IN THE FIRST BYTE OF THE SPECIFIED BUFFER.
                ;
                ;AUTHOR:         BERT HUBER, CSS/DP MUNICH       29-JUN-76
                ;-
005020  004737  006136  $..RED: CALL    $..PRO          ;PRINT PROMPT STRING
```

```
$..RED

1036 005024  010637  007156                    MOV     SP,INPREQ       ;SET SPECIAL REQUST FLAG
1037 005030  026627  000002  000004            CMP     2(SP),#4        ;DETECT SPECIAL ASCII INPUT RUNNING
1038 005036  003402                            BLE     100$            ;NO ASCII INPUT
1039 005040  010637  007174                    MOV     SP,$.$ASF       ;SET SPECIAL ASCII INPUT FLAG
1040 005044                          100$:
1041 005044  005737  007150          1$:       TST     INFLAG          ;WAIT FOR INPUT COMPLETE
1042 005050  001375                            BNE     1$              ;
1043 005052                                    PUSH    R1,R2,R3,R4,R5  ;SAVE REGS
1044 005064  012701  007026                    MOV     #KBBUFF,R1      ;GET INPUTPIONTER
1045 005070  016602  000014                    MOV     14(SP),R2       ;GET INPUTMOFE INDICATOR
1046 005074  000172  005100                    JMP     @2$(R2)         ;SELECT REQ. INPUT
1047 005100  005112                  2$:       $..OCT                  ;HANDLE OCTAL INPUT
1048 005102  005270                            $..DEC                  ;HANDLE DECIMAL INPUT
1049 005104  005504                            $..BIN                  ;HANDLE BINARY INPUT
1050 005106  005444                            $..BUF                  ;HANDLE ASCII INPUT INTO BUFFER
1051 005110  005464                            $..ASC                  ;HANDLE ASCII INPUT INTO BUFFER
1052 005112  005000                  $..OCT:   CLR     R0              ;CLEAR INPUT POINTER
1053 005114  005037  005244                    CLR     6$              ;RESET COUNTER
1054 005120  121127  000015                    CMPB    @R1,#15         ;ZERO INPUT ?
1055 005124  001014                            BNE     3$              ;IF NE, SKIP
1056 005126                                    POP     R5,R4,R3,R2,R1  ;***ABOO: RESTORE GEN. REGISTERS
1057 005140  011666  000002                    MOV     (SP),2(SP)      ;***ABOO: REAJUST RETURN ADDRESS
1058 005144  005726                            TST     (SP)+           ;***ABOO:
1059 005146  005037  007156                    CLR     INPREQ          ;***ABOO: RESET SPECIAL REQUEST COUNTER
1060 005152  000261                            SEC                     ;***ABOO: SET CARRY AS ZERO INPUT INDICATOR
1061 005154  000207                            RETURN                  ;***ABOO: AND GO BACK TO CALLER
1062 005156  006300                  3$:       ASL     R0              ;ADJUST INPUT CHARACTER
1063 005160  006300                            ASL     R0              ;       "
1064 005162  006300                            ASL     R0              ;       "
1065 005164  023727  005244  000006            CMP     6$,#6           ;ALL INPUT HANDLED ?
1066 005172  001406                            BEQ     4$              ;MORE THAN 6 DIGITS INPUT
1067 005174  121127  000060                    CMPB    @R1,#60         ;LEGAL OCTAL DIGIT ?
1068 005200  103403                            BLO     4$              ;IF LO, NO
1069 005202  121127  000067                    CMPB    @R1,#67         ;LEGAL OCTAL DIGIT ?
1070 005206  101412                            BLOS    5$              ;IF LOS, YES
1071 005210                          4$:       WRITE   MILOCT          ;ILLEGAL OCTAL INPUT
1072 005220                                    POP     R5,R4,R3,R2,R1  ;RESTORE REGS
1073 005232  000672                            BR      $..RED          ;RESTART INPUT SEQUENCE
1074 005234  142711  000060          5$:       BICB    #60,@R1         ;BUILD BINARY
1075 005240  152100                            BISB    (R1)+,R0        ;INSERT INTO BUFFER
1076 005242  005227                            INC     (PC)+           ;COUNT INPUTS HANDLED
1077 005244  000000                  6$:       .WORD   0               ;DIGIT COUNTER
1078 005246  121127  000015                    CMPB    @R1,#15         ;END OF INPUT DETECTED?
1079 005252  001341                            BNE     3$              ;IF NE , NO
1080 005254  023727  005244  000001            CMP     6$,#1           ;SET CARRY IF ONLY CR WAS THE INPUT
1081 005262  001001                            BNE     7$              ;
1082 005264  000261                            SEC                     ;SET CARRY
1083 005266                          7$:
1084 005266  000557                            BR      RED..E          ;END OF INPUT
1085 005270  005000                  $..DEC:   CLR     R0              ;CLEAR TRANSFER BUFFER
1086 005272  005004                            CLR     R4              ;RESET COUNTER
1087 005274  122721  000015          1$:       CMPB    #15,(R1)+       ;END OF INPUT ?
1088 005300  001402                            BEQ     2$              ;IF EQ, YES
1089 005302  005204                            INC     R4              ;DIGIT COUNTER
1090 005304  000773                            BR      1$              ;CEEP COUNTING
1091 005306  012701  007026          2$:       MOV     #KBBUFF,R1      ;SET INPUT BUFFER POINTER
1092 005312  020427  000005                    CMP     R4,#5           ;MORE THAN 5 DIGITS ?
```

```
1093 005316  101412                          BLOS    4$              ;IF LOS, NO
1094 005320                          3$:     WRITE   MILDEC          ;ILLEGAL DECIMAL INPUT
1095 005330                                  POP     R5,R4,R3,R2,R1  ;REST. REGS
1096 005342  000626                          BR      $..RED          ;RESTART INPUT
1097 005344  005704                  4$:     TST     R4              ;ZERO DIGIT COUNT ?
1098 005346  001527                          BEQ     RED..E          ;IF EQ, YES
1099 005350  006304                          ASL     R4              ;BUILD TABLE OFFSET
1100 005352  016402  005360                  MOV     5$(R4),R2       ;SETUP CORRECT PARAMETER
1101 005356  000406                          BR      6$              ;SKIP TABLE
1102 005360  000000  000001  000012  5$:     .WORD   0,1,10.,100.,1000.,10000.
     005366  000144  001750  023420
1103 005374  006204                  6$:     ASR     R4              ;REBUILD R4 CONTENT
1104 005376  005003                          CLR     R3              ;RESET SAVE BUFFER
1105 005400  112103                          MOVB    (R1)+,R3        ;GET FIRST DIGIT
1106 005402  020327  000060                  CMP     R3,#60          ;CHECK LOWER DIGIT RANGE
1107 005406  103744                          BLO     3$              ;IF LO, ERROR
1108 005410  020327  000071                  CMP     R3,#71          ;CHECK UPPER DIGIT RANGE
1109 005414  101341                          BHI     3$              ;IF HI, ERROR
1110 005416  042703  177760                  BIC     #177760,R3      ;CONVERT TO OCTAL
1111 005422  005703                          TST     R3              ;ZERO DIGIT?
1112 005424  001405                          BEQ     13$             ;IF EQ, YES
1113 005426  000241                  7$:     CLC                     ;RESET CARRY
1114 005430  060200                          ADD     R2,R0           ;BUILD OCTAL NUMBER
1115 005432  103732                          BCS     3$              ;ERROR IF OVERFLOW
1116 005434  005303                          DEC     R3              ;ALL DONE?
1117 005436  001373                          BNE     7$              ;IF NE, NO
1118 005440  005304                  13$:    DEC     R4              ;NEXT DIGIT
1119 005442  000740                          BR      4$              ;
1120 005444  122711  000015          $..BUF: CMPB    #15,(R1)        ;ZERO DIGIT ?
1121 005450  001001                          BNE     1$              ;SKIP IF NOT
1122 005452  005011                          CLR     (R1)            ;RESET FIRST INPUT WORD
1123 005454  010100                  1$:     MOV     R1,R0           ;TRANSFER BUFFER ADDRESS
1124 005456  005037  007174                  CLR     $.$ASF          ;CLEAR SPECIAL ASCII FLAG
1125 005462  000461                          BR      RED..E          ;END OF INPUT
1126 005464  005000                  $..ASC: CLR     R0              ;
1127 005466  005037  007174                  CLR     $.$ASF          ;CLEAR SPECIAL ASCII INPUT FLAG
1128 005472  122711  000015                  CMPB    #15,@R1         ;ZERO INPUT
1129 005476  001453                          BEQ     RED..E          ;IF EQ, YES
1130 005500  111100                          MOVB    @R1,R0          ;GET FIRST BYTE
1131 005502  000451                          BR      RED..E          ;END OF INPUT
1132 005504  005000                  $..BIN: CLR     R0              ;
1133 005506  005037  005624                  CLR     6$              ;RESET COUNTER
1134 005512  122711  000015                  CMPB    #15,@R1         ;ZERO INPUT?
1135 005516  001443                          BEQ     RED..E          ;END OF INPUT
1136 005520  022737  000021  005624  1$:     CMP     #17.,6$         ;TOO MANY DIGITS?
1137 005526  001013                          BNE     2$              ;IF NE, NO
1138 005530                          5$:     WRITE   MILBIN          ;ILLEGAL INPUT MESSAGE
1139 005540                                  POP     R5,R4,R3,R2,R1  ;REST. REGS
1140 005552  000137  005020                  JMP     $..RED          ;REENTER
1141 005556  121127  000060          2$:     CMPB    @R1,#60 ;ZERO DIGIT ?
1142 005562  001407                          BEQ     3$              ;BRANCH IF YES
1143 005564  121127  000061                  CMPB    @R1,#61         ;ONE DIGIT ?
1144 005570  001011                          BNE     4$              ;BRANCH IF NOT
1145 005572  006300                          ASL     R0              ;ADJUST TRANSFER BUFFER
1146 005574  052700  000001                  BIS     #BIT0,R0        ;INSERT INTO TRANSFER BUFFER
1147 005600  000401                          BR      7$              ;
1148 005602  006300                  3$:     ASL     R0              ;ADJUST TRANSFER BUFFER
```

```
1149 005604  005201                 7$:     INC     R1              ;POINT TO NEXT INPUT
1150 005606  005237  005624                 INC     6$              ;COUNT INPUTS
1151 005612  000742                 4$:     BR      1$              ;CHECK NEXT
1152 005614  121127  000015                 CMPB    @R1,#15         ;END OF INPUT ?
1153 005620  001343                         BNE     5$              ;NO, ILLEGAL CHARACTER
1154 005622  000401                         BR      RED..E          ;
1155 005624  000000                 6$:     .WORD   0               ;COUNTER
1156 005626                          RED..E: POP     R5,R4,R3,R2,R1  ;REST. REGS
1157 005640  011666  000002                 MOV     (SP),2(SP)      ;READJUST STACK RETURN ADDRESS
1158 005644  005726                         TST     (SP)+           ;       "
1159 005646  005037  007156                 CLR     INPREQ          ;RESET SPECIAL REQUEST POINTER
1160 005652  000207                         RETURN                  ;RETURN TO CALLER
```

```
                                        .SBTTL  $..WRT
                                ;+
                                ;SUBROUTINE:    $..WRT
                                ;***********    ******
                                ;
                                ;THIS ROUTINE IS CALLED TO SETTUP A MESSAGE PRINTOUT ON CONSOLE
                                ;ALL PRINTING IS CONTROLLED BY INTERRUPT EXEPT <CR>, <LF>.
                                ;
                                ;INPUT:         2(SP)   -       ADDRESS OF MESSAGE TEXT
                                ;               (SP)    -       CALLER PC
                                ;
                                ;OUTPUT:                MESSAGE ON TERMINAL
                                ;
                                ;AUTHOR:        BERT HUBER CSS/DP MUNICH        28-JUN-76
                                ;
                                ;MODIFIED BY:   JOHN LEVESQUE   CSS ISG   23-JAN-83
                                ;
                                ;               MODIFICATION REQUIRED TO HANDLE XON AND XOFF
                                ;
                                ;-
                                        ;.PSECT CSSMON
                                        .ENABL  LSB
005654  005737  007152          $..WRT: TST     OUTFLG          ;OUTPUT RUNNING ?
005660  001375                          BNE     $..WRT          ;IF NE, YES - WAIT
005662  005737  007150                  TST     INFLAG          ;INPUT RUNNING ?
005666  001372                          BNE     $..WRT          ;IF NE, YES - WAIT
005670  010637  007152                  MOV     SP,OUTFLG       ;SET OUTPUTFLAG
005674  016627  000002                  MOV     2(SP),(PC)+             ;GET MESSAGE POINTER
005700  000000          $..MSP: .WORD   0               ;MESSAGE POINTER
005702  012737  005736  000064          MOV     #1$,@#64        ;SETUP VECTOR
005710  012737  000340  000066          MOV     #340,@#66       ;;;     "
005716  012616                          MOV     (SP)+,(SP)      ;UPDATE STACK
005720  052737  000100  177564          BIS     #100,@#TPS      ;ENABLE INTERRUPTS
005726  005737  007152                  TST     OUTFLG          ;OUTPUT RUNNING?        ;**GS0001**
005732  001375                          BNE     .-4             ;IF NE ,YES->WAIT       ;**GS0001**
005734  000207                          RETURN                  ;RETURN TO CALLER
005736  122737  000023  177562  1$:     CMPB    #23,@#TKB       ;;;  CHECK FOR XOFF
005744  001401                          BEQ     3$              ;;;  XOFF CONDITION WAIT TO CLEAR
005746  000404                          BR      20$             ;;;  NO XOFF THEN CONTINUE
005750  122737  000021  177562  3$:     CMPB    #21,@#TKB       ;;;  CHECK FOR XON
005756  001367                          BNE     1$              ;;;  NO XON GO WAIT FOR IT
005760                          20$:
005760  127727  177714  000135          CMPB    @$..MSP,#']             ;END OF MESSAGE ?
005766  001434                          BEQ     WRT..E          ;;;IF EQ, YES
005770  127727  177704  000133          CMPB    @$..MSP,#'[             ;;;<CR>,<LF>?
005776  001022                          BNE     30$             ;;;IF NE, NO
006000  042737  000100  177564          BIC     #100,@#TPS      ;;;DISABLE INTERRUPTS
006006  012737  000015  177566          MOV     #15,@#TPB       ;;;SEND <CR>
006014  105737  177564                  TSTB    @#TPS           ;;;WAIT FOR DONE
006020  100375                          BPL     .-4             ;;;
006022  005237  005700                  INC     $..MSP          ;;;POINT TO NEXT CHARACTER
006026  012737  000012  177566          MOV     #12,@#TPB       ;;;SEND <LF>
006034  052737  000100  177564          BIS     #100,@#TPS      ;;;RE-ENABLE INTERRUPT
006042  000002                          RTI                     ;;;RETURN TO MAIN PROGRAM
006044  117737  177630  177566  30$:     MOVB    @$..MSP,@#TPB   ;;;SEND NEXT CHARACTER
006052  005237  005700                  INC     $..MSP          ;;;POINT TO NEXT
006056  000002                          RTI                     ;;;RETURN TO CALLER
```

```
$..WRT

1219 006060  042737  000100  177564  WRT..E: BIC     #100,@#TPS      ;;;DISABLE OUTPUT INTERRUPT
1220 006066  005037  007152                  CLR     OUTFLG          ;;;RESET OUTPUT FLAG
1221 006072  005737  007170                  TST     SPEFLG          ;;;THIS FLAG IS SET ONLY
1222 006076  001410                          BEQ     4$              ;;;WHEN DURING A PRINTOUT
1223 006100  005037  007170                  CLR     SPEFLG          ;;;THE <CNTRL C> COMMAND WAS
1224 006104  005037  007156                  CLR     INPREQ          ;;;NECCESARY TO INTERRUPT THE
1225 006110  004737  003360                  CALL    $..RSV          ;;;RUNNING PRINTOUT
1226 006114  000137  003520                  JMP     $$SPE           ;;;NOW NEW SPEC. INPUT IS PROCESSED
1227 006120  000002                  4$:     RTI                     ;;;RETURN TO MAIN PROGRAM
1228                                         .DSABL LSB
```

```
1230                                            .SBTTL  $..KBO
1231                                    ;+
1232                                    ;SUBROUTINE:    $..KBO
1233                                    ;***********    ******
1234                                    ;
1235                                    ;KEYBOARD ECHO ROUTINE FOR TEMINAL INPUT
1236                                    ;
1237                                    ;INPUT:         (SP)    -       CALLER PC
1238                                    ;               R0      -       PATTERN TO ECHO
1239                                    ;
1240                                    ;OUTPUT:        PRINT PATTERN TO TERMINAL
1241                                    ;
1242                                    ;AUTHOR:        BERT HUBER CSS/DP MUNICH        28-JUN-76
1243                                    ;-
1244                                            ;.PSECT CSSMON
1245                                            .ENABL  LSB
1246 006122  105737  177564            $..KBO: TSTB    @#TPS           ;ECHO RUNNING ?
1247 006126  100375                            BPL     $..KBO          ;IF PL, WAIT
1248 006130  010037  177566                    MOV     R0,@#TPB        ;ECHO CHARACTER
1249 006134  000207                            RETURN                  ;RETURN TO CALLER
1250                                            .DSABL  LSB
```

```
                                .SBTTL  $..PRO
                        ;+
                        ;SUBROUTINE:    $..PRO
                        ;***********    ******
                        ;
                        ;THIS ROUTINE IS CALLED TO PRINT THE DEFAULT KEYBOARD
                        ;PROMPT STRING ON THE TERMINAL, AND TO SET THE INPUT FLAG.
                        ;
                        ;INPUT:         (SP)    .       CALLER PC
                        ;
                        ;OUTPUT:        PROMPT STING ON TERMINAL
                        ;
                        ;AUTHOR:        BERT HUBER CSS/DP MUNICH        28-JUN-76
                        ;       MZ001
                        ;       *****
                        ;       THE USE OF THIS MACRO'S ALLOWS TO USE ONE VERSION OF CDM
                        ;       ON LSI AND PDP.
                        ;
                        ;-
                                .IDENT  /V1.0/
                                ;.PSECT CSSMON
                                .ENABL  LSB
006136  005037  007150  $..PRO: CLR     INFLAG          ;;;RESET INPUT FLAG
006142                          PREAD   STATUS  ;SAVE STATUS    ;MZ001
006166                          PSET    #0      ;CLEAR PS       ;MZ001
006212                          WRITE   PROMES          ;;;WRITE PROMPT STRING
006222  005737  007152  1$:     TST     OUTFLG          ;WAIT FOR OUTPUT COMPLETE
006226  001375                  BNE     1$              ;
006230                          PSET    STATUS          ;RELOAD STATUS  ;MZ001
006254  010637  007150          MOV     SP,INFLAG               ;;;SET INPUT FLAG
006260  000207                  RETURN                  ;RETURN TO CALLING PROGRAM
                                .DSABL  LSB
```

```
                                .SBTTL  $..STX
                        ;+
                        ;SUBROUTINE:    $..STX
                        ;***********    ******
                        ;
                        ;THIS ROUTINE PRINTS THE 'SYNTAX ERROR' MESSAGE
                        ;
                        ;INPUTS:                (SP)=   CALLER PC
                        ;
                        ;OUTPUT:                MESSAGE ON TERMINAL
                        ;
                        ;AUTHOR:         BERT HUBER CSS/DP MUNICH        28-JUN-76
                        ;
                        ;
                        ;       MZ001
                        ;       *****
                        ;       THE USE OF THIS MACRO'S ALLOWS TO RUN ONE VERSION OF CDM
                        ;       ON LSI AND PDP.
                        ;
                        ;-
                                ;.PSECT CSSMON
                                .ENABL  LSB
006262  000240          $..STX: NOP                             ;;;DUMMY
006264                          PREAD   STATUS  ;SAVE STATUS    ;MZ001
006310                          PSET    #0      ;CLEAR PS       ;MZ001
006334                          WRITE   MSYERR                  ;WRITE SYNTAX ERROR MESSAGE
006344  005737  007152    1$:   TST     OUTFLG  ;WAIT FOR OUTPUT COMPLETE
006350  001375                  BNE     1$                      ;
006352                          PSET    STATUS                  ;RELOAD PS      ;MZ001
006376  000207                  RETURN                          ;;;RETURN TO CALLER
                                .DSABL  LSB
```

```
                        .SBTTL  $..DMP
                ;+
                ;SUBROUTINE:    $..DMP
                ;***********    ******
                ;
                ;THIS ROUTINE PRINTS ON THE TERMINAL PRINTER NUMBERS
                ;IN BINARY, DECIMAL AND OCTAL FORMAT, DEPENDING ON THE
                ;TYPE-ARGUMENT OF THE CALLING DUMP MACRO.
                ;       THIS MONITOR WAS MODIFIED IN JANUARY 1983 TO INCLUDE XON AND XOFF
                ;       TERMINAL FEATURES. ALSO INCLUDED SOME MACRO DIRECTIVES TO ALLOW
                ;       ASSEMBLY ON VAX.
                ;
                ;
```

```
                                        ;
                                        ;INPUT:         4(SP)   =       VALUE TO DUMP
                                        ;               2(SP)   =TYPE OF DUMP   :  0 = OCTAL
                                        ;                                          2 = DECIMAL
                                        ;                                          4 = BINARY
                                        ;               (SP)    =RETURN PC
                                        ;
                                        ;OUTPUT:        DUMP ON TERMINAL
                                        ;
                                        ;AUTHOR:        BERT HUBER CSS/DP MUNICH        28-JUN-76
                                        ;-
                                .PSECT  CSSMON
                                .ENABL  LSB
006400                          $..DMP: PUSH    R0              ;SAVE R0
006402  016600  000004                  MOV     4(SP),R0                ;GET TYPE ARGUMENT
006406  005737  007152                  TST     OUTFLG          ;OUTPUT RUNNING ?
006412  001375                          BNE     .-4             ;IF NE, WAIT
006414  000170  006420                  JMP     @D..TYP(R0)     ;SELECT FUNCTION ROUTINE
006420  006426                  D..TYP: $..DOC
006422  006520                          $..DDC
006424  006630                          $..DBN
006426  012746  000006          $..DOC: MOV     #6,-(SP)        ;SETUP DIGIT COUNT
006432  016646  000010                  MOV     10(SP),-(SP)    ;GET VALUE TO DUMP
006436  012700  000060                  MOV     #'0,R0          ;SETUP BASIC ASCII VALUE
006442  006316                          ASL     (SP)            ;BUILD FIRST DIGIT
006444  103001                          BCC     1$              ;IF CC, DIGIT IS A '0'
006446  005200                          INC     R0              ;OTHERWISE DIGIT IS A ?
006450  004737  006122          1$:     CALL    $..KBO          ;DUMP DIGIT
006454  005366  000002                  DEC     2(SP)           ;COUNT DIGITS DUMPED
006460  001415                          BEQ     4$              ;IF EQ, ALL DONE
006462  012700  000060                  MOV     #'0,R0          ;SETUP NEXT DIGIT BASE
006466  006316                          ASL     (SP)            ;BUILD NEXT DIGIT
006470  103002                          BCC     2$              ;IF CC, DIGIT INCLUDES ?????
006472  062700  000004                  ADD     #4,R0           ;DIGIT = BASE*4
006476  006316                  2$:     ASL     (SP)            ;ANALYZE NEXT BIT
006500  103001                          BCC     3$              ;IF CC, DIGIT INCLUDES ????
006502  122020                          CMPB    (R0)+,(R0)+     ;DIGIT = DIGIT + 2
006504  006316                  3$:     ASL     (SP)            ;ANALIZE LAST BIT OF DIGIT
006506  103360                          BCC     1$              ;IF CC, DIGIT MUST BE EVEN
006510  005200                          INC     R0              ;OTHERWISE DIGIT IS ODD
006512  000756                          BR      1$              ;GO AND DUMP
006514  022626                  4$:     CMP     (SP)+,(SP)+     ;READJUST STACK
006516  000466                          BR      DMP..E          ;END OF DUMP
                                .DSABL  LSB
                                .ENABL  LSB
006520  012746  000005          $..DDC: MOV     #5,-(SP)        ;SETUP A DIGIT COUNT
006524  016646  000010                  MOV     10(SP),-(SP)    ;GET VALUE TO DUMP
006530  012700  000060                  MOV     #'0,R0  ;BUILD LEADING ZERO
006534  004737  006122                  CALL    $..KBO          ;AND PRINT
006540  012700  000060          1$:     MOV     #'0,R0  ;SETUP BASIC ASCII VALUE
006544  027716  000044          2$:     CMP     @$POINT,(SP)    ;CMP VALUE WITH ACT. DEC. DIGIT
006550  101004                          BHI     3$              ;VALUE IS SMALLER
006552  005200                          INC     R0              ;COUNT NUMBER OF DIVISIONS
006554  167716  000034                  SUB     @$POINT,(SP)    ;DIVIDE BY ACT. DEC. DIGIT
006560  000771                          BR      2$              ;DO NEXT
006562  004737  006122          3$:     CALL    $..KBO          ;PRINT THIS DEC. DIGIT
006566  062737  000002  006614          ADD     #2,$POINT       ;POINT TO NEXT DEC. VALUE
```

```
$..DMP

1388 006574 005366 000002                DEC     2(SP)           ;COUNT NUMBER OF CONF. DIGITS
1389 006600 001357                       BNE     1$              ;ALL DONE
1390 006602 012737 006616 006614         MOV     @$TABLE,$POINT  ;REBUILD FOR NEXT USER
1391 006610 022626                       CMP     (SP)+,(SP)+     ;CORRECT STACK FOR RETURN
1392 006612 000430                       BR      DMP..E          ;END OF DEC. DUMP
1393 006614 006616              $POINT:  $TABLE
1394 006616 023420              $TABLE:  10000.
1395 006620 001750                        1000.
1396 006622 000144                         100.
1397 006624 000012                          10.
1398 006626 000001                           1
1399                                    .DSABL  LSB
1400                                    .ENABL  LSB
1401 006630 012766 000020 000004 $..DBN: MOV     @16.,4(SP)              ;SETUP PRINT POINTER
1402 006636 000241               1$:     CLC                     ;RESET CARRY
1403 006640 006166 000006                ROL     6(SP)           ;SELECT FIRST CHARACTER
1404 006644 103410                       BCS     3$              ;IF " 1 " BRANCH
1405 006646 012700 000060                MOV     @60,R0          ;SETUP A "0" CHARACTER
1406 006652 004737 006122        2$:     CALL    $..KBO          ;DUMP CHARACTER
1407 006656 005366 000004                DEC     4(SP)           ;COUNT CHARACTERS DUMPED
1408 006662 001365                       BNE     1$              ;IF NE, CONTINUE
1409 006664 000403                       BR      DMP..E          ;END OF DUMP
1410 006666 012700 000061        3$:     MOV     @61,R0          ;SETUP A " 1 " CHARACTER
1411 006672 000767                       BR      2$              ;DUMP IT
1412                                    .DSABL  LSB
1413 006674                      DMP..E: POP     R0              ;RESTORE R0
1414 006676 062706 000006                ADD     @6,SP           ;READJUST STACK
1415 006702 000176 177772                JMP     @-6(SP)         ;RETURN TO CALLER
1416                                    .DSABL  LSB
```

```
1418                                            .SBTTL  $..ADP
1419                                    ;*
1420                                    ; THIS SUBROUTINE IS USED TO PRINT OUT ADDITIONAL INFORMATION
1421                                    ; ABOUT AN ERROR. MOSTTIMES IT WILL BE USED TO PRINT THE
1422                                    ; DATA IN CASE OF DATA ERROR.
1423                                    ;
1424                                    ;
1425                                    ;       INPUTS  :  (SP) =ADDRESS OF FIRST ARGUMENT
1426                                    ;
1427                                    ;
1428                                    ;       OUTPUT:    NONE
1429                                    ;
1430                                    ; AUTHOR:       MICHAEL ZILLER  CSS DP  MUNICH MAY 1977
1431 006706                            $..ADP: WRITE   MER1    ;"SHOULD BE"
1432 006716                                    DUMP    OCT,$SHLD       ;DUMP DATA
1433 006730                                    WRITE   MER2            ;"WAS"
1434 006740                                    DUMP    OCT,$WAS        ;DUMP   DATA
1435 006752  000207                            RETURN                  ;RETURN TO MAIN
```

```
1437                                            .SBTTL  $..TOT
1438                                    ;+
1439                                    ;THIS ROUTINE IS ENTERED AFTER THE MACRO "ADRTST" HAS BEEN EVOCED
1440                                    ;AND A BUS TIMEOUT HAS HAPPENED
1441                                    ;
1442                                    ;INPUT: 4(SP) = PC FOR  PROGRAM CONTINUATION
1443                                    ;        R0   = REGISTER ADDRESS (E.G. 164000) WHICH SHOULD BE TESTED
1444                                    ;
1445                                    ;OUTPUT:        THE ERROR MESSAGE:
1446                                    ;               THIS ADDRESS IS NOT AVAILABLE ON UNIBUS:  164000
1447                                    ;AUTHOR:        ALBERT BREM,CSS MUC     FEB 1979
1448                                    ;-
1449                                    ;
1450                                    ;
1451 006754  062706  000004            $..TOT: ADD     #4,SP           ;CORRECT SP
1452 006760                                    WRITE   $MNOAV          ;SAY ADDRESS NOT AVAILABLE ON UNIBUS
1453 006770                                    DUMP    OCT,R0          ;DUMP REGISTER ADDRESS
1454 007000  005737  007152                    TST     OUTFLG          ;SYNCHRONIZE PRINTOUT
1455 007004  001375                            BNE     .-4             ;"
1456 007006  012737  000006  000004           MOV     #6,@#4          ;REBUILD TRAP CATCHER
1457 007014  000136                            JMP     @(SP)+          ;JUMP TO CONTINUATION LABEL
1458                                    ;
1459                                    ;
1460                                    ;
1461                                    ;
```

```
1463                                    .SBTTL  $..BUF
1464                                ;+
1465                                ;SUBSECTION TO CONTAIN ALL CDM-BUFFERS, CONSTANTS AND
1466                                ;'NOT MACRO-DEFINED' PARAMETERS.
1467                                ;
1468                                ;AUTHOR:        BERT HUBER CSS/DP MUNICH
1469                                ;-
1470                                        ;.PSECT CSSMON
1471                                        .ENABL  LSB
1472                                ;MEMORY MANAGEMENT DEFINITIONS
1473          172360                KDSAR0=172360
1474          172320                KDSDR0=172320
1475          172340                KISAR0=172340
1476          172352                KISAR5=172352
1477          172354                KISAR6=172354
1478          172356                KISAR7=172356
1479          172300                KISDR0=172300
1480          172314                KISDR6=172314
1481          172316                KISDR7=172316
1482          172200                SISDR0=172200
1483          177660                UDSAR0=177660
1484          177620                UDSDR0=177620
1485          177640                UISAR0=177640
1486          177650                UISAR4=177650
1487          177652                UISAR5=177652
1488          177654                UISAR6=177654
1489          177656                UISAR7=177656
1490          177600                UISDR0=177600
1491          177610                UISDR4=177610
1492          177612                UISDR5=177612
1493          177614                UISDR6=177614
1494          177616                UISDR7=177616
1495          170200                UBMPR=170200
1496          140000                CMODE=140000
1497          030000                PMODE=30000
1498          177572                SR0=177572
1499          172516                SR3=172516
1500 007016   000000                $$PTYP: .WORD   0               ;IF 0:=LSI; IF -1:=PDP
1501 007020   000000                $$MTYP: .WORD   0               ;IF 0:NO MM; IF 1:WITH MM
1502 007022   000000   000000       MEMEND: .WORD   0,0             ;TOP OF CORE AND CORE EXTENSION
1503                                                                ;STARTING FROM HERE TILL PROMES
1504                                                                ;THE CONTENTS WILL BE CLEARED
1505                                                                ;WITH "ABO"
1506 007026                        KBBUFF: .BLKB   80.             ;TERMINAL INPUT BUFFER
1507 007146                        KBBEND:                         ;REFERENCE LABEL
1508 007146   007026                KBBPNT: .WORD   KBBUFF  ;INPUT BUFFER POINTER
1509 007150   000000                INFLAG: .WORD   0       ;INPUT 'RUNNING" FLAG
1510 007152   000000                OUTFLG: .WORD   0       ;OUTPUT 'RUNNING" FLAG
1511 007154   000000                ERRFLG: .WORD   0               ;'ERROR HANDLING REQ.' FLAG
1512 007156   000000                INPREQ: .WORD   0               ;'WAIT FOR SPECIAL INPUT" FLAG
1513 007160   000000                PSDSWR: .WORD   0               ;SOFTWARE  SWITCHREGISTER
1514 007162   000000                RUBFLG: .WORD   0               ;RUBOUTMODE-INDICATOR FLAG
1515 007164   000000                STATUS: .WORD   0               ;BUFFER PS-CONTENT IF SAVED
1516 007166   000000                $..ER:  .WORD   0               ;HOLDS CURRENT ERROR NUMBER
1517 007170   000000                SPEFLG: .WORD   0               ;USED IN $..KBI AND $..WRT
1518 007172   001000                SCOPAD: 1000            ;SAVE AREA FOR SCOPE LOOP ADDRESS
1519 007174   000000                $.$ASF: .WORD   0               ;SPECIAL ASCII INPUT FLAG
```

```
1520 007176  000000                  $SMLD:  .WORD   0               ;USED IN $..ADP
1521 007200  000000                  $WAS:   .WORD   0               ;USED FOR $..ADP
1522                                         .NLIST  BEX
1523 007202    133    103    104    PROMES: .ASCII  /[CDM>]/
1524 007210    133    040    135    DUMMES: .ASCII  /[ ]/
1525 007213    133    113    105    MKBOVF: .ASCII  /[KEYBOARD BUFFER OVERFLOW! REENTER]/
1526 007256    133    111    114    MILOCT: .ASCII  /[ILLEGAL OCTAL INPUT !! REENTER]/
1527 007316    133    111    114    MILDEC: .ASCII  /[ILLEGAL DECIMAL INPUT !! REENTER]/
1528 007360    133    111    114    MILBIN: .ASCII  /[ILLEGAL BINARY INPUT !! REENTER]/
1529 007421    133    111    114    MILEMT: .ASCII  /[ILLEGAL EMT-NUMBER]/
1530 007445    133    102    131    MILADR: .ASCII  /[BYTE ADDRESS IS NOT ALLOWED ]/
1531 007503    133    123    131    MSYERR: .ASCII  /[SYNTAX ERROR ![]/
1532 007524    133    123    103    MILSCP: .ASCII  /[SCOPE LOOP SKIPPED TO A SUBSEQUENT ERROR !![/
1533 007601    133    123    125            .ASCII  /[SUSPECT AN INTERMITTEND HARDWARE ERROR[]/
1534 007652    133    105    122    MERROR: .ASCII  /[ERROR ]/
1535 007662    040    040    040    MERRP2: .ASCII  /   AT LOCATION : ]/
1536 007704    133    120    122    MPWRFL: .ASCII  /[PROGRAM MADE POWER FAIL []/
1537 007737    133    105    122    MERCOV: .ASCII  /[ERROR COUNTER OVERFLOW ON ERROR: ]/
1538 010002    133    056    056    MERHLT: .ASCII  /[...HALT AFTER ERROR...]/
1539 010032    133    117    120    MNOSUB: .ASCII  /[OPTION NOT SUPPORTED IN THIS CDM VERSION]/
1540 010104    133    111    114    MILTR1: .ASCII  /[ILLEGAL INTERRPT OR TRAP TO : ]/
1541 010144    040    040    040    MILTR2: .ASCII  /   FROM: ]/
1542 010156    133    133    133    MVERSN: .ASCII  /[[[[                    CDM V3.5 ---CSS DIAGNOSTIC MONITOR---[[[/
1543 010252    110    111    107            .ASCII  /HIGHEST MEMORY ADDRESS : ]/
1544 010304    133    040    103    MER1:   .ASCII  /[ CONTENT SHOULD BE : ]/
1545 010333    040    040    040    MER2:   .ASCII  /   BUT WAS : ]/
1546 010351    133    133    124    $MNOAV: .ASCII  /[[THIS ADDRESS IS NOT AVAILABLE ON UNIBUS:  ]/
1547 010426    133    115    105    MEMDEF: .ASCII  /[MEMORY MANAGEMENT UNIT IS DEFECT!!!/
1548 010472    133    111    114    MAPER:  .ASCII  /[ILLEGAL MAPPING ADDRESS SPECIFIED!!!![]/
1549 010542    133    127    105            .ASCII  /[WE WILL TRY WITHOUT MEMORY MANAGEMENT[]/
1550 010612    066    135            NO6:    .ASCII  /6]/
1551                                         .EVEN
1552                                         .LIST   BEX
1553                                         .DSABL  LSB
1554 010614                          CDM..E:
```

```
                                .TITLE          IEC11-B TEST
                                .SBTTL  LOCAL MACRO DEFINITIONS
                        ;
                        ;       THIS SECTION CONTAINS ONLY MACROS WHICH ARE
                        ;       USED SEPARATE FROM THE MACRO LIBRARY (NEWMAC).
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                        ;
                                .MACRO  MCLEAR
                                MOV     #BIT5,@CIR              ; CLEAR REGISTERS IN IEC11-A
                                MOV     #BIT3,@CSR              ; CLEAR REGISTERS IN IEC11-B
                                .ENDM   MCLEAR
                        ;
                        ;
                        ;
                        ;
                                .MACRO  DATACC
                                BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
                                BEQ     .-6                     ; IF YES,CONTINUE
                                BIC     #BIT15,@CIR             ; CLEAR "DATA ACC" IN CIR
                                .ENDM   DATACC
                        ;
                        ;
                        ;
                        ;
                                .MACRO  STALL
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                NOP
                                .ENDM
                        ;
                        ;
                        ;
                        ;       THE MACRO "CACS" SETS THE IEC11-A
                        ;       TO CONTROLLER ACTIVE STATE (CONTROLLER IN CHARGE)
                        ;
                                .MACRO  CACS,?A,?B
                                BIS     #BIT0,@CIR                      ; SET SACS
```

LOCAL MACRO DEFINITIONS

```
58                                      BTS     #BIT6,@SMR      ; SET SIC
59                              A:      BIT     #BIT13,@SMR     ; IS SIAS STILL SET ?
60                                      BNE     A               ; IF NOT,TEST AGAIN
61                              B:      BIT     #BIT8,@SMR      ; IS CACS SET ?
62                                      BEQ     B               ; IF NOT,WAIT
63                                      BIC     #177400,@CIR    ;
64                                      .ENDM   CACS
65                              ;
66                              ;
67                              ;
68                              ;
69                              ;
70                              ;
71                              ;
72                              ;
73                              ;
74                              ;
75                              ;
```

```
                                        .SBTTL          INPUT PROCEDURE
010614  032737  000003  007024  BUFPRP: BIT     #3,MEMEND+2             ; MORE THAN 32 K ?
010622  001012                          BNE     1$                      ;
010624                                  IF MEMEND HI #157776 GOTO 1$    ;
010640  013737  007022  026772          MOV     MEMEND,MEMSAV           ;
010646  000403                          BR      2$                      ;
010650  012737  157776  026772  1$:     MOV     #157776,MEMSAV          ; USE 28K FOR BUFFER
010656  013700  026772          2$:     MOV     MEMSAV,R0               ;
010662  162700  000277                  SUB     #277,R0                 ; SAVE ABSOLUTE LOADER AREA
010666  010037  027004                  MOV     R0,BUFBE                ; LAST BYTE ADDRESS OF BUFFER B
010672  012737  031624  026774          MOV     #PRGEND,BUFAB           ; FIRST BYTE ADDRESS OF BUFFER A
010700  013700  027004                  MOV     BUFBE,R0                ; BUILD LENGTH
010704  162700  031623                  SUB     #PRGEND-1,R0            ; IN BYTES
010710  006200                          ASR     R0                      ; OF
010712  042700  100000                  BIC     #BIT15,R0               ;
010716  010037  027000                  MOV     R0,BUFFL                ; BUFFER A OR B
010722  062700  031624                  ADD     #PRGEND,R0              ; BUILD FIRST BYTE ADDRESS OF
010726  010037  027002                  MOV     R0,BUFBB                ; BUFFER B
010732  162700  000001                  SUB     #1,R0                   ; BUILD LAST BYTE ADDRESS
010736  010037  026776                  MOV     R0,BUFAE                ; OF BUFFER A
010742                                  WRITE   MID                     ; IDENTIFY TEST
010752                          RGAIN:  WRITE   MES1                    ; ENTER FIRST REG OF IEC11-A
010762                                  READ    OCT,R0                  ; INPUT REQUEST
010770                                  IF R0 NE #0 GOTO 1$             ;
011000  012700  160010                  MOV     #160010,R0              ; SAVE DEFAULT VALUE
011004  032700  000007          1$:     BIT     #7,R0                   ; CHECK THREE LSB OF INPUT
011010  001360                          BNE     RGAIN                   ; IF NOT CLEAR,REQUEST AGAIN
011012                                  IF R0 LO #160010 GOTO RGAIN     ;
011022                                  IF R0 HI #177776 GOTO RGAIN     ;
011032                                  ADRTST  RGAIN                   ;
011056  010037  026732                  MOV     R0,CIR                  ; SAVE CIR ADDRESS
011062  062700  000002                  ADD     #2,R0                   ; BUILD NEXT ADDRESS
011066                                  ADRTST  RGAIN                   ;
011112  010037  026734                  MOV     R0,SMR                  ; SAVE SMR REG ADDRESS
011116  062700  000002                  ADD     #2,R0                   ; BUILD NEXT ADDRESS
011122                                  ADRTST  RGAIN                   ;
011146  010037  026736                  MOV     R0,IOR                  ; SAVE IOR REG ADDRESS
011152  062700  000001                  ADD     #1,R0                   ; BUILD HIGH-BYTE ADDRESS
011156  010037  026740                  MOV     R0,IORHB                ; OF IOR
011162  062700  000001                  ADD     #1,R0                   ; BUILD NEXT ADDRESS
011166                                  ADRTST  RGAIN                   ;
011212  010037  026742                  MOV     R0,VSR                  ; SAVE VSR REG ADDRESS
011216                          VECAIN: WRITE   MES2                    ; REQUEST VECTOR ADDRESS OF IEC11-A
011226                                  READ    OCT,R0                  ; INPUT REQUEST
011234                                  IF R0 NE #0 GOTO 2$             ;
011244  012700  000270                  MOV     #270,R0                 ; SAVE DEFAULT VALUE
011250                          2$:     IF R0 LO #40 GOTO VECAIN        ;
011260                                  IF R0 HI #774 GOTO VECAIN       ;
011270  020077  015446                  CMP     R0,@VSR                 ; IS INPUT EQUAL TO VSR ?
011274  001406                          BEQ     SAV                     ; IF YES,SAVE INPUT AND CONTINUE
011276                                  WRITE   MES6                    ; IF NOT,WRITE MESSAGE
011306  000137  011216                  JMP     VECAIN                  ; REENTER
011312  010037  026756          SAV:    MOV R0,VECA                     ; SAVE IEC11-A VECTOR ADDRESS
011316                          ADDRIN: WRITE   MES5                    ; REQUEST IEC11-A BUS ADDRESS
011326                                  READ    OCT,R0                  ; INPUT
011334                                  IF R0 HI #36 GOTO ADDRIN        ;
011344                                  IF R0 EQ #0 GOTO DEFA           ;
```

```
134 011354                                      IF RO EQ #35 GOTO DEFA          ;
135 011366  010037  026762                      MOV     RO,IECAAD               ; SAVE IEC11-A BUS ADDRESS
136 011372  000403                              BR      RGBIN                   ; GOTO GET NEXT REGISTER ADDRESS
137 011374  012737  000035  026762  DEFA:       MOV     #35,IECAAD              ; SAVE DEFAULT VALUE
138 011402                          RGBIN:      WRITE   MES3                    ; ENTER FIRST REG OF IEC11-B
139 011412                                      READ OCT,RO                     ; INPUT REQUEST
140 011420                                      IF RO NE #0 GOTO 4$             ;
141 011430  012700  160020                      MOV     #160020,RO              ; SAVE DEFAULT VALUE
142 011434  032700  000007          4$:         BIT     #7,RO                   ; CHECK THREE LSB OF INPUT
143 011440  001360                              BNE     RGBIN                   ; ARE ZERO
144 011442                                      IF RO LO #160020 GOTO RGBIN     ;
145 011452                                      IF RO HI #177776 GOTO RGBIN     ;
146 011462                                      ADRTST  RGBIN                   ;
147 011506  010037  026744                      MOV     RO,CSR                  ; SAVE CSR REG ADDRESS
148 011512  062700  000002                      ADD     #2,RO                   ; BUILD NEXT REG ADDRESS
149 011516                                      ADRTST  RGBIN                   ;
150 011542  010037  026746                      MOV     RO,BCR                  ; SAVE BCR REG ADDRESS
151 011546  062700  000002                      ADD     #2,RO                   ; BUILD NEXT REG ADDRESS
152 011552                                      ADRTST  RGBIN                   ;
153 011576  010037  026750                      MOV     RO,BAR                  ; SAVE BAR REG ADDRESS
154 011602  062700  000002                      ADD     #2,RO                   ; BUILD NEXT REG ADDRESS
155 011606                                      ADRTST  RGBIN                   ;
156 011632  010037  026752                      MOV     RO,MCR                  ; SAVE MCR REG ADDRESS
157 011636  062700  000001                      ADD     #1,RO                   ; BUILD MCR-HIGHBYTE
158 011642  010037  026754                      MOV     RO,MCRHB                ;
159 011646                          VECBIN:     WRITE   MES4                    ; REQUEST IEC11-B VECTOR
160 011656                                      READ    OCT,RO                  ; INPUT REQUEST
161 011664                                      IF RO NE #0 GOTO 5$             ;
162 011674  012700  000274                      MOV     #274,RO                 ; SAVE DEFAULT VALUE
163 011700                          5$:         IF RO LO #40 GOTO VECBIN        ;
164 011710                                      IF RO HI #774 GOTO VECBIN       ;
165 011720  010037  026760                      MOV     RO,VECB                 ; SAVE IEC11-B VECTOR ADDRESS
166 011724                          BDDRIN:     WRITE   MES7                    ; REQUEST IEC11-B BUS ADDRESS
167 011734                                      READ    OCT,RO                  ; INPUT
168 011742                                      IF RO HI #36 GOTO BDDRIN        ;
169 011752                                      IF RO EQ #0 GOTO DEFB           ;
170 011762                                      IF RO EQ #36 GOTO DEFB          ;
171 011774  010037  026764                      MOV     RO,IECBAD               ; SAVE IEC11-B BUS ADDRESS
172 012000  000403                              BR      $..SPC                  ; GOTO TEST SELECT
173 012002  012737  000036  026764  DEFB:       MOV     #36,IECBAD              ; SAVE DEFAULT VALUE
```

```
                                                .SBTTL  TEST SELECT ROUTINE
012010                                  $..SPC: REMVEC  @VECA                   ;
012016                                          REMVEC  @VECB                   ;
012024  005737  007152                          TST     OUTFLG                  ; WAIT FOR ANY OUTPUT COMPLETE
012030  001375                                  BNE     .-4                     ; ...
012032  000005                                  RESET                           ; CLEAR THE WORLD
012034                                          SET6    @@TKS                   ; RE-ENABLE TTY
012042                                  LAB11:  WRITE   MESNEX                  ; REQUEST NEXT TEST TO RUN
012052                                          READ    OCT,R0                  ; WAIT FOR INPUT
012060                                          IF R0 HI #7 GOTO LAB11          ;
012070                                          IF R0 EQ #0 GOTO TESTAL         ;
012100  012737  177777  027024                  MOV     #177777,TSTREP          ; LOOP ON SINGLE TESTS
012106  006300                                  ASL     R0                      ; BUILD WORD OFFSET INTO TABLE
012110  010027                                  MOV     R0,(PC)+                ; AND SAVE
012112  000000                          OFFSET: .WORD   0                       ; HOLDS CURRENT TEST NUMBER
012114  013737  012112  012240          SINGLE: MOV     OFFSET,OFFCNT           ;
012122  062737  012220  012240                  ADD     #TT,OFFCNT              ;
012130  017737  000104  012240                  MOV     @OFFCNT,OFFCNT          ;
012136  004777  000076                          JSR     PC,@OFFCNT              ; GOTO SELECTED TEST
012142  000764                                  BR      SINGLE                  ; REPEAT TEST
012144  012737  000000  027024          TESTAL: MOV     #0,TSTREP               ; NO LOOP ON SINGLE TESTS
012152  012727  012222                          MOV     #TT+2,(PC)+             ; GET ADDRESS OF FIRST TEST
012156  000000                          SEQPNT: .WORD   0                       ; POINTER FOR TEST IN PROGRESS
012160  013737  012156  012240          SEQ:    MOV     SEQPNT,OFFCNT           ; LOAD ADDRESS OF NEXT TEST
012166  017737  000046  012240                  MOV     @OFFCNT,OFFCNT          ;
012174  004777  000040                          JSR     PC,@OFFCNT              ; GOTO EXECUTE TEST
012200  023727  012156  012236                  CMP     SEQPNT,#TTE-4           ; ALL DONE ?
012206  001756                                  BEQ     TESTAL                  ; IF EQ, YES
012210  062737  000002  012156                  ADD     #2,SEQPNT               ; POINT TO NEXT TEST
012216  000760                                  BR      SEQ                     ; AND DO NEXT
012220  000000  012242  013074          TT:     .WORD   0,TEST1,TEST2,TEST3,TEST4,TEST5,TEST6,TEST7
012226  014352  017350  020442
012234  021350  022206
012240  000000                          OFFCNT: .WORD   0                       ;
012242                                  TTE:
```

```
209                                             .SBTTL  TEST 1: REGISTER STATIC TEST
210 012242                              TEST1:  WRITE   ME^8                    ; IDENTIFY TEST 1
211 012252  104000                      REP1:   SCOPE                           ;
212 012254                                      MCLEAR                          ;
213 012270  052777  000161  014446              BIS     #161,@CSR               ; SET ALL R\W BITS IN CSR
214 012276  052777  177777  014442              BIS     #177777,@BCR            ; SET ALL R\W BITS IN BCR
215 012304  052777  177777  014436              BIS     #177777,@BAR            ; SET ALL R\W BITS IN BAR
216 012312  052777  137777  014432              BIS     #137777,@MCR            ; SET ALL R\W BITS IN MCR
217 012320                                      MCLEAR                          ;
218 012334  022777  000000  014370              CMP     #0,@CIR                 ; ALL BITS RESET IN CIR ?
219 012342  001417                              BEQ     1$                      ; IF YES,CONTINUE
220 012344                                      ADP     #0,@CIR                 ;
221 012376                                      ERROR   1.                      ;
222 012402  022777  000000  014324  1$:         CMP     #0,@SMR                 ; ALL BITS RESET IN SMR ?
223 012410  001417                              BEQ     2$                      ; IF YES,CONTINUE
224 012412                                      ADP     #0,@SMR                 ;
225 012444                                      ERROR   2.                      ;
226 012450  022777  000000  014260  2$:         CMP     #0,@IOR                 ; ALL BITS RESET IN IOR ?
227 012456  001417                              BEQ     3$                      ; IF YES,CONTINUE
228 012460                                      ADP     #0,@IOR                 ;
229 012512                                      ERROR   3.                      ;
230 012516  022777  000000  014220  3$:         CMP     #0,@CSR                 ; ALL BITS RESET IN CSR ?
231 012524  001417                              BEQ     4$                      ; IF YES,CONTINUE
232 012526                                      ADP     #0,@CSR                 ;
233 012560                                      ERROR   4.                      ;
234 012564  022777  000000  014154  4$:         CMP     #0,@BCR                 ; ALL BITS RESET IN BCR ?
235 012572  001417                              BEQ     5$                      ; IF YES,CONTINUE
236 012574                                      ADP     #0,@BCR                 ;
237 012626                                      ERROR   5.                      ;
238 012632  022777  000000  014110  5$:         CMP     #0,@BAR                 ; ALL BITS RESET IN BAR ?
239 012640  001417                              BEQ     6$                      ; IF YES,CONTINUE
240 012642                                      ADP     #0,@BAR                 ;
241 012674                                      ERROR   6.                      ;
242 012700  022777  000000  014044  6$:         CMP     #0,@MCR                 ; ALL BITS RESET IN MCR ?
243 012706  001417                              BEQ     7$                      ; IF YES,CONTINUE
244 012710                                      ADP     #0,@MCR                 ;
245 012742                                      ERROR   7.                      ;
246 012746  012746  000060              7$:     MOV     #60,-(SP)               ; SAVE BIT MASK
247 012752  012746  026744                      MOV     #CSR,-(SP)              ; SAVE REGISTER
248 012756  004737  031100                      CALL    REGTST                  ; TEST R/W BITS
249 012762  012746  000100                      MOV     #100,-(SP)              ; SAVE BIT MASK
250 012766  012746  026744                      MOV     #CSR,-(SP)              ; SAVE  REGISTER
251 012772  004737  031100                      CALL    REGTST                  ; TEST R/W BITS
252 012776  012777  000010  013740              MOV     #BIT3,@CSR              ; CLEAR REGISTERS IN IEC11-B
253 013004  012746  177777                      MOV     #177777,-(SP)           ; SAVE BIT MASK
254 013010  012746  026746                      MOV     #BCR,-(SP)              ; SAVE  REGISTER
255 013014  004737  031100                      CALL    REGTST                  ; TEST R/W BITS
256 013020  012746  177777                      MOV     #177777,-(SP)           ; SAVE BIT MASK
257 013024  012746  026750                      MOV     #BAR,-(SP)              ; SAVE REGISTER
258 013030  004737  031100                      CALL    REGTST                  ; TEST R/W BITS
259 013034  012746  137777                      MOV     #137777,-(SP)           ; SAVE BIT MASK
260 013040  012746  026752                      MOV     #MCR,-(SP)              ; SAVE REGISTER
261 013044  004737  031100                      CALL    REGTST                  ; TEST R/W BITS
262 013050  005737  027024                      TST     TSTREP                  ; TEST LOOP SELECTED ?
263 013054  001402                              BEQ     8$                      ; IF NOT,LEAVE THE TEST
264 013056  000137  012252                      JMP     REP1                    ;
265 013062                              8$:     WRITE   MESEND                  ; END OF TEST
```

```
266 013072  000207                 RETURN
```

```
                                        .SBTTL  TEST 2: TALKER AND LISTENER FUNCTION TEST
013074                          TEST2:  WRITE   MES9                    ; IDENTIFY TEST 2
013104  104000                          SCOPE                           ; LOOP FOR ERROR 3
013106                          REP2:   MCLEAR                          ; TEST LOOP ENTRY
013122  052777  000001  013602          BIS     #BIT0,@CIR              ; SET SACS
013130  052777  000100  013576          BIS     #BIT6,@SMR              ; SET SIC
013136  005037  027006                  CLR     CNT1                    ;
013142  032777  020000  013564  1$:     BIT     #BIT13,@SMR             ; IS SIAS STILL SET ?
013150  001405                          BEQ     2$                      ; IF NOT,CONTINUE
013152  005237  027006                  INC     CNT1                    ; IF YES,WAIT A WHILE
013156  001371                          BNE     1$                      ;
013160                                  ERROR   8.                      ;
013164  032777  000400  013542  2$:     BIT     #BIT8,@SMR              ; IS CACS SET ?
013172  001002                          BNE     3$                      ;
013174                                  ERROR   9.                      ;
013200  042777  177400  013524  3$:     BIC     #177400,@CIR            ;
013206  013700  026766                  MOV     TAIND,R0                ; BUILD MTA B
013212  063700  026764                  ADD     IECBAD,R0               ;       "
013216  110077  013514                  MOVB    R0,@IOR                 ; SET B TO TADS
013222  005037  027006                  CLR     CNT1                    ;
013226  032777  100000  013476  4$:     BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
013234  001007                          BNE     5$                      ; IF YES,CONTINUE
013236  005237  027006                  INC     CNT1                    ; IF NOT,WAIT A WHILE
013242  005737  027006                  TST     CNT1                    ; WAITLOOP FINISHED ?
013246  001367                          BNE     4$                      ;
013250                                  ERROR   10.                     ;
013254  042777  100000  013450  5$:     BIC     #BIT15,@CIR             ; CLEAR "DATA ACC" IN CIR
013262  052777  000004  013444          BIS     #BIT2,@SMR              ; GOTO STANDBY STATE,B TO TACS
013270  022777  001204  013446          CMP     #1204,@CSR              ; IS TACS,STATE CH AND INT IN B SET?
013276  001420                          BEQ     LAB1                    ; IF YES CONTINUE
013300                                  ADP     #1204,@CSR              ;
013332                                  ERROR   11.                     ;
013336  104000                          SCOPE                           ; LOOP FOR ERROR 4
013340  042777  001000  013376  LAB1:   BIC     #BIT9,@CSR              ; CLEAR STATE CHANGE IN CSR
013346  022777  000004  013370          CMP     #4,@CSR                 ; TACS SET,STATE CH AND INT CLEAR?
013354  001420                          BEQ     LAB2                    ; IF YES,CONTINUE
013356                                  ADP     #4,@CSR                 ;
013410                                  ERROR   12.                     ;
013414  104000                          SCOPE                           ; LOOP FOR ERROR 5
013416  052777  000002  013310  LAB2:   BIS     #BIT1,@SMR              ; LEAVE STANDBY STATE
013424  022777  001200  013312          CMP     #1200,@CSR              ; STATE CH AND INT SET,TACS CLEAR?
013432  001420                          BEQ     LAB3                    ; IF YES CONTINUE
013434                                  ADP     #1200,@CSR              ;
013466                                  ERROR   13.                     ;
013472  104000                          SCOPE                           ;
013474  042777  001000  013242  LAB3:   BIC     #BIT9,@CSR              ; CLEAR STATE CHANGE IN CSR
013502  013700  026766                  MOV     TAIND,R0                ; BUILD MTA A
013506  063700  026762                  ADD     IECAAD,R0               ;       "
013512  110077  013220                  MOVB    R0,@IOR                 ; A SETS ITSELF TO TACS,UNADDR. OTHER
013516                                  DATACC                          ;
013534  052777  000004  013172          BIS     #BIT2,@SMR              ; GO TO STANDBY STATE
013542  022777  000000  013174          CMP     #0,@CSR                 ; TACS CLEAR ?
013550  001420                          BEQ     LAB4                    ; IF YES,CONTINUE
013552                                  ADP     #0,@CSR                 ;
013604                                  ERROR   14.                     ;
013610  104000                          SCOPE                           ; LOOP FOR ERROR 7
013612  052777  000002  013114  LAB4:   BIS     #BIT1,@SMR              ; LEAVE STANDBY STATE
```

```
013620  013700  026766                  MOV     TAIND,R0        ; BUILD MTA B
013624  063700  026764                  ADD     IECBAD,R0       ;       "
013630  110077  013102                  MOVB    R0,@IOR         ; SET B TO TADS
013634                                  DATACC                  ;
013652  013700  026770                  MOV     LIIND,R0        ; BUILD MLA B
013656  063700  026764                  ADD     IECBAD,R0       ;       "
013662  110077  013050                  MOVB    R0,@IOR         ; SET B TO LADS
013666                                  DATACC                  ;
013704  052777  000004  013022          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,B TO LACS
013712  022777  001202  013024          CMP     #1202,@CSR      ; LACS,STATE CH AND INT SET ?
013720  001417                          BEQ     LAB5            ; IF YES,CONTINUE
013722                                  ADP     #1202,@CSR      ; ELSE ERROR
013754                                  ERROR   15.             ;
013760  104000                  LAB5:   SCOPE                   ; LOOP FOR ERROR 8
013762  042777  001000  012754          BIC     #BIT9,@CSR      ; CLEAR STATE CHANGE IN CSR
013770  022777  000002  012746          CMP     #2,@CSR         ; LACS SET,STATE CHANGE AND INT RESET ?
013776  001417                          BEQ     LAB6            ; IF TRUE,CONTINUE
014000                                  ADP     #2,@CSR         ;
014032                                  ERROR   16.             ;
014036  104000                  LAB6:   SCOPE                   ; LOOP FOR ERROR 9
014040  052777  000002  012666          BIS     #BIT1,@SMR      ; LEAVE STANDBY STATE
014046  022777  001200  012670          CMP     #1200,@CSR      ; STATE CHGE AND INT SET,LACS CLEAR ?
014054  001417                          BEQ     LAB7            ; IF YES,CONTINUE
014056                                  ADP     #1200,@CSR      ;
014110                                  ERROR   17.             ;
014114  042777  001000  012622  LAB7:   BIC     #BIT9,@CSR      ; CLEAR STATE CHGE AND INT
014122  104000                          SCOPE                   ; LOOP FOR ERROR 10
014124  012700  000077                  MOV     #77,R0          ;
014130  110077  012602                  MOVB    R0,@IOR         ; UNLISTEN IEC11-B
014134                                  DATACC                  ;
014152  052777  000004  012554          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE
014160  032777  000002  012556          BIT     #BIT1,@CSR      ; IS LACS RESET ?
014166  001403                          BEQ     LAB8            ; IF YES,CONTINUE
014170                                  ERROR   18.             ;
014174  104000                          SCOPE                   ; LOOP FOR ERROR 11
014176  052777  000002  012530  LAB8:   BIS     #BIT1,@SMR      ; LEAVE STANDBY STATE
014204  013700  026770                  MOV     LIIND,R0        ; BUILD MLA B
014210  063700  026764                  ADD     IECBAD,R0       ;       "
014214  110077  012516                  MOVB    R0,@IOR         ; SET B TO LADS
014220                                  DATACC                  ;
014236  013700  026766                  MOV     TAIND,R0        ; BUILD MTA B
014242  063700  026764                  ADD     IECBAD,R0       ;       "
014246  110077  012464                  MOVB    R0,@IOR         ; SET B TO TADS
014252  052777  000004  012454          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,SET B TO TACS
014260  022777  001204  012456          CMP     #1204,@CSR      ; TACS,STATE CHGE AND INT SET ?
014266  001417                          BEQ     LAB9            ; IF YES,CONTINUE
014270                                  ADP     #1204,@CSR      ;
014322                                  ERROR   19.             ;
014326  005737  027024          LAB9:   TST     TSTREP          ; TEST LOOP SELECTED ?
014332  001402                          BEQ     1$              ; IF NOT,LEAVE THE TEST
014334  000137  013106                  JMP     REP2            ;
014340                          1$:     WRITE   MESEND          ; END OF TEST
014350  000207                          RETURN
```

```
                                                .SBTTL TEST 3: GENERAL INTERRUPT AND DMA FUNCTION TEST
                                        TEST3:  WRITE   MES10                   ;
                                                TST     OUTFLG                  ; WAIT FOR ANY OUTPUT COMPLETE
                                                BNE     .-4                     ; ...
                                                SCOPE                           ;
                                        REP3:   MCLEAR                          ;
                                                CACS                            ;
                                                SETVEC  @VECB,@INTTST,@340      ;
                                                MOV     LIIND,R0                ; BUILD MLA B
                                                ADD     IECBAD,R0               ;       "
                                                MOVB    R0,@IOR                 ; SET B TO LADS
                                                DATACC                          ;
                                                MOV     TAIND,R0                ; BUILD MTA A
                                                ADD     IECAAD,R0               ;       "
                                                MOVB    R0,@IOR                 ; SET A TO TADS
                                                DATACC                          ;
                                                BIS     @BIT2,@SMR              ; GOTO STANDBY ,SET A TO TACS,B TO LACS
                                                CLR     INTFLG                  ;
                                        STCHGE: BIS     @BIT6,@CSR              ; ENABLE INTERRUPT
                                                MOV     @177000,CNT1            ; PREPARE DELAY
                                        1$:     TST     INTFLG                  ; HAS INTERRUPT OCCURRED ?
                                                BNE     2$                      ; IF YES,CONTINUE
                                                INC     CNT1                    ;
                                                BNE     1$                      ;
                                                BIC     @BIT6,@CSR              ; DISABLE INTERRUPTS
                                                ERROR   20.                     ;
                                        2$:     BIT     @100,@CSR               ; IS INTERRUPT ENABLE BIT RESET ?
                                                BEQ     3$                      ; IF YES,CONTINUE
                                                ERROR   21.                     ;
                                        3$:     CMP     @1202,@CSR              ; CAUSED STATE CHGE THE INTERRUPT ?
                                                BEQ     NEXBIT                  ; IF YES,CONTINUE
                                                ADP     @1202,@CSR              ;
                                                ERROR   22.                     ;
                                                SCOPE                           ;
                                        NEXBIT: SETVEC  @VECB,@INTSRV,@340      ;
                                                CLR     NEXFLG                  ;
                                                BIC     @177400,@CSR            ; CLEAR INTERRUPT CAUSING BITS
                                                CMP     @157776,MEMEND          ;
                                                BNE     NEX1                    ;
                                                CMP     @3,MEMEND+2             ; 128K MEMORY ?
                                                BNE     NEX1                    ;
                                                MOV     @NEXMEM,@04             ; SETUP VECTOR
                                                BIS     @60,@CSR                ; ENABLE ADDRESSING OVER 32K
                                                MOV     @160000,R0              ; TRY FIRST ADDRESS IN I/O PAGE
                                        1$:     TST     (R0)                    ; NON-EXISTANT ADDRESS?
                                                TST     NEXFLG                  ;
                                                BNE     2$                      ;
                                                ADD     @2,R0                   ; IF NOT,TRY NEXT ONE
                                                BR      1$                      ;
                                        2$:     MOV     @6,@04                  ; REBUILD VECTOR
                                                MOV     R0,@BAR                 ; NEX-ADDRESS TO BAR
                                                MOV     @1,@BCR                 ; PREPARE BCR
                                                BIS     @101,@CSR               ; ENABLE INTERRUPT AND FUNCTION (DMA)
                                                MOVB    @252,@IOR               ; DUMMY VALUE TO OUTPUT REGISTER
                                                MOV     @177000,CNT1            ; PREPARE DELAY
                                        6$:     BIT     @BIT15,@CIR             ; DATA ACCEPTED ?
                                                BNE     3$                      ; IF YES,CONTINUE
```

```
 436 015072  005237  027006                    INC     CNT1            ; IF NOT,WAIT A WHILE
 437 015076  005737  027006                    TST     CNT1            ; WAITLOOP FINISHED ?
 438 015102  001367                            BNE     6$              ;
 439 015104                                    ERROR   23.             ;
 440 015110  032777  000100  011626  3$:       BIT     @BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
 441 015116  001410    .                       BEQ     4$              ; IF YES,CONTINUE
 442 015120  005237  027006                    INC     CNT1            ;
 443 015124  001371                            BNE     3$              ;
 444 015126  042777  000100  011610            BIC     @BIT6,@CSR      ; DISABLE INTERRUPTS
 445 015134                                    ERROR   24.             ;
 446 015140  022777  100262  011576  4$:       CMP     @100262,@CSR    ; CAUSED NXM THE INTERRUPT ?
 447 015146  001417                            BEQ     5$              ; IF YES,CONTINUE
 448 015150                                    ADP     @100262,@CSR    ;
 449 015202                                    ERROR   25.             ;
 450 015206  000137  016216          5$:       JMP     @COVFL          ;
 451 015212  104000                            SCOPE                   ;
 452 015214  042777  177760  011522  NEX1:     BIC     @177760,@CSR   ; CLEAR INTERRUPT CAUSING BITS
 453 015222  032737  000002  007024            BIT     @2,MEMEND+2     ; MEMORY EXISTS ?
 454 015230  001075                            BNE     NEX2            ;
 455 015232  052777  000040  011504            BIS     @40,@CSR        ; SELECT BUS ADDRESS 400000
 456 015240  012777  000000  011502            MOV     @0,@BAR         ;
 457 015246  012777  000001  011472            MOV     @1,@BCR         ; PREPARE BCR
 458 015254  052777  000101  011462            BIS     @101,@CSR       ; ENABLE INTERRUPT AND FUNCTION (DMA)
 459 015262  112777  000252  011446            MOVB    @252,@IOR       ; DUMMY VALUE TO OUTPUT REGISTER
 460 015270  012737  177000  027006            MOV     @177000,CNT1    ; PREPARE DELAY
 461 015276  032777  100000  011426  5$:       BIT     @BIT15,@CIR     ; DATA ACCEPTED ?
 462 015304  001007                            BNE     1$              ; IF YES,CONTINUE
 463 015306  005237  027006                    INC     CNT1            ; IF NOT,WAIT A WHILE
 464 015312  005737  027006                    TST     CNT1            ; WAITLOOP FINISHED ?
 465 015316  001367                            BNE     5$              ;
 466 015320                                    ERROR   26.             ;
 467 015324  032777  000100  011412  1$:       BIT     @BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
 468 015332  001410                            BEQ     2$              ; IF YES,CONTINUE
 469 015334  005237  027006                    INC     CNT1            ;
 470 015340  001371                            BNE     1$              ;
 471 015342  042777  000100  011374            BIC     @BIT6,@CSR      ; DISABLE INTERRUPTS
 472 015350                                    ERROR   27.             ;
 473 015354  022777  100242  011362  2$:       CMP     @100242,@CSR    ; CAUSED NXM THE INTERRUPT ?
 474 015362  001420                            BEQ     NEX2            ; IF YES,CONTINUE
 475 015364                                    ADP     @100242,@CSR    ;
 476 015416                                    ERROR   28.             ;
 477 015422  104000                            SCOPE                   ;
 478 015424  042777  177760  011312  NEX2:     BIC     @177760,@CSR   ;
 479 015432  032737  000001  007024            BIT     @1,MEMEND+2     ; MEMORY EXISTS ?
 480 015440  001072                            BNE     NEX3            ;
 481 015442  052777  000020  011274            BIS     @20,@CSR        ; SELECT BUS ADDRESS 200000
 482 015450  012777  000000  011272            MOV     @0,@BAR         ;
 483 015456  052777  000101  011260            BIS     @101,@CSR       ; ENABLE INTERRUPT AND FUNCTION (DMA)
 484 015464  112777  000252  011244            MOVB    @252,@IOR       ; DUMMY VALUE TO OUTPUT REGISTER
 485 015472  012737  177000  027006            MOV     @177000,CNT1    ; PREPARE DELAY
 486 015500  032777  100000  011224  5$:       BIT     @BIT15,@CIR     ; DATA ACCEPTED ?
 487 015506  001007                            BNE     2$              ; IF YES,CONTINUE
 488 015510  005237  027006                    INC     CNT1            ; IF NOT,WAIT A WHILE
 489 015514  005737  027006                    TST     CNT1            ; WAITLOOP FINISHED ?
 490 015520  001367                            BNE     5$              ;
 491 015522                                    ERROR   29.             ;
 492 015526  032777  000100  011210  2$:       BIT     @BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
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                                        BEQ     3$                      ; IF YES,CONTINUE
                                        INC     CNT1                    ;
                                        BNE     2$                      ;
                                        BIC     #BIT6,@CSR              ; DISABLE INTERRUPTS
                                        ERROR   30.                     ;
                                3$:     CMP     #100222,@CSR            ; CAUSED NXM THE INTERRUPT ?
                                        BEQ     NEX3                    ; IF YES,CONTINUE
                                        ADP     #100222,@CSR            ;
                                        ERROR   31.                     ;
                                        SCOPE                           ;
                                NEX3:   BIC     #177760,@CSR            ;
                                        BIT     #BIT15,MEMEND           ; MEMORY EXISTS ?
                                        BNE     NEX4                    ;
                                        MOV     #100000,@BAR            ; SELECT BUS ADDRESS 100000
                                        BIS     #101,@CSR               ; ENABLE INTERRUPT AND FUNCTION (DMA)
                                        MOVB    #252,@IOR               ; DUMMY VALUE TO OUTPUT REGISTER
                                        MOV     #177000,CNT1            ; PREPARE DELAY
                                5$:     BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
                                        BNE     2$                      ; IF YES,CONTINUE
                                        INC     CNT1                    ; IF NOT,WAIT A WHILE
                                        TST     CNT1                    ; WAITLOOP FINISHED ?
                                        BNE     5$                      ;
                                        ERROR   32.                     ;
                                2$:     BIT     #BIT6,@CSR              ; HAS INTERRUPT OCCURRED ?
                                        BEQ     3$                      ; IF YES,CONTINUE
                                        INC     CNT1                    ;
                                        BNE     2$                      ;
                                        BIC     #BIT6,@CSR              ; DISABLE INTERRUPTS
                                        ERROR   33.                     ;
                                3$:     CMP     #100202,@CSR            ; CAUSED NXM THE INTERRUPT ?
                                        BEQ     NEX4                    ; IF YES,CONTINUE
                                        ADP     #100202,@CSR            ;
                                        ERROR   34.                     ;
                                        SCOPE                           ;
                                NEX4:   BIC     #177400,@CSR            ; CLEAR INTERRUPT CAUSING BITS
                                        BIT     #BIT14,MEMEND           ; MEMORY EXISTS ?
                                        BNE     BCOVFL                  ;
                                        MOV     #40000,@BAR             ; SELECT BUS ADDRESS 40000
                                        BIS     #101,@CSR               ; ENABLE INTERRUPT AND FUNCTION (DMA)
                                        MOVB    #252,@IOR               ; DUMMY VALUE TO OUTPUT REGISTER
                                        MOV     #177000,CNT1            ; PREPARE DELAY
                                5$:     BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
                                        BNE     1$                      ; IF YES,CONTINUE
                                        INC     CNT1                    ; IF NOT,WAIT A WHILE
                                        TST     CNT1                    ; WAITLOOP FINISHED ?
                                        BNE     5$                      ;
                                        ERROR   35.                     ;
                                1$:     BIT     #BIT6,@CSR              ; HAS INTERRUPT OCCURRED ?
                                        BEQ     2$                      ; IF YES,CONTINUE
                                        INC     CNT1                    ;
                                        BNE     1$                      ;
                                        BIC     #BIT6,@CSR              ; DISABLE INTERRUPTS
                                        ERROR   36.                     ;
                                2$:     CMP     #100202,@CSR            ; CAUSED NXM THE INTERRUPT ?
                                        BEQ     BCOVFL                  ; IF YES,CONTINUE
                                        ADP     #100202,@CSR            ;
                                        ERROR   37.                     ;
```

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550 016214 104000                      SCOPE                   ;
551 016216 042777 177760 010520 BCOVFL: BIC    #177760,@CSR    ; CLEAR INTERRUPT CAUSING BITS
552 016224 012777 177777 010514         MOV    #177777,@BCR    ; PREPARE BCR WITH HIGHEST VALUE
553 016232 013777 027002 010510         MOV    BUFBB,@BAR      ; FIRST BUFFER ADDRESS
554 016240 052777 000101 010476         BIS    #101,@CSR       ; SET INTERRUPT ENABLE AND FUNCTION BIT
555 016246 112777 000252 010462         MOVB   #252,@IOR       ; DUMMY VALUE TO I/O REGISTER
556 016254 012737 177000 027006         MOV    #177000,CNT1    ; PREPARE DELAY
557 016262 032777 100000 010442 5$:     BIT    #BIT15,@CIR     ; DATA ACCEPTED ?
558 016270 001007                       BNE    1$              ; IF YES,CONTINUE
559 016272 005237 027006                INC    CNT1            ; IF NOT,WAIT A WHILE
560 016276 005737 027006                TST    CNT1            ; WAITLOOP FINISHED ?
561 016302 001367                       BNE    5$              ;
562 016304                              ERROR  38.             ;
563 016310 032777 000100 010426 1$:     BIT    #BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
564 016316 001410                       BEQ    2$              ; IF YES,CONTINUE
565 016320 005237 027006                INC    CNT1            ;
566 016324 001371                       BNE    1$              ;
567 016326 042777 000100 010410         BIC    #BIT6,@CSR      ; DISABLE INTERRUPTS
568 016334                              ERROR  39.             ;
569 016340 022777 004202 010376 2$:     CMP    #4202,@CSR      ; CAUSED BC OVFL THE INTERRUPT ?
570 016346 001420                       BEQ    ENDBIT          ; IF YES,CONTINUE
571 016350                              ADP    #4202,@CSR      ;
572 016402                              ERROR  40.             ;
573 016406 104000                      SCOPE                   ;
574 016410 042777 177400 010326 ENDBIT: BIC    #177400,@CSR    ; CLEAR INTERRUPT CAUSING BITS
575 016416 013777 027002 010324         MOV    BUFBB,@BAR      ; FIRST BUFFER ADDRESS
576 016424 012777 000001 010314         MOV    #1,@BCR         ; PREPARE BYTE COUNT REGISTER
577 016432 012777 100777 010312         MOV    #100777,@MCR    ; PREPARE MATCH CHARACTER
578 016440 052777 000101 010276         BIS    #101,@CSR       ; ENABLE FUNCTION (DMA) AND INTERRUPT
579 016446 112777 000377 010262         MOVB   #377,@IOR       ; FIRST BYTE IN I/O REGISTER
580 016454 012737 177000 027006         MOV    #177000,CNT1    ; PREPARE DELAY
581 016462 032777 100000 010242 5$:     BIT    #BIT15,@CIR     ; DATA ACCEPTED ?
582 016470 001007                       BNE    1$              ; IF YES,CONTINUE
583 016472 005237 027006                INC    CNT1            ; IF NOT,WAIT A WHILE
584 016476 005737 027006                TST    CNT1            ; WAITLOOP FINISHED ?
585 016502 001367                       BNE    5$              ;
586 016504                              ERROR  41.             ;
587 016510 032777 000100 010226 1$:     BIT    #BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
588 016516 001410                       BEQ    2$              ; IF YES,CONTINUE
589 016520 005237 027006                INC    CNT1            ;
590 016524 001371                       BNE    1$              ;
591 016526 042777 000100 010210         BIC    #BIT6,@CSR      ; DISABLE INTERRUPTS
592 016534                              ERROR  42.             ;
593 016540 022777 002202 010176 2$:     CMP    #2202,@CSR      ; CAUSED "END" THE INTERRUPT ?
594 016546 001417                       BEQ    3$              ; IF YES,CONTINUE
595 016550                              ADP    #2202,@CSR      ;
596 016602                              ERROR  43.             ;
597 016606 005737 027024        3$:     TST    TSTREP          ; TEST LOOP SELECTED ?
598 016612 001403                       BEQ    PR              ; IF NOT,DO THE REST OF TEST
599 016614 000137 014372                JMP    REP3            ;
600 016620 104000                      SCOPE                   ;
601 016622                      PR:     REMVEC #VECB           ;
602 016630                              MCLEAR                 ;
603 016644                              CACS                   ;
604 016706 013700 026766                MOV    TAIND,R0        ; BUILD MTA A
605 016712 063700 026762                ADD    IECAAD,R0       ;       "
606 016716 110077 010014                MOVB   R0,@IOR         ; SET B TO TADS
```

```
                                        DATACC                  ;
                                        MOV     LIIND,R0        ; BUILD MLA B
                                        ADD     IECBAD,R0       ;       "
                                        MOVB    R0,@IOR         ; SET A TO LADS
                                        DATACC                  ;
                                        BIS     #BIT2,@SMR      ; GOTO STANDBY STATE
                                        SETVEC  #VECB,#PRIOR,#340 ;
                                        PSET    #340            ; SETUP PSW
                                        BIS     #BIT6,@CSR      ; ENABLE INTERRUPT
                                PR1:    NOP                     ;
                                        NOP                     ;
                                        MOV     #PRI7,R3        ; GET PRINTOUT ADDR. BR7
                                        PSET    #300            ; ALLOW BR7
                                        NOP                     ;
                                        NOP                     ;
                                        BR      PR2             ; GOTO PRIORITY 6
                                PRI7:   WRITE   MES13           ;
                                        JMP     PRIEX           ; LEAVE TEST 3
                                PR2:    MOV     #PRI6,R3        ; GET PRINTOUT ADDR. BR6
                                        PSET    #240            ; ALLOW BR6
                                        NOP                     ;
                                        NOP                     ;
                                        BR      PR3             ; GOTO PRIORITY 5
                                PRI6:   WRITE   MES14           ;
                                        JMP     PRIEX           ; LEAVE TEST 3
                                PR3:    MOV     #PRI5,R3        ; GET PRINTOUT ADDR. BR5
                                        PSET    #200            ; ALLOW BR5
                                        NOP                     ;
                                        NOP                     ;
                                        BR      PR4             ; GOTO PRIORITY 4
                                PRI5:   WRITE   MES15           ;
                                        JMP     PRIEX           ; LEAVE TEST 3
                                PR4:    MOV     #PRI4,R3        ; GET PRINTOUT ADDR. BR4
                                        PSET    #140            ; ALLOW BR4
                                        NOP                     ;
                                        NOP                     ;
                                        BR      PRERR           ; GOTO ERROR
                                PRI4:   WRITE   MES16           ;
                                        JMP     PRIEX           ; LEAVE TEST 3
                                PRERR:  ERROR   44.             ; NO INTERRUPT OCCURED
                                PRIEX:  REMVEC  #VECB           ;
                                        WRITE   MESEND          ; END OF TEST
                                        RETURN                  ;
```

TEST 4: DMA-TRANSFER FROM B TO A (B IS TALKER)

```
                                                .SBTTL TEST 4: DMA-TRANSFER FROM B TO A (B IS TALKER)
017350                                  TEST4:  WRITE   MES11
017360  005737  027024                        TST     TSTREP                  ; TEST LOOP SELECTED ?
017364  001004                                BNE     BCIN4                   ;
017366  013737  027000  027020                MOV     BUFFL,BCINP             ; USE MAXIMAL BUFFER LENGTH
017374  000425                                BR      REP4                    ;
017376                                  BCIN4:  WRITE   MES17                   ; REQUEST BYTE COUNT
017406                                          DUMP    OCT,BUFFL               ; MAXIMAL INPUT
017420                                          READ    OCT,R0                  ;
017426                                          IF R0 HI BUFFL GOTO BCIN4       ;
017436                                          IF R0 EQ #0 GOTO BCIN4          ;
017444  010037  027020                        MOV     R0,BCINP                ; SAVE BYTE COUNT
017450  005737  007152                  REP4:   TST     OUTFLG                  ; WAIT FOR ANY OUTPUT COMPLETE
017454  001375                                BNE     .-4                     ; ...
017456  104000                                SCOPE                           ;
017460                                          REMVEC  #VECB                   ;
017466  005037  027006                        CLR     CNT1                    ;
017472  013700  027002                        MOV     BUFBB,R0                ; PREPARE
017476  005001                          1$:   CLR     R1                      ; BUFFER B
017500  110120                          2$:   MOVB    R1,(R0)+                ; WITH
017502  005237  027006                        INC     CNT1                    ;
017506  023737  027006  027000                CMP     CNT1,BUFFL              ; CONSECUTIVE
017514  001405                                BEQ     3$                      ; VALUES
```

```
675 017516  005201                          INC     R1                      ; FROM
676 017520  022701  000400                  CMP     #400,R1                 ; 0-377
677 017524  001365                          BNE     2$                      ; OCTAL
678 017526  000763                          BR      1$                      ;
679 017530  013700  026774          3$:     MOV     BUFAB,R0                ; SET ALL
680 017534  112720  000377          4$:     MOVB    #377,(R0)+              ; BITS
681 017540  020037  027002                  CMP     R0,BUFBB                ; IN
682 017544  001373                          BNE     4$                      ; BUFFER A
683 017546                                  MCLEAR                          ;
684 017562                                  CACS                            ;
685 017624  013700  026766                  MOV     TAIND,R0                ; BUILD MTA B
686 017630  063700  026764                  ADD     IECBAD,R0               ;       "
687 017634  110077  007076                  MOVB    R0,@IOR                 ; SET B TO TADS
688 017640                                  DATACC                          ;
689 017656  013700  026770                  MOV     LIIND,R0                ; BUILD MLA A
690 017662  063700  026762                  ADD     IECAAD,R0               ;       "
691 017666  110077  007044                  MOVB    R0,@IOR                 ; SET A TO LADS
692 017672                                  DATACC                          ;
693 017710  052777  000004  007016          BIS     #BIT2,@SMR              ; GOTO STANDBY STATE
694 017716  104000                          SCOPE                           ;
695 017720  042777  177400  007016          BIC     #177400,@CSR            ; CLEAR INTERRUPT CAUSING BITS
696 017726  013777  027002  007014          MOV     BUFBB,@BAR              ; FIRST BUFFER ADDRESS
697 017734  013700  027020                  MOV     BCINP,R0                ; PREPARE BYTE COUNT REGISTER
698 017740  005400                          NEG     R0                      ;       "
699 017742  010077  007000                  MOV     R0,@BCR                 ;       "
700 017746  013701  026774                  MOV     BUFAB,R1                ; POINTER TO BUFFER A
701 017752                                  SETVEC  #VECB,#INTSRV,#340      ;
702 017770  052777  000101  006746          BIS     #101,@CSR               ; ENABLE FUNCTION (DMA) AND INTERRUPT
703 017776  005037  027010                  CLR     CNT2                    ;
704 020002  005037  027014                  CLR     DONE                    ;
705 020006  005037  027006                  CLR     CNT1                    ;
706 020012  032777  100000  006712  5$:     BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
707 020020  001013                          BNE     DMA4                    ; IF YES,CONTINUE
708 020022  005237  027006                  INC     CNT1                    ; IF NOT,WAIT A WHILE
709 020026  005737  027006                  TST     CNT1                    ; WAITLOOP FINISHED ?
710 020032  001367                          BNE     5$                      ;
711 020034                                  ERROR   45.                     ;
712 020040  032777  100000  006664  ACC4:   BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
713 020046  001774                          BEQ     ACC4                    ; IF YES,CONTINUE
714 020050  032777  000100  006666  DMA4:   BIT     #100,@CSR               ; HAS INTERRUPT OCCURRED ?
715 020056  001410                          BEQ     INTB4                   ; IF YES,GET LAST BYTE
716 020060  042777  100000  006644          BIC     #BIT15,@CIR             ;
717 020066  117721  006646                  MOVB    @IORHB,(R1)+            ; DATA TO BUFFER A
718 020072  005237  027010                  INC     CNT2                    ; BYTE COUNTER
719 020076  000760                          BR      ACC4                    ;
720 020100  012737  150000  027006  INTB4:  MOV     #150000,CNT1            ; PREPARE DELAY AFTER INTERRUPT B
721 020106  005237  027006          LAST4:  INC     CNT1                    ;
722 020112  005737  027006                  TST     CNT1                    ;
723 020116  001426                          BEQ     10$                     ;
724 020120  032777  100000  006604          BIT     #BIT15,@CIR             ; DATA ACCEPTED ?
725 020126  001767                          BEQ     LAST4                   ; IF NOT,WAIT
726 020130  005237  027010          9$:     INC     CNT2                    ; IF YES,CHECK FOR
727 020134  005737  027014                  TST     DONE                    ; CORRECT BYTE COUNT
728 020140  001023                          BNE     11$                     ;
729 020142  042777  100000  006562          BIC     #BIT15,@CIR             ;
730 020150  117721  006564                  MOVB    @IORHB,(R1)+            ; BYTE TO BUFFER A
731 020154  023737  027010  027020          CMP     CNT2,BCINP              ; ALL BYTES DONE ?
```

```
 732 020162  001351                        BNE     LAST4           ; IF YES,
 733 020164  052737  177777  027014        BIS     #177777,DONE    ; SET FLAG
 734 020172  000745                        BR      LAST4           ;
 735 020174  005737  027014          10$:  TST     DONE            ; ALL DONE ?
 736 020200  001005                        BNE     12$             ;
 737 020202                                ERROR   46.             ; NOT ALL BYTES TRANSFERRED
 738 020206  000402                        BR      12$             ;
 739 020210                          11$:  ERROR   47.             ; TO MANY BYTES TRANSFERRED
 740 020214  022777  004204  006522  12$:  CMP     #4204,@CSR      ; CAUSED "BC OVFL" THE INTERRUPT
 741 020222  001417                        BEQ     13$             ; IF YES,CONTINUE
 742 020224                                ADP     #4204,@CSR      ;
 743 020256                                ERROR   48.             ;
 744 020262  013700  026774          13$:  MOV     BUFAB,R0        ; PROVIDE FIRST BYTE OF BUFFER A
 745 020266  013701  027002                MOV     BUFBB,R1        ; PROVIDE FIRST BYTE OF BUFFER B
 746 020272  005037  027006                CLR     CNT1            ;
 747 020276  005237  027006          CMP4: INC     CNT1            ; BYTE COUNT
 748 020302  122021                        CMPB    (R0)+,(R1)+     ; BUFFER A EQUAL TO BUFFER B
 749 020304  001440                        BEQ     14$             ; IF YES,CONTINUE
 750 020306  114037  027026                MOVB    -(R0),ASAVE     ; IF NOT,SAVE DATA
 751 020312  114137  027030                MOVB    -(R1),BSAVE     ;
 752 020316  032737  040000  007160        BIT     #BIT14,PSDSWR   ; PRINTOUT ALLOWED ?
 753 020324  001030                        BNE     14$             ;
 754 020326                                WRITE   MES18           ; WRITE BYTE COUNT
 755 020336                                DUMP    OCT,CNT1        ; DUMP NUMBER
 756 020350                                ADP     BSAVE,ASAVE     ;
 757 020402                                ERROR   49.             ;
 758 020406  023737  027006  027020  14$:  CMP     CNT1,BCINP      ; ALL BYTES COMPARED ?
 759 020414  001330                        BNE     CMP4            ; IF NOT,GET NEXT ONE
 760 020416  005737  027024                TST     TSTREP          ; TEST LOOP SELECTED ?
 761 020422  001402                        BEQ     15$             ; IF NOT,LEAVE THE TEST
 762 020424  000137  017450                JMP     REP4            ;
 763 020430                          15$:  WRITE   MESEND          ; END OF TEST
 764 020440  000207                        RETURN
```

```
                                        .SBTTL TEST 5: DMA-TRANSFER FROM A TO B (B IS LISTENER)
020442                          TEST5:  WRITE   MES12
020452  005737  027024                  TST     TSTREP          ; TEST LOOP SELECTED ?
020456  001004                          BNE     BCIN5           ;
020460  013737  027000  027020          MOV     BUFFL,BCINP     ; USE MAXIMAL BUFFER LENGTH
020466  000425                          BR      REP5            ;
020470                          BCIN5:  WRITE   MES17           ; REQUEST BYTE COUNT
020500                                  DUMP    OCT,BUFFL       ; MAXIMAL INPUT
020512                                  READ    OCT,R0          ;
020520                                  IF R0 MI BUFFL GOTO BCIN5       ;
020530                                  IF R0 EQ #0 GOTO BCIN5          ;
020536  010037  027020                  MOV     R0,BCINP        ; SAVE BYTE COUNT
020542  005737  007152          REP5:   TST     OUTFLG          ; WAIT FOR ANY OUTPUT COMPLETE
020546  001375                          BNE     .-4             ; ...
020550  104000                          SCOPE                   ;
020552                                  REMVEC  #VECB           ;
020560  013700  026774                  MOV     BUFAB,R0        ; PREPARE
020564  005001                  1$:     CLR     R1              ; BUFFER A
020566  110120                  2$:     MOVB    R1,(R0)+        ; WITH
020570  020037  027002                  CMP     R0,BUFBB        ; CONSECUTIVE
020574  001405                          BEQ     3$              ; VALUES
020576  005201                          INC     R1              ; FROM
020600  022701  000400                  CMP     #400,R1         ; 0-377
020604  001370                          BNE     2$              ; OCTAL
020606  000766                          BR      1$              ;
020610  005037  027006          3$:     CLR     CNT1            ; SET
020614  013700  027002                  MOV     BUFBB,R0        ; ALL
020620  112720  000377          4$:     MOVB    #377,(R0)+      ; BITS
020624  005237  027006                  INC     CNT1            ; IN
020630  023737  027000  027006          CMP     BUFFL,CNT1      ; BUFFER
020636  001370                          BNE     4$              ; A
020640                                  MCLEAR                  ;
020654                                  CACS                    ;
020716  013700  026766                  MOV     TAIND,R0        ; BUILD MTA A
020722  063700  026762                  ADD     IECAAD,R0       ;       "
020726  110077  006004                  MOVB    R0,@IOR         ; SET A TO TADS
020732                                  DATACC                  ;
020750  013700  026770                  MOV     LIIND,R0        ; BUILD MLA B
020754  063700  026764                  ADD     IECBAD,R0       ;       "
020760  110077  005752                  MOVB    R0,@IOR         ; SET B TO LADS
020764                                  DATACC                  ;
021002  052777  000004  005724          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE
021010  104000                          SCOPE                   ;
021012  042777  177400  005724          BIC     #177400,@CSR    ; CLEAR INTERRUPT CAUSING BITS
021020  013777  027002  005722          MOV     BUFBB,@BAR      ; FIRST BUFFER ADDRESS
021026  013700  027020                  MOV     BCINP,R0        ; PREPARE BYTE COUNT REGISTER
021032  005400                          NEG     R0              ;       "
021034  010077  005706                  MOV     R0,@BCR         ;       "
021040  013701  026774                  MOV     BUFAB,R1        ; POINTER TO BUFFER A
021044                                  SETVEC  #VECB,#INTSRV,#340      ;
021062  052777  000101  005654          BIS     #101,@CSR       ; ENABLE FUNCTION (DMA) AND INTERRUPT
021070  112177  005642          5$:     MOVB    (R1)+,@IOR      ; DATA BYTE TO I/O REGISTER
021074                                  DATACC                  ;
021112  032777  000100  005624          BIT     #100,@CSR       ; HAS INTERRUPT OCCURRED ?
021120  001363                          BNE     5$              ; IF NOT,CONTINUE DMA
021122  022777  004202  005614          CMP     #4202,@CSR      ; CAUSED "BC OVFL" THE INTERRUPT
021130  001417                          BEQ     6$              ; IF YES,CONTINUE
```

```
                                                        ADP     @4202,BCSR      ;
                                                        ERROR   50.             ;
021170  013700  026774          6$:                    MOV     BUFAB,R0        ; PROVIDE FIRST BYTE OF BUFFER A
021174  013701  027002                                  MOV     BUFBB,R1        ; PROVIDE FIRST BYTE OF BUFFER B
021200  005037  027006                                  CLR     CNT1            ;
021204  005237  027006          CMP5:                  INC     CNT1            ; BYTE COUNT
021210  122021                                         CMPB    (R0)+,(R1)+     ; BUFFER A EQUAL TO BUFFER B ·
021212  001440                                         BEQ     7$              ; IF YES,CONTINUE
021214  114037  027026                                 MOVB    -(R0),ASAVE     ; IF NOT,SAVE DATA
021220  114137  027030                                 MOVB    -(R1),BSAVE     ;
021224  032737  040000  007160                         BIT     @BIT14,PSDSWR   ; PRINTOUT ALLOWED ?
021232  001030                                         BNE     7$              ;
021234                                                 WRITE   MES18           ;
021244                                                 DUMP    OCT,CNT1        ; WRITE BYTE COUNT
021256                                                 ADP     ASAVE,BSAVE     ; DUMP NUMBER
021310                                                 ERROR   51.             ;
021314  023737  027006  027020  7$:                    CMP     CNT1,BCINP      ; ALL BYTES COMPARED ?
021322  001330                                         BNE     CMP5            ; IF NOT,GET NEXT ONE
021324  005737  027024                                 TST     TSTREP          ; TEST LOOP SELECTED ?
021330  001402                                         BEQ     8$              ; IF NOT,LEAVE THE TEST
021332  000137  020542                                 JMP     REP5            ;
021336                          8$:                    WRITE   MESEND          ; END OF TEST
021346  000207                                         RETURN
```

```
                                                .SBTTL TEST 6: MATCH CHARACTER REGISTER TEST (B IS LISTENER)
021350                                  TEST6:  WRITE   MES19
021360  005737  007152                        TST     OUTFLG                  ; WAIT FOR ANY OUTPUT COMPLETE
021364  001375                                BNE     .-4                     ; ...
021366                                          MCLEAR                          ;
021402                                          CACS                            ;
021444  013700  026766                        MOV     TAIND,R0                ; BUILD MTA A
021450  063700  026762                        ADD     IECAAD,R0               ;   "
021454  110077  005256                        MOVB    R0,@IOR                 ; SET A TO TADS
021460                                          DATACC                          ;
021476  013700  026770                        MOV     LIIND,R0                ; BUILD MLA B
021502  063700  026764                        ADD     IECBAD,R0               ;   "
021506  110077  005224                        MOVB    R0,@IOR                 ; SET B TO LADS
021512                                          DATACC                          ;
021530  052777  000004  005176                BIS     #BIT2,@SMR              ; GOTO STANDBY STATE
021536  042777  177400  005200          1$:   BIC     #177400,@CSR            ; CLEAR HIGH-BYTE IN CSR
021544                                          SETVEC  #VECB,#INTSRV,#340      ;
021562  104000                                  SCOPE                           ;
021564  012737  000001  027010          REP6:   MOV     #1,CNT2                 ; FIRST COUNT OF MCR
021572  005037  027012                        CLR     CHAR                    ; FIRST CHARACTER OF MCR
021576  042777  177400  005140          BEG6:   BIC     #177400,@CSR            ; CLEAR INTERRUPT CAUSING BITS
021604  005001                                CLR     R1                      ;
021606  013700  026774                        MOV     BUFAB,R0                ; POINTER TO BUFFER A
021612  113720  027012                  1$:   MOVB    CHAR,(R0)+              ; FILL BUFFER A
021616  105201                                INCB    R1                      ; WITH ONE CHARACTER
021620  123701  027010                        CMPB    CNT2,R1                 ; LIMITED BY MATCH COUNT
021624  001372                                BNE     1$                      ;
021626  013701  026774                        MOV     BUFAB,R1                ; PROVIDE FIRST BUFFER ADDRESS A
021632  013777  027002  005110                MOV     BUFBB,@BAR              ; PREPARE BAR
021640  012777  000001  005100                MOV     #1,@BCR                 ; DUMMY VALUE TO BCR
021646  113777  027010  005100                MOVB    CNT2,@MCRMB             ; COUNT TO REGISTER
021654  113777  027012  005070                MOVB    CHAR,@MCR               ; CHARACTER TO REGISTER
021662  152777  000200  005064                BISB    #BIT7,@MCRMB            ; ENABLE MATCH
021670  052777  000101  005046                BIS     #101,@CSR               ; ENABLE INTERRUPT AND DMA
021676  112177  005034                  DMA6:   MOVB    (R1)+,@IOR              ; ONE BYTE TO IOR
021702                                          DATACC                          ;
021720  032777  000100  005016                BIT     #100,@CSR               ; HAS INTERRUPT OCCURRED ?
021726  001363                                BNE     DMA6                    ; IF NOT,CONTINUE DMA
021730  022777  002202  005006                CMP     #2202,@CSR              ; CAUSED "END" THE INTERRUPT
021736  001417                                BEQ     3$                      ; IF YES,CONTINUE
021740                                          ADP     #2202,@CSR              ;
021772                                          ERROR   52.                     ;
021776  013700  026774                  3$:   MOV     BUFAB,R0                ; PROVIDE FIRST BYTE OF BUFFER A
022002  013701  027002                        MOV     BUFBB,R1                ; PROVIDE FIRST BYTE OF BUFFER B
022006  005002                                CLR     R2                      ;
022010  020237  027010                  CMP6:   CMP     R2,CNT2                 ; END OF BYTE COUNT ?
022014  001442                                BEQ     6$                      ;
022016  005202                                INC     R2                      ; BYTE COUNT
022020  122021                                CMPB    (R0)+,(R1)+             ; BUFFER A EQUAL TO BUFFER B
022022  001772                                BEQ     CMP6                    ; IF YES,CONTINUE
022024  114037  027026                        MOVB    -(R0),ASAVE             ; IF NOT,SAVE DATA
022030  114137  027030                        MOVB    -(R1),BSAVE             ;
022034  032737  040000  007160                BIT     #BIT14,PSDSWR           ; PRINTOUT ALLOWED ?
022042  001010                                BNE     5$                      ;
022044                                          WRITE   MES18                   ; WRITE BYTE COUNT
022054                                          DUMP    OCT,R2                  ; DUMP NUMBER
022064                                  5$:     ADP     ASAVE,BSAVE             ;
```

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IEC11 B IEST    MACRO M1200  30-MAR-84 16:11  PAGE 38-1                                  SEQ 111
TEST 6: MATCH CHARACTER REGISTER TEST (B IS LISTENER)

     904 022116                                          ERROR   53.                     ;
     905 022122  005237  027012              6$:        INC     CHAR                    ; NEXT MATCH CHARACTER
     906 022126  122737  000400  027012                 CMPB    #400,CHAR               ; LAST CHARACTER ?
     907 022134  001220                                  BNE     BEG6                    ;
     908 022136  005037  027012                          CLR     CHAR                    ; FIRST CHARACTER
     909 022142  005237  027010                          INC     CNT2                    ; NEXT MATCH COUNT
     910 022146  122737  000100  027010                 CMPB    #100,CNT2               ; ALL COUNTS DONE ?
     911 022154  001402                                  BEQ     7$                      ;
     912 022156  000137  021576                          JMP     BEG6                    ;
     913 022162  005737  027024              7$:        TST     TSTREP                  ; TEST LOOP SELECTED ?
     914 022166  001402                                  BEQ     8$                      ; IF NOT,LEAVE THE TEST
     915 022170  000137  021564                          JMP     REP6                    ;
     916 022174                              8$:        WRITE   MESEND                  ; END OF TEST
     917 022204  000207                                  RETURN
```

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                                        .SBTTL TEST 7: SERIAL POLL PROCEDURE TEST
022206                          TEST7:  WRITE   MES20
022216  005737  007152                 TST     OUTFLG          ; WAIT FOR ANY OUTPUT COMPLETE
022222  001375                         BNE     .-4             ; ...
022224                                  SETVEC  @VECB,@INTSRV,@340      ;
022242                          SETVEC  @VECA,@INTA,@340        ;
022260                          REP7:   MCLEAR                  ;
022274                                  CACS                    ;
022336  104000                          SCOPE                   ;
022340  052777  000002  004366  POLL0:  BIS     @BIT1,@SMR      ; GOTO CACS
022346  112777  000030  004362          MOVB    @30,@IOR        ; SERIAL POLL ENABLE
022354  013700  026770                  MOV     LIIND,R0        ; BUILD MLA A
022360  063700  026762                  ADD     IECADD,R0       ;       "
022364  110077  004346                  MOVB    R0,@IOR         ; SET A TO LADS
022370                                  DATACC                  ;
022406  012701  000000                  MOV     @0,R1           ; BUILD FIRST TALKER ADDRESS
022412  013700  026766          P0:     MOV     TAIND,R0        ;
022416  060100                          ADD     R1,R0           ; BUILD TALKER ADDRESS
022420  110077  004312                  MOVB    R0,@IOR         ;
022424                                  DATACC                  ;
022442  052777  000004  004264          BIS     @BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
022450                                  STALL                   ;
022500  122777  000000  004232          CMPB    @0,@IORMB       ; STATUS BYTE IS ZERO ?
022506  001416                         BEQ     5$              ; IF YES,TRY THE NEXT ONE
022510  032737  040000  007160          BIT     @BIT14,PSDSWR   ; PRINTOUT SELECTED ?
022516  001012                         BNE     5$              ;
022520                                  WRITE   MES21           ; GIVE INFORMATION ABOUT
022530                                  DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
022540                                  ERROR   54.             ;
022544  005201                  5$:     INC     R1              ; GET NEXT TALKER ADDRESS
022546  022701  000037                  CMP     @37,R1          ; ALL DONE ?
022552  001405                         BEQ     7$              ;
022554  052777  000002  004152          BIS     @BIT1,@SMR      ; IF NOT,GOTO CACS
022562  000137  022412                  JMP     P0              ; AND SELECT THE NEXT ONE
022566  052777  000002  004140  7$:     BIS     @BIT1,@SMR      ; GOTO CACS
022574  112777  000031  004134          MOVB    @31,@IOR        ; DISABLE SERIAL POLL
022602  052777  000004  004124          BIS     @BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
022610  000240                  DONE:   NOP                     ; JUST ENTRY-POINT
022612  042777  177400  004112          BIC     @177400,@CIR    ; CLEAR INTERRUPT CAUSING BITS
022620  012737  177700  027006          MOV     @177700,CNT1    ; PREPARE DELAY
022626  052777  000400  004110          BIS     @BIT8,@CSR      ; REQUEST SERVICE
022634  052777  000100  004070          BIS     @100,@CIR       ; ENABLE INTERRUPT A
022642  032777  000100  004062  1$:     BIT     @100,@CIR       ; HAS INTERRUPT OCCURRED ?
022650  001407                         BEQ     2$              ; IF YES,CONTINUE
022652  005237  027006                  INC     CNT1            ;
022656  005737  027006                  TST     CNT1            ;
022662  001367                         BNE     1$              ;
022664                                  ERROR   55.             ;
022670  022777  040201  004034  2$:     CMP     @040201,@CIR    ; CAUSED SRQ THE INTERRUPT ?
022676  001417                         BEQ     POLL1           ; IF YES,CONTINUE
022700                                  ADP     @040201,@CIR    ;
022732                                  ERROR   56.             ;
022736  104000                  POLL1:  SCOPE                   ;
022740  005037  027014                  CLR     DONE            ; CLEAR DONE FLAG
022744  052777  000002  003762          BIS     @BIT1,@SMR      ; GOTO CACS
022752  112777  000030  003756          MOVB    @30,@IOR        ; SERIAL POLL ENABLE
022760  013700  026770                  MOV     LIIND,R0        ; BUILD MLA A
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 976 022764  063700  026762                ADD     IECAAD,R0       ;       "
 977 022770  110077  003742                MOVB    R0,@IOR         ; SET A TO LADS
 978 022774                                DATACC                  ;
 979 023012  012701  000000                MOV     #0,R1           ; BUILD FIRST TALKER ADDRESS
 980 023016  013700  026766          P1:   MOV     TAIND,R0        ;
 981 023022  060100                        ADD     R1,R0           ; BUILD TALKER ADDRESS
 982 023024  110077  003706                MOVB    R0,@IOR         ;
 983 023030                                DATACC                  ;
 984 023046  052777  000004  003660        BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
 985 023054                                STALL
 986 023104  122777  000000  003626        CMPB    #0,@IORMB       ; POLLING ADDRESS ?
 987 023112  001452                        BEQ     5$              ; IF NOT,TRY THE NEXT ONE
 988 023114  120137  026764                CMPB    R1,IECBAD       ; LEGAL ADDRESS ?
 989 023120  001416                        BEQ     3$              ; IF YES,CONTINUE
 990 023122  032737  040000  007160        BIT     #BIT14,PSDSWR   ; PRINTOUT SELECTED ?
 991 023130  001012                        BNE     3$              ;
 992 023132                                WRITE   MES21           ; GIVE INFORMATION ABOUT
 993 023142                                DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
 994 023152                                ERROR   57.             ;
 995 023156  117702  003556          3$:   MOVB    @IORMB,R2       ; SAVE STATUS BYTE
 996 023162  042702  177400                BIC     #177400,R2      ;
 997 023166  022702  000100                CMP     #100,R2         ; STATUS BYTE OK ?
 998 023172  001416                        BEQ     4$              ; IF YES,CONTINUE
 999 023174                                ADP     #100,R2         ;
1000 023224                                ERROR   58.             ;
1001 023230  012737  177777  027014  4$:   MOV     #177777,DONE    ; SET DONE FLAG
1002 023236  000411                        BR      PEND1           ; GOTO FINISH THIS TESTPART
1003 023240  005201                  5$:   INC     R1              ; GET NEXT TALKER ADDRESS
1004 023242  022701  000037                CMP     #37,R1          ; ALL DONE ?
1005 023246  001405                        BEQ     PEND1           ;
1006 023250  052777  000002  003456        BIS     #BIT1,@SMR      ; IF NOT,GOTO CACS
1007 023256  000137  023016                JMP     P1              ; AND SELECT THE NEXT ONE
1008 023262  005737  027014          PEND1: TST    DONE            ; ONE POLLING ADDRESS FOUND AT LEAST ?
1009 023266  001002                        BNE     7$              ; IF YES,GOTO NEXT PART OF THE TEST
1010 023270                                ERROR   59.             ;
1011 023274  104000                  7$:   SCOPE                   ;
1012 023276  052777  000002  003430        BIS     #BIT1,@SMR      ; GOTO CACS
1013 023304  112777  000031  003424        MOVB    #31,@IOR        ; DISABLE SERIAL POLL
1014 023312  052777  000004  003414        BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1015 023320  032777  040000  003404        BIT     #BIT14,@CIR     ; SRQ CLEARED BY "SPD" ?
1016 023326  001402                        BEQ     DON1            ; IF YES,CONTINUE
1017 023330                                ERROR   60.             ;
1018 023334  000240                DON1:   NOP                     ; JUST ENTRY-POINT
1019 023336                                MCLEAR                  ;
1020 023352                                CACS                    ;
1021 023414  013700  026770                MOV     LIIND,R0        ; BUILD MLA B
1022 023420  063700  026764                ADD     IECBAD,R0       ;       "
1023 023424  110077  003306                MOVB    R0,@IOR         ; SET B TO LADS
1024 023430                                DATACC                  ;
1025 023446  013700  026766                MOV     TAIND,R0        ; BUILD MTA A
1026 023452  063700  026762                ADD     IECAAD,R0       ;       "
1027 023456  110077  003254                MOVB    R0,@IOR         ; SET A TO TADS
1028 023462                                DATACC                  ;
1029 023500  052777  000004  003226        BIS     #BIT2,@SMR      ; GOTO STANDBY ,SET A TO TACS,B TO LACS
1030 023506  042777  177760  003230  SPOVFL: BIC    #177760,@CSR    ; CLEAR INTERRUPT CAUSING BITS
1031 023514  012777  177777  003224        MOV     #177777,@BCR    ; PREPARE BCR WITH HIGHEST VALUE
1032 023522  013777  027002  003220        MOV     BUFBB,@BAR      ; FIRST BUFFER ADDRESS
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1033 023530  052777  000101  003206          BIS     #101,@CSR       ; SET INTERRUPT ENABLE AND FUNCTION BIT
1034 023536  112777  000252  003172          MOVB    #252,@IOR       ; DUMMY VALUE TO I/O REGISTER
1035 023544                                  DATACC                  ;
1036 023562  032777  000100  003154  1$:     BIT     #BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
1037 023570  001374                          BNE     1$              ; IF YES,CONTINUE
1038 023572  052777  000400  003144          BIS     #BIT8,@CSR      ; REQUEST SERVICE
1039 023600  104000                          SCOPE                   ;
1040 023602  005037  027014          POLL2:  CLR     DONE            ; CLEAR DONE FLAG
1041 023606  052777  000002  003120          BIS     #BIT1,@SMR      ; GOTO CACS
1042 023614  112777  000137  003114          MOVB    #137,@IOR       ; UNTALK IEC11-A
1043 023622                                  DATACC                  ;
1044 023640  112777  000030  003070          MOVB    #30,@IOR        ; SERIAL POLL ENABLE
1045 023646  013700  026770                  MOV     LIIND,R0        ; BUILD MLA A
1046 023652  063700  026762                  ADD     IECAAD,R0       ;       "
1047 023656  110077  003054                  MOVB    R0,@IOR         ; SET A TO LADS
1048 023662                                  DATACC                  ;
1049 023700  012701  000000                  MOV     #0,R1           ; BUILD FIRST TALKER ADDRESS
1050 023704  013700  026766          P2:     MOV     TAIND,R0        ;
1051 023710  060100                          ADD     R1,R0           ; BUILD TALKER ADDRESS
1052 023712  110077  003020                  MOVB    R0,@IOR         ;
1053 023716                                  DATACC                  ;
1054 023734  052777  000004  002772          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1055 023742                                  STALL                   ;
1056 023772  122777  000000  002740          CMPB    #0,@IORHB       ; POLLING ADDRESS ?
1057 024000  001452                          BEQ     5$              ; IF NOT,TRY THE NEXT ONE
1058 024002  120137  026764                  CMPB    R1,IECBAD       ; LEGAL ADDRESS ?
1059 024006  001416                          BEQ     3$              ; IF YES,CONTINUE
1060 024010  032737  040000  007160          BIT     #BIT14,PSDSWR   ; PRINTOUT SELECTED ?
1061 024016  001012                          BNE     3$              ;
1062 024020                                  WRITE   MES21           ; GIVE INFORMATION ABOUT
1063 024030                                  DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
1064 024040                                  ERROR   61.             ;
1065 024044  117702  002670          3$:     MOVB    @IORHB,R2       ; SAVE STATUS BYTE
1066 024050  042702  177400                  BIC     #177400,R2      ;
1067 024054  022702  000104                  CMP     #104,R2         ; STATUS BYTE OK ?
1068 024060  001416                          BEQ     4$              ; IF YES,CONTINUE
1069 024062                                  ADP     #104,R2         ;
1070 024112                                  ERROR   62.             ;
1071 024116  012737  177777  027014  4$:     MOV     #177777,DONE    ; SET DONE FLAG
1072 024124  000411                          BR      PEND2           ; GOTO FINISH THIS TESTPART
1073 024126  005201                  5$:     INC     R1              ; GET NEXT TALKER ADDRESS
1074 024130  022701  000037                  CMP     #37,R1          ; ALL DONE ?
1075 024134  001405                          BEQ     PEND2           ;
1076 024136  052777  000002  002570          BIS     #BIT1,@SMR      ; IF NOT,GOTO CACS
1077 024144  000137  023704                  JMP     P2              ; AND SELECT THE NEXT ONE
1078 024150  005737  027014          PEND2:  TST     DONE            ; ONE POLLING ADDRESS FOUND AT LEAST ?
1079 024154  001002                          BNE     7$              ; IF YES,GOTO NEXT PART OF THE TEST
1080 024156                                  ERROR   63.             ;
1081 024162  052777  000002  002544  7$:     BIS     #BIT1,@SMR      ; GOTO CACS
1082 024170  112777  000031  002540          MOVB    #31,@IOR        ; DISABLE SERIAL POLL
1083 024176  052777  000004  002530          BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1084 024204  000240                  DON2:   NOP                     ; JUST ENTRY-POINT
1085 024206                                  MCLEAR                  ;
1086 024222                                  CACS                    ;
1087 024264  013700  026770                  MOV     LIIND,R0        ; BUILD MLA B
1088 024270  063700  026764                  ADD     IECBAD,R0       ;       "
1089 024274  110077  002436                  MOVB    R0,@IOR         ; SET B TO LADS
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1090 024300                                        DATACC
1091 024316  013700  026766                       MOV     TAIND,R0        ; BUILD MTA A
1092 024322  063700  026762                       ADD     IECAAD,R0       ;       "
1093 024326  110077  002404                       MOVB    R0,@IOR         ; SET A TO TADS
1094 024332                                        DATACC                  ;
1095 024350  052777  000004  002356               BIS     #BIT2,@SMR      ; GOTO STANDBY ,SET A TO TACS,B TO LACS
1096 024356  042777  177400  002360  SPEND:      BIC     #177400,@CSR    ; CLEAR INTERRUPT CAUSING BITS
1097 024364  013777  027002  002356               MOV     BUFBB,@BAR      ; FIRST BUFFER ADDRESS
1098 024372  012777  000001  002346               MOV     #1,@BCR         ; PREPARE BYTE COUNT REGISTER
1099 024400  012777  100777  002344               MOV     #100777,@MCR    ; PREPARE MATCH CHARACTER
1100 024406  052777  000101  002330               BIS     #101,@CSR       ; ENABLE FUNCTION (DMA) AND INTERRUPT
1101 024414  112777  000377  002314               MOVB    #377,@IOR       ; FIRST BYTE IN I/O REGISTER
1102 024422                                        DATACC                  ;
1103 024440  032777  000100  002276  1$:         BIT     #BIT6,@CSR      ; HAS INTERRUPT OCCURRED ?
1104 024446  001374                               BNE     1$              ; IF YES,CONTINUE
1105 024450  052777  000400  002266               BIS     #BIT8,@CSR      ; REQUEST SERVICE
1106 024456  104000                               SCOPE                   ;
1107 024460  005037  027014         POLL3:        CLR     DONE            ; CLEAR DONE FLAG
1108 024464  052777  000002  002242               BIS     #BIT1,@SMR      ; GOTO CACS
1109 024472  112777  000137  002236               MOVB    #137,@IOR       ; UNTALK IEC11-A
1110 024500                                        DATACC                  ;
1111 024516  112777  000030  002212               MOVB    #30,@IOR        ; SERIAL POLL ENABLE
1112 024524  013700  026770                       MOV     LIIND,R0        ; BUILD MLA A
1113 024530  063700  026762                       ADD     IECAAD,R0       ;       "
1114 024534  110077  002176                       MOVB    R0,@IOR         ; SET A TO LADS
1115 024540                                        DATACC                  ;
1116 024556  012701  000000                       MOV     #0,R1           ; BUILD FIRST TALKER ADDRESS
1117 024562  013700  026766         P3:           MOV     TAIND,R0        ;
1118 024566  060100                               ADD     R1,R0           ; BUILD TALKER ADDRESS
1119 024570  110077  002142                       MOVB    R0,@IOR         ;
1120 024574                                        DATACC                  ;
1121 024612  052777  000004  002114               BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1122 024620                                        STALL
1123 024650  122777  000000  002062               CMPB    #0,@IORHB       ; POLLING ADDRESS ?
1124 024656  001452                               BEQ     5$              ; IF NOT,TRY THE NEXT ONE
1125 024660  120137  026764                       CMPB    R1,IECBAD       ; LEGAL ADDRESS ?
1126 024664  001416                               BEQ     3$              ; IF YES,CONTINUE
1127 024666  032737  040000  007160               BIT     #BIT14,PSDSWR   ; PRINTOUT SELECTED ?
1128 024674  001012                               BNE     3$              ;
1129 024676                                        WRITE   MES21           ; GIVE INFORMATION ABOUT
1130 024706                                        DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
1131 024716                                        ERROR   64.             ;
1132 024722  117702  002012         3$:           MOVB    @IORHB,R2       ; SAVE STATUS BYTE
1133 024726  042702  177400                       BIC     #177400,R2      ;
1134 024732  022702  000110                       CMP     #110,R2         ; STATUS BYTE OK ?
1135 024736  001416                               BEQ     4$              ; IF YES,CONTINUE
1136 024740                                        ADP     #110,R2         ;
1137 024770                                        ERROR   65.             ;
1138 024774  012737  177777  027014  4$:           MOV     #177777,DONE    ; SET DONE FLAG
1139 025002  000411                               BR      PEND3           ; GOTO FINISH THIS TESTPART
1140 025004  005201                 5$:           INC     R1              ; GET NEXT TALKER ADDRESS
1141 025006  022701  000037                       CMP     #37,R1          ; ALL DONE ?
1142 025012  001405                               BEQ     PEND3           ;
1143 025014  052777  000002  001712               BIS     #BIT1,@SMR      ; IF NOT,GOTO CACS
1144 025022  000137  024562                       JMP     P3              ; AND SELECT THE NEXT ONE
1145 025026  005737  027014         PEND3:        TST     DONE            ; ONE POLLING ADDRESS FOUND AT LEAST ?
1146 025032  001002                               BNE     7$              ; IF YES,GOTO NEXT PART OF THE TEST
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1147 025034                                    ERROR   66.                     ;
1148 025040  052777  000002  001666  7$:      BIS     #BIT1,@SMR              ; GOTO CACS
1149 025046  112777  000031  001662           MOVB    #31,@IOR                ; DISABLE SERIAL POLL
1150 025054  052777  000004  001652           BIS     #BIT2,@SMR              ; GOTO STANDBY STATE,A TO LACS
1151 025062  000240                 DON3:     NOP                             ; JUST ENTRY-POINT
1152 025064                                    MCLEAR                          ;
1153 025100                                    CACS                            ;
1154 025142  013700  026770                    MOV     LIIND,R0                ; BUILD MLA B
1155 025146  063700  026764                    ADD     IECBAD,R0               ;       "
1156 025152  110077  001560                    MOVB    R0,@IOR                 ; SET B TO LADS
1157 025156                                    DATACC                          ;
1158 025174  013700  026766                    MOV     TAIND,R0                ; BUILD MTA A
1159 025200  063700  026762                    ADD     IECAAD,R0               ;       "
1160 025204  110077  001526                    MOVB    R0,@IOR                 ; SET A TO TADS
1161 025210                                    DATACC                          ;
1162 025226  052777  000004  001500           BIS     #BIT2,@SMR              ; GOTO STANDBY ,SET A TO TACS,B TO LACS
1163 025234  005037  027016         SPNEX:    CLR     NEXFLG                  ;
1164 025240  042777  177760  001476           BIC     #177760,@CSR            ; CLEAR INTERRUPT CAUSING BITS
1165 025246  012737  026722  000004           MOV     #NEXMEM,@#4             ;
1166 025254  052777  000060  001462           BIS     #60,@CSR                ;
1167 025262  012700  160000                    MOV     #160000,R0              ; FIRST LOC IN I/O PAGE
1168 025266  005710                 1$:       TST     (R0)                    ; FIND A
1169 025270  005737  027016                    TST     NEXFLG                  ; NON-EXISTANT
1170 025274  001001                            BNE     2$                      ; MEMORY ADDRESS
1171 025276  000773                            BR      1$                      ;
1172 025300  012737  000006  000004  2$:       MOV     #6,@#4                  ;
1173 025306  010077  001436                    MOV     R0,@BAR                 ;
1174 025312  012777  000001  001426           MOV     #1,@BCR                 ; PREPARE BCR
1175 025320  052777  000101  001416           BIS     #101,@CSR               ; ENABLE INTERRUPT AND FUNCTION (DMA)
1176 025326  112777  000252  001402           MOVB    #252,@IOR               ; DUMMY VALUE TO OUTPUT REGISTER
1177 025334                                    DATACC                          ;
1178 025352  032777  000100  001364  3$:       BIT     #BIT6,@CSR              ; HAS INTERRUPT OCCURRED ?
1179 025360  001374                            BNE     3$                      ; IF YES,CONTINUE
1180 025362  052777  000400  001354           BIS     #BIT8,@CSR              ; REQUEST SERVICE
1181 025370  104000                            SCOPE                           ;
1182 025372  005037  027014         POLL4:    CLR     DONE                    ; CLEAR DONE FLAG
1183 025376  052777  000002  001330           BIS     #BIT1,@SMR              ; GOTO CACS
1184 025404  112777  000137  001324           MOVB    #137,@IOR               ; UNTALK IEC11-A
1185 025412                                    DATACC                          ;
1186 025430  112777  000030  001300           MOVB    #30,@IOR                ; SERIAL POLL ENABLE
1187 025436  013700  026770                    MOV     LIIND,R0                ; BUILD MLA A
1188 025442  063700  026762                    ADD     IECAAD,R0               ;       "
1189 025446  110077  001264                    MOVB    R0,@IOR                 ; SET A TO LADS
1190 025452                                    DATACC                          ;
1191 025470  012701  000000                    MOV     #0,R1                   ; BUILD FIRST TALKER ADDRESS
1192 025474  013700  026766         P4:       MOV     TAIND,R0                ;
1193 025500  060100                            ADD     R1,R0                   ; BUILD TALKER ADDRESS
1194 025502  110077  001230                    MOVB    R0,@IOR                 ;
1195 025506                                    DATACC                          ;
1196 025524  052777  000004  001202           BIS     #BIT2,@SMR              ; GOTO STANDBY STATE,A TO LACS
1197 025532                                    STALL                           ;
1198 025562  122777  000000  001150           CMPB    #0,@IORHB               ; POLLING ADDRESS ?
1199 025570  001452                            BEQ     5$                      ; IF NOT,TRY THE NEXT ONE
1200 025572  120137  026764                    CMPB    R1,IECBAD               ; LEGAL ADDRESS ?
1201 025576  001416                            BEQ     3$                      ; IF YES,CONTINUE
1202 025600  032737  040000  007160           BIT     #BIT14,PSDSWR           ; PRINTOUT SELECTED ?
1203 025606  001012                            BNE     3$                      ;
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1204 025610                                    WRITE   MES21           ; GIVE INFORMATION ABOUT
1205 025620                                    DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
1206 025630                                    ERROR   67.             ;
1207 025634  117702  001100          3$:      MOVB    @IORHB,R2       ; SAVE STATUS BYTE
1208 025640  042702  177400                    BIC     #177400,R2      ;
1209 025644  022702  000102                    CMP     #102,R2         ; STATUS BYTE OK ?
1210 025650  001416                            BEQ     4$              ; IF YES,CONTINUE
1211 025652                                    ADP     #102,R2         ;
1212 025702                                    ERROR   68.             ;
1213 025706  012737  177777  027014  4$:      MOV     #177777,DONE    ; SET DONE FLAG
1214 025714  000411                            BR      PEND4           ; GOTO FINISH THIS TESTPART
1215 025716  005201                    5$:     INC     R1              ; GET NEXT TALKER ADDRESS
1216 025720  022701  000037                    CMP     #37,R1          ; ALL DONE ?
1217 025724  001405                            BEQ     PEND4           ;
1218 025726  052777  000002  001000            BIS     #BIT1,@SMR      ; IF NOT,GOTO CACS
1219 025734  000137  025474                    JMP     P4              ; AND SELECT THE NEXT ONE
1220 025740  005737  027014          PEND4:  TST     DONE            ; ONE POLLING ADDRESS FOUND AT LEAST ?
1221 025744  001002                            BNE     7$              ; IF YES,GOTO NEXT PART OF THE TEST
1222 025746                                    ERROR   69.             ;
1223 025752  052777  000002  000754  7$:      BIS     #BIT1,@SMR      ; GOTO CACS
1224 025760  112777  000031  000750            MOVB    #31,@IOR        ; DISABLE SERIAL POLL
1225 025766  052777  000004  000740            BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1226 025774  000240                    DON4:   NOP                     ; JUST ENTRY-POINT
1227 025776                                    MCLEAR                  ;
1228 026012                                    CACS                    ;
1229 026054  013700  026766                    MOV     TAIND,R0        ; BUILD MTA B
1230 026060  063700  026764                    ADD     IECBAD,R0       ;       "
1231 026064  110077  000646                    MOVB    R0,@IOR         ; SET B TO TADS
1232 026070                                    DATACC                  ;
1233 026106  013700  026770                    MOV     LIIND,R0        ; BUILD MLA A
1234 026112  063700  026762                    ADD     IECAAD,R0       ;       "
1235 026116  110077  000614                    MOVB    R0,@IOR         ; SET A TO LADS
1236 026122                                    DATACC                  ;
1237 026140  052777  000004  000566            BIS     #BIT2,@SMR      ; GOTO STANDBY STATE
1238 026146  104000                            SCOPE                   ;
1239 026150  042777  177400  000566  SPBTOA:  BIC     #177400,@CSR    ; CLEAR INTERRUPT CAUSING BITS
1240 026156  013777  027002  000564            MOV     BUFBB,@BAR      ; FIRST BUFFER ADDRESS
1241 026164  013700  027002                    MOV     BUFBB,R0        ; PREPARE
1242 026170  112710  000000                    MOVB    #0,(R0)         ; TO TRANSFER "0"
1243 026174  012700  000001                    MOV     #1,R0           ; PREPARE BYTE COUNT REGISTER
1244 026200  005400                            NEG     R0              ;       "
1245 026202  010077  000540                    MOV     R0,@BCR         ;       "
1246 026206  013701  026774                    MOV     BUFAB,R1        ; POINTER TO BUFFER A
1247 026212  052777  000101  000524            BIS     #101,@CSR       ; ENABLE FUNCTION (DMA) AND INTERRUPT
1248 026220                                    DATACC                  ;
1249 026236  117721  000476                    MOVB    @IORHB,(R1)+    ; DATA TO BUFFER A
1250 026242  032777  000100  000474  1$:      BIT     #100,@CSR       ; HAS INTERRUPT OCCURRED ?
1251 026250  001374                            BNE     1$              ; IF YES,CONTINUE
1252 026252  052777  000400  000464            BIS     #BIT8,@CSR      ; REQUEST SERVICE
1253 026260  104000                            SCOPE                   ;
1254 026262  005037  027014          POLL5:  CLR     DONE            ; CLEAR DONE FLAG
1255 026266  052777  000002  000440            BIS     #BIT1,@SMR      ; GOTO CACS
1256 026274  112777  000030  000434            MOVB    #30,@IOR        ; SERIAL POLL ENABLE
1257 026302  012701  000000                    MOV     #0,R1           ; BUILD FIRST TALKER ADDRESS
1258 026306  013700  026766          P5:     MOV     TAIND,R0        ;
1259 026312  060100                            ADD     R1,R0           ; BUILD TALKER ADDRESS
1260 026314  110077  000416                    MOVB    R0,@IOR         ;
```

TEST 7: SERIAL POLL PROCEDURE TEST

```
1261 026320                                        DATACC
1262 026336  052777  000004  000370                BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1263 026344                                        STALL
1264 026374  122777  000000  000336                CMPB    #0,@IORMB       ; POLLING ADDRESS ?
1265 026402  001452                                BEQ     5$              ; IF NOT,TRY THE NEXT ONE
1266 026404  120137  026764                        CMPB    R1,IECBAD       ; LEGAL ADDRESS ?
1267 026410  001416                                BEQ     3$              ; IF YES,CONTINUE
1268 026412  032737  040000  007160                BIT     #BIT14,PSDSWR   ; PRINTOUT SELECTED ?
1269 026420  001012                                BNE     3$              ;
1270 026422                                        WRITE   MES21           ; GIVE INFORMATION ABOUT
1271 026432                                        DUMP    OCT,R1          ; ILLEGAL IEC-BUS ADDRESS
1272 026442                                        ERROR   70.             ;
1273 026446  117702  000266            3$:         MOVB    @IORMB,R2       ; SAVE STATUS BYTE
1274 026452  042702  177400                        BIC     #177400,R2      ;
1275 026456  022702  000104                        CMP     #104,R2         ; STATUS BYTE OK ?
1276 026462  001416                                BEQ     4$              ; IF YES,CONTINUE
1277 026464                                        ADP     #104,R2         ;
1278 026514                                        ERROR   71.             ;
1279 026520  012737  177777  027014    4$:         MOV     #177777,DONE    ; SET DONE FLAG
1280 026526  000411                                BR      PEND5           ; GOTO FINISH THIS TESTPART
1281 026530  005201                    5$:         INC     R1              ; GET NEXT TALKER ADDRESS
1282 026532  022701  000037                        CMP     #37,R1          ; ALL DONE ?
1283 026536  001405                                BEQ     PEND5           ;
1284 026540  052777  000002  000166                BIS     #BIT1,@SMR      ; IF NOT,GOTO CACS
1285 026546  000137  026306                        JMP     P5              ; AND SELECT THE NEXT ONE
1286 026552  005737  027014            PEND5:      TST     DONE            ; ONE POLLING ADDRESS FOUND AT LEAST ?
1287 026556  001002                                BNE     7$              ; IF YES,GOTO NEXT PART OF THE TEST
1288 026560                                        ERROR   72.             ;
1289 026564  052777  000002  000142    7$:         BIS     #BIT1,@SMR      ; GOTO CACS
1290 026572  112777  000031  000136                MOVB    #31,@IOR        ; DISABLE SERIAL POLL
1291 026600  052777  000004  000126                BIS     #BIT2,@SMR      ; GOTO STANDBY STATE,A TO LACS
1292 026606  000240                    DON5:       NOP                     ; JUST ENTRY-POINT
1293 026610  005737  027024                        TST     TSTREP          ; TEST LOOP SELECTED ?
1294 026614  001402                                BEQ     8$              ; IF NOT,LEAVE THE TEST
1295 026616  000137  022260                        JMP     REP7            ;
1296 026622                            8$:         WRITE   MESEND          ; END OF TEST
1297 026632  000207                                RETURN
```

```
1299                                            .SBTTL  INTERRUPT SERVICE ROUTINES
1300                                    ;
1301                                    ;
1302                                    ;
1303 026634  052737  177777  027022  INTTST: BIS     #177777,INTFLG          ; SET INTERRUPT FLAG
1304 026642  000002                           RTI                             ;
1305                                    ;
1306                                    ;
1307                                    ;
1308 026644  000240                   INTSRV: NOP                             ; JUST ENTRY POINT
1309 026646  000002                           RTI                             ;
1310                                    ;
1311                                    ;
1312                                    ;
1313 026650                           PRIOR:  PSET    #0                      ; CLR PSW
1314 026674  062706  000004                   ADD     #4,SP                   ; INCREASE SP BY 4
1315 026700  000113                           JMP     (R3)                    ; GOTO PRINTOUT
1316                                    ;
1317                                    ;
1318                                    ;
1319 026702  032777  040000  000022   INTA:   BIT     #BIT14,@CIR             ; CAUSED SRQ THE INTERRUPT ?
1320 026710  001003                           BNE     1$                      ;
1321 026712  052777  000100  000012           BIS     #100,@CIR               ; REENABLE INTERRUPT
1322 026720  000002                   1$:     RTI                             ;
1323                                    ;
1324                                    ;
1325                                    ;
1326 026722  052737  177777  027016  NEXMEM: BIS     #177777,NEXFLG          ; SET FLAG FOR NEX INDICATION
1327 026730  000002                           RTI                             ;
1328                                    ;
1329                                    ;
1330                                    ;
```

```
1332
1333 026732  160010          CIR:    .SBTTL  CONSTANTS, VARIABLES
                                      160010                      ; CIR ADDRESS DEFAULT VALUE
1334 026734  160012          SMR:    160012                      ; SMR      "
```

```
1336 026736  160014                IOR:    160014                ; IOR     "
```

```
1338 026740  160015                IORMB:  160015          ; IOR HIGH-BYTE ADDRESS DEFAULT VALUE
1339 026742  160016                VSR:    160016          ; VSR      "
1340 026744  160020                CSR:    160020          ; CSR      "
1341 026746  160022                BCR:    160022          ; BCR      "
1342 026750  160024                BAR:    160024          ; BAR      "
1343 026752  160026                MCR:    160026          ; MCR      "
1344 026754  160027                MCRMB:  160027          ; MCR HIGH-BYTE ADDRESS DEFAULT VALUE
1345 026756  000270                VECA:     270           ; DEFAULT OF IEC11-A VECTOR ADDRESS
1346 026760  000274                VECB:     274           ; DEFAULT OF IEC11-B VECTOR ADDRESS
1347 026762  000035                IECAAD:    35           ; IEC11-A BUS ADDRESS DEFAULT VALUE
1348 026764  000036                IECBAD:    36           ; IEC11-B BUS ADDRESS DEFAULT VALUE
1349 026766  000100                TAIND:    100           ; TALKER INDICATION
1350 026770  000040                LIIND:     40           ; LISTENER INDICATION
1351                               ;
1352                               ;
1353 026772  000000                MEMSAV: .WORD 0         ; MEMORY AREA FOR BUFFERS
1354 026774  000000                BUFAB:  .WORD 0         ; FIRST ADDRESS IN BUFFER A
1355 026776  000000                BUFAE:  .WORD 0         ; LAST ADDRESS IN BUFFER A
1356 027000  000000                BUFFL:  .WORD 0         ; LENGTH OF BUFFERS IN BYTES
1357 027002  000000                BUFBB:  .WORD 0         ; FIRST ADDRESS IN BUFFER B
1358 027004  000000                BUFBE:  .WORD 0         ; LAST ADDRESS IN BUFFER B
1359                               ;
1360                               ;
1361 027006  000000                CNT1:   .WORD 0         ; DELAY OR COUNTER
1362 027010  000000                CNT2:   .WORD 0         ; DELAY OR COUNTER
1363 027012  000000                CHAR:   .WORD 0         ; CHARACTER FOR MCR
1364 027014  000000                DONE:   .WORD 0         ;
1365 027016  000000                NEXFLG: .WORD 0         ; NEX-PROCEDURE (TEST3) TIMEOUT FLAG
1366 027020  000000                BCINP:  .WORD 0         ; REQUESTED BYTE COUNT FOR DMA
1367 027022  000000                INTFLG: .WORD 0         ; INTERRUPT FLAG
1368 027024  000000                TSTREP: .WORD 0         ; FLAG FOR LOOP ON SINGLE TESTS
1369 027026  000000                ASAVE:  .WORD 0         ;
1370 027030  000000                BSAVE:  .WORD 0         ;
```

```
1372                                            .SBTTL  MESSAGES
1373                                            .NLIST  BEX
1374 027032  133  111  105  MID:    .ASCII  /[IEC11-B  TEST IN CONNECTION/
1375 027066  133  127  111         .ASCII  /[WITH AN IEC11-A INTERFACE/
1376 027120  133  103  132         .ASCII  /[CZIECAO/
1377 027130  133  103  123         .ASCII  /[CSS MUNICH MARCH 1979/
1378 027156  133  115  117         .ASCII  /[MODIFIED FOR SDC SUBMISSION MARCH 1984]/
1379 027226  133  133  133  MES1:   .ASCII  /[[[ENTER FIRST REGISTER ADDRESS OF IEC11-A/
1380 027300  133  050  104         .ASCII  /[(DEFAULT IS 160010)]/
1381 027325  133  105  116  MES2:   .ASCII  /[ENTER VECTOR ADDRESS OF IEC11-A/
1382 027365  133  050  104         .ASCII  /[(DEFAULT IS 270)]/
1383 027407  133  105  116  MES3:   .ASCII  /[ENTER FIRST REGISTER ADDRESS OF IEC11-B/
1384 027457  133  050  104         .ASCII  /[(DEFAULT IS 160020)]/
1385 027504  133  105  116  MES4:   .ASCII  /[ENTER VECTOR ADDRESS OF IEC11-B/
1386 027544  133  050  104         .ASCII  /[(DEFAULT IS 274)]/
1387 027566  133  105  116  MES5:   .ASCII  /[ENTER IEC-BUS ADDRESS OF IEC11-A/
1388 027627  133  050  104         .ASCII  /[(DEFAULT IS 35)]/
1389 027650  133  126  105  MES6:   .ASCII  /[VECTOR INPUT IS NOT EQUAL TO CONTENTS OF VSR]/
1390 027726  133  105  116  MES7:   .ASCII  /[ENTER IEC-BUS ADDRESS OF IEC11-B/
1391 027767  133  050  104         .ASCII  /[(DEFAULT IS 36)]/
1392 030010  133  133  124  MES8:   .ASCII  /[[TEST 1: REGISTER STATIC TEST]/
1393 030047  133  133  124  MES9:   .ASCII  /[[TEST 2: TALKER AND LISTENER FUNCTION TEST]/
1394 030123  133  133  124  MES10:  .ASCII  /[[TEST 3: GENERAL INTERRUPT AND DMA FUNCTION TEST]/
1395 030205  133  133  124  MES11:  .ASCII  /[[TEST 4: DMA-TRANSFER FROM B TO A  (B IS TALKER)]/
1396 030267  133  133  124  MES12:  .ASCII  /[[TEST 5: DMA-TRANSFER FROM A TO B  (B IS LISTENER)]/
1397 030353  133  133  102  MES13:  .ASCII  /[[BUS REQUEST LEVEL IS 7 !]/
1398 030406  133  133  102  MES14:  .ASCII  /[[BUS REQUEST LEVEL IS 6 !]/
1399 030441  133  133  102  MES15:  .ASCII  /[[BUS REQUEST LEVEL IS 5 !]/
1400 030474  133  133  102  MES16:  .ASCII  /[[BUS REQUEST LEVEL IS 4 !]/
1401 030527  133  133  105  MES17:  .ASCII  /[[ENTER BYTE COUNT NUMBER : (MAXIMAL)]/
1402 030575  133  102  131  MES18:  .ASCII  /[BYTE COUNT NUMBER  ]/
1403 030622  133  133  124  MES19:  .ASCII  /[[TEST 6: MATCH CHARACTER REGISTER TEST (B IS LISTENER)]/
1404 030712  133  133  124  MES20:  .ASCII  /[[TEST 7: SERIAL POLL PROCEDURE TEST]/
1405 030757  133  133  111  MES21:  .ASCII  /[[ILLEGAL STATUS BYTE ON IEC BUS ADDRESS :  ]/
1406 031034  133  133  116  MESNEX: .ASCII  /[[NEXT TEST TO RUN ?]/
1407 031061  133  133  105  MESEND: .ASCII  /[[END OF TEST]/
1408                                            .EVEN
1409                                            .LIST   BEX
```

```
                                        .SBTTL  STANDARD CSS REGISTER TEST
                                        ;       GR001           31-MAR-76
                                        ;       *****
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;
                                        ;       ROUTINE DESCRIPTION:
                                        ;       --------------------
                                        ; INPUT: REGISTER,BITMASK
                                        ; OUTPUT:ONLY IF ERRORS OCCUR:
                                        ;       BIT MASK OF R AND W BITS IN REGISTER NR: XXXXXX
                                        ;       CONTENTS SHOULD BE: ..... BUT WAS .....
                                        ;       ERROR   000255,000254 OR 000253
                                        ; FUNCTION:BEFORE THIS ROUTINE CALL AT FIRST MUST BE
                                        ;         PUSHED THE BITMASK AND THEN THE REGISTER
                                        ;         ONTO THE STACK.
                                        ;         THE ROUTINE CHECKS ALL READ/WRITE BITS OF
                                        ;         THE CORRESPONDING REGISTER AND PRINTS ERROR
                                        ;         MESSAGES IF THE READ AND WRITE WAS NOT IDENT.
                                        ;
                                        ;
                                        ; EXAMPLE:PUSH  #128,@CSR
                                        ;       CALL   REGTST
                                        ;
                                        ;
031100                          REGTST: PUSH    R0,R1,R2,R3             ;  GR001
031110  017601  000012                  MOV     @12(SP),R1              ; GET ADDRESS OF REGISTER;GR001
031114  016602  000014                  MOV     14(SP),R2               ; GET BITMASK ;GR001
031120  104000                  1$:     SCOPE                           ; PREPARE SCOPE LOOP
031122  010211                          MOV     R2,@R1                  ; TRY TO SET ALL BITS
031124  011100                          MOV     @R1,R0                  ; TRY TO READ IT BACK
031126  005102                          COM     R2                      ; BUILD MASK COMPLEMENT
031130  040200                          BIC     R2,R0                   ; CLEAR UNUSED BITS
031132  005102                          COM     R2                      ; REBUILD MASK
031134  020200                          CMP     R2,R0                   ; ALL BITS SET ?
031136  001432                          BEQ     2$                      ; BRANCH IF YES
031140                                  TST14   PSDSWR                  ; IF ADP AFTER ERROR IS NOT ALLOWED,
031146  001010                          BNE     5$                      ; GOTO 5$,ELSE WRITE
031150                                  WRITE   RG$MS$                  ; WRITE AT REGISTER NR:
031160                                  DUMP    OCT,R1                  ; DMP REGISTER NUMBER
031170                          5$:     ADP     R2,R0
031216                                  ERROR   255.                    ; NOT ALL BITS SET
031222  000736                          BR      1$                      ; RESTART TEST
031224  104000                  2$:     SCOPE                           ; SAVE SCOPE LOOP ADRESS
031226  040211                          BIC     R2,@R1                  ; CLEAR BITS UNDER MASK
031230  011100                          MOV     @R1,R0                  ; READ BITS
031232  005102                          COM     R2                      ; BUILD MASK COMPLEMENT
031234  040200                          BIC     R2,R0                   ; MASK OUT UNUSED BITS
031236  005102                          COM     R2                      ; REBUILD MASK
031240  005700                          TST     R0                      ; ARE ALL BITS RESET
031242  001433                          BEQ     3$                      ; BRANCH IF YES
031244                                  TST14   PSDSWR                  ; IF ADP IS NOT ALLOWED
031252  001010                          BNE     6$                      ; GOTO 6$
031254                                  WRITE   RG$MS$                  ; AT REGISTER
```

```
1468 031264                                    DUMP    OCT,R1          ; DMP REGISTER NR
1469 031274                            6$:     ADP     #0,R0
1470 031324                                    ERROR   254.            ; NOT ALL BITS RESET
1471 031330  000673                            BR      1$              ; RESTART TEST
1472 031332  005102                    3$:     COM     R2              ; BUILD COMPLEMENT OF MASK
1473 031334  004737  031506                    CALL    RANDOM          ; GET A RANDOM #
1474 031340  040200                            BIC     R2,R0           ; MASK OUT UNUSED BITS
1475 031342  104000                            SCOPE                   ; SAVE SCOPE LOOP ADDRESS
1476 031344  010011                            MOV     R0,(R1)         ; TRY TO SET RANDOM BITS
1477 031346  011103                            MOV     @R1,R3          ; READ IT BACK  ; GR001
1478 031350  040203                            BIC     R2,R3           ; CLEAR UNUSED BITS     ; GR001
1479 031352  020300                            CMP     R3,R0           ; ALL BITS OK ? ; GR001
1480 031354  001432                            BEQ     4$              ; BRANCH IF YES
1481 031356                                    TST14   PSDSWR          ; IF ADP IS NOT ALLOWED
1482 031364  001023                            BNE     7$              ; GOTO 7$
1483 031366                                    WRITE   RG$MS$          ; ELSE WRITE REGISTER NR
1484 031376                                    DUMP    OCT,R1          ; DUMP REGISTER NUMBER
1485 031406                                    ADP     R0,R3           ; SHOULD BE R0,WAS R3
1486 031434                            7$:     ERROR   253.            ; DATA CHECK IN REGISTER
1487 031440  000627                            BR      1$              ; RESTART TEST
1488 031442  005102                    4$:     COM     R2              ; REBUILD MASK
1489 031444                                    $$LOOP  1000,1$
1490 031466                                    POP     R3,R2,R1,R0     ;  GR001
1491 031476  062706  000006                    ADD     #6,SP           ; REBUILD STACK
1492 031502  000176  177772                    JMP     @-6(SP)         ; RETURN TO CALLER
1493                                   ;
1494                                   ;       RANDOM NUMBER GENERATOR USED FOR REGTST
1495                                   ;
1496 031506  013746  031544            RANDOM: MOV     RA,-(SP)
1497 031512  013700  031546                    MOV     RB,R0
1498 031516  006316                            ASL     @SP
1499 031520  005500                            ADC     R0
1500 031522  006200                            ASR     R0
1501 031524  005516                            ADC     @SP
1502 031526  061600                            ADD     @SP,R0
1503 031530  005600                            SBC     R0
1504 031532  012637  031544                    MOV     (SP)+,RA
1505 031536  010037  031546                    MOV     R0,RB
1506 031542  000207                            RETURN
1507 031544  135753                    RA:     135753
1508 031546  024624                    RB:     024624
1509                                           .NLIST  BEX
1510 031550     133     102     111    RG$MS$: .ASCII  /[BIT MASK OF R AND W BITS IN REGISTER NR: ]/
1511                                           .LIST   BEX
1512                                           .EVEN
1513 031624                            PRGEND:
1514         001204                            .END    START
```

SYMBOL TABLE

```
ACC4     020040        D..TYP  006420        MERROR  007652        NOR.ER  004376        SAV     011312
ADDRIN   011316        EMTTBL  002416        MERRP2  007662        NOR..E  004372        SCOPAD  007172
ASAVE    027026        EMTTND  002424        MER1    010304        NO6     010612        SCOPE = 104000
BAR      026750        EMT0    002424        MER2    010333        OFFCNT  012240        SEQ     012160
BCINP    027020        EMT1    002432        MESEND  031061        OFFSET  012112        SEQPNT  012156
BCIN4    017376        EMT2    002470        MESNEX  031034        OUTFLG  007152        SINGLE  012114
BCIN5    020470        ENDBIT  016410        MES1    027226        PEND1   023262        SISDR0= 172200
BCOVFL   016216        ERRFLG  007154        MES10   030123        PEND2   024150        SMR     026734
BCR      026746        IAD..E  004302        MES11   030205        PEND3   025026        SPBTOA  026150
BDDRIN   011724        IAE..E  005016        MES12   030267        PEND4   025740        SPEFLG  007170
BEG6     021576        IAS..E  004466        MES13   030353        PEND5   026552        SPEND   024356
BIT0  = 000001         IAY..E  004116        MES14   030406        PMODE = 030000        SPNEX   025234
BIT1  = 000002         IECAAD  026762        MES15   030441        POLL0   022340        SPOVFL  023506
BIT10 = 002000         IECBAD  026764        MES16   030474        POLL1   022736        SR0   = 177572
BIT11 = 004000         INFLAG  007150        MES17   030527        POLL2   023602        SR3   = 172516
BIT12 = 010000         INPREQ  007156        MES18   030575        POLL3   024460        START   001204
BIT13 = 020000         INP..E  003776        MES19   030622        POLL4   025372        STATUS  007164
BIT14 = 040000         INTA    026702        MES2    027325        POLL5   026262        STCHGE  014564
BIT15 = 100000         INTB4   020100        MES20   030712        PR      016622        TAIND   026766
BIT2  = 000004         INTFLG  027022        MES21   030757        PRERR   017324        TESTAL  012144
BIT3  = 000010         INTSRV  026644        MES3    027407        PRGEND  031624        TEST1   012242
BIT4  = 000020         INTTST  026634        MES4    027504        PRIEX   017330        TEST2   013074
BIT5  = 000040         IOR     026736        MES5    027566        PRIOR   026650        TEST3   014352
BIT6  = 000100         IORHB   026740        MES6    027650        PRI4    017310        TEST4   017350
BIT7  = 000200         I..DMP= 000001        MES7    027726        PRI5    017236        TEST5   020442
BIT8  = 000400         KBBEND  007146        MES8    030010        PRI6    017164        TEST6   021350
BIT9  = 001000         KBBPNT  007146        MES9    030047        PRI7    017112        TEST7   022206
BSAVE    027030        KBBUFF  007026        MID     027032        PROMES  007202        TKB   = 177562
BUFAB    026774        KDSAR0= 172360        MILADR  007445        PR1     017050        TKS   = 177560
BUFAE    026776        KDSDR0= 172320        MILBIN  007360        PR2     017126        TPB   = 177566
BUFBB    027002        KISAR0= 172340        MILDEC  007316        PR3     017200        TPS   = 177564
BUFBE    027004        KISAR5= 172352        MILEMT  007421        PR4     017252        TSTREP  027024
BUFFL    027000        KISAR6= 172354        MILOCT  007256        PS    = 177776        TT      012220
BUFPRP   010614        KISAR7= 172356        MILSCP  007524        PSDSWR  007160        TTE     012242
CDM..E   010614        KISDR0= 172300        MILTR1  010104        P0      022412        TYP..E  001252
CHAR     027012        KISDR6= 172314        MILTR2  010144        P1      023016        UBMPR = 170200
CIR      026732        KISDK7= 172316        MKBOVF  007213        P2      023704        UDSAR0= 177660
CMODE = 140000         LAB1    013340        MNOSUB  010032        P3      024562        UDSDR0= 177620
CMP4     020276        LAB11   012042        MPWRFL  007704        P4      025474        UISAR0= 177640
CMP5     021204        LAB2    013416        MSYERR  007503        P5      026306        UISAR4= 177650
CMP6     022010        LAB3    013474        MVERSN  010156        RA      031544        UISAR5= 177652
CNT1     027006        LAB4    013612        M..DET  001662        RANDOM  031506        UISAR6= 177654
CNT2     027010        LAB5    013760        M..HIM  001766        RB      031546        UISAR7= 177656
CSR      026744        LAB6    014036        M..MMM  002006        RED..E  005626        UISDR0= 177600
DEFA     011374        LAB7    014114        M..RET  001726        REGTST  031100        UISDR4= 177610
DEFB     012002        LAB8    014176        M..SAV  001424        REP1    012252        UISDR5= 177612
DMA4     020050        LAB9    014326        M..TRP  001776        REP2    013106        UISDR6= 177614
DMA6     021676        LAST4   020106        M..TSE  001374        REP3    014372        UISDR7= 177616
DMP..E   006674        LIIND   026770        M..TST  001516        REP4    017450        U..DET  001760
DONE     027014        MAPER   010472        N     = 000005        REP5    020542        VECA    026756
DONO     022610        MCR     026752        NEXBIT  014712        REP6    021564        VECAIN  011216
DON1     023334        MCRHB   026754        NEXFLG  027016        REP7    022260        VECB    026760
DON2     024204        MEMDEF  010426        NEXMEM  026722        RGAIN   010752        VECBIN  011646
DON3     025062        MEMEND  007022        NEX1    015214        RGBIN   011402        VSR     026742
DON4     025774        MEMSAV  026772        NEX2    015424        RG$MS$  031550        WRT..E  006060
DON5     026606        MERCOV  007737        NEX3    015626        RUBFLG  007162        X     = 000340
DUMMES   007210        MERHLT  010002        NEX4    016022        R..TYP= 000001        XX    = 000004
```

K10

SYMBOL TABLE

```
Z$$Z  = 000004          $.$ASF  007174          $..DOC  006426          $..IOT  003056          $..RED  005020
Z$$$Z = 000000          $..ADP  006706          $..EMT  002326          $..KBI  003424          $..RRS  003400
$MNOAV  010351          $..ASC  005464          $..ER   007166          $..KBO  006122          $..RSV  003360
$POINT  006614          $..BIN  005504          $..IAA  004120          $..MAP  002116          $..SPC  012010
$SMLD   007176          $..BUF  005444          $..IAD  004210          $..MSP  005700          $..STX  006262
$TABLE  006616          $..DBN  006630          $..IAE  004472          $..NOR  004304          $..TOT  006754
$WAS    007200          $..DDC  006520          $..IAS  004402          $..OCT  005112          $..TRP  002524
$$MTYP  007020          $..DEC  005270          $..IAY  004010          $..PRO  006136          $..TYP  001242
$$PTYP  007016          $..DMP  006400          $..INP  003574          $..PWR  003126          $..WRT  005654
$$SPE   003520

. ABS.  031624    000
        000000    001
CSSMON  000000    002
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  13624 WORDS  ( 54 PAGES)
DYNAMIC MEMORY:  20060 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:03:37
ZIECAO,ZIECAO/-SP=NEWMAC/ML,CDM,ZIECAO

.
```