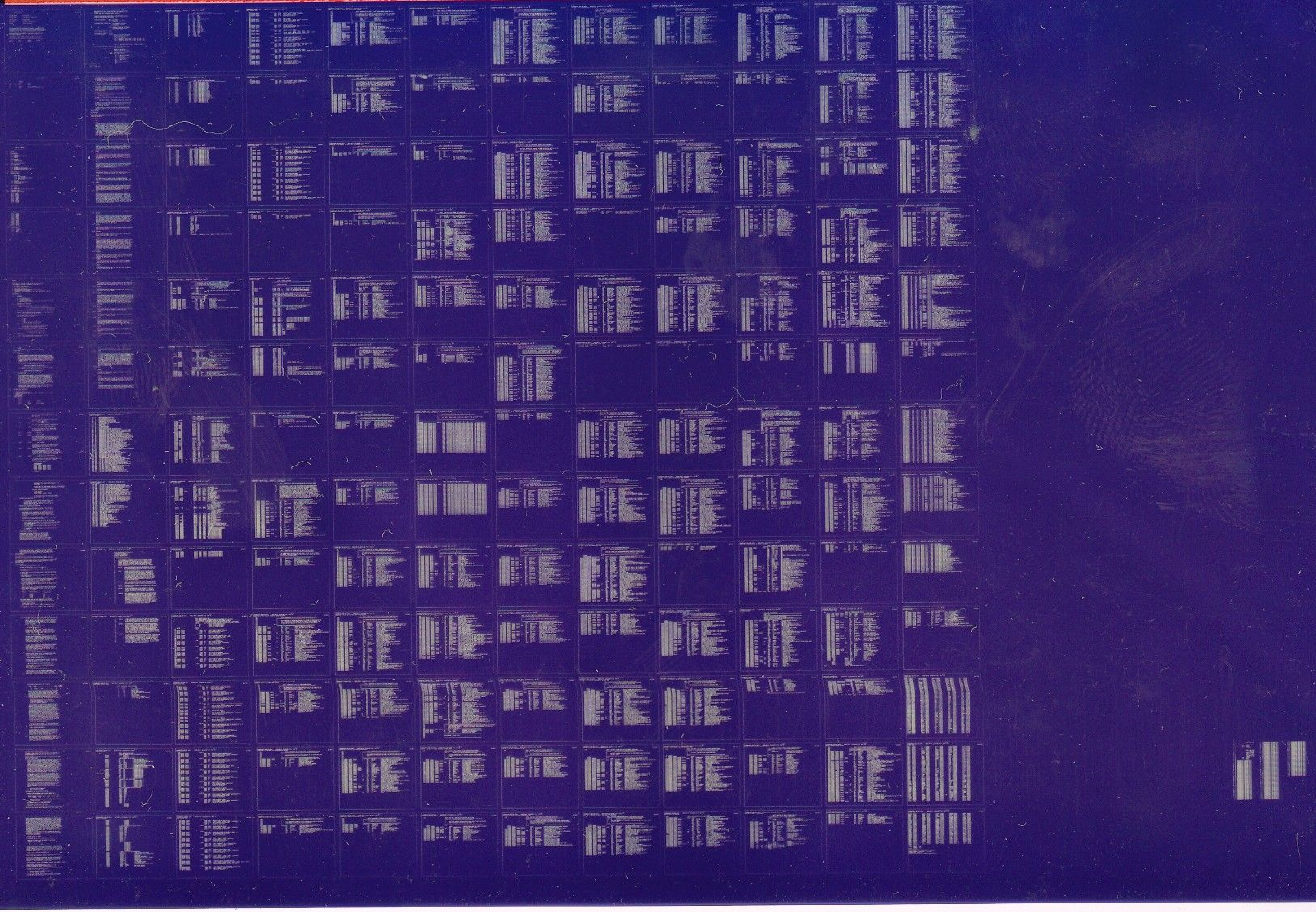
DR11

DR11 GEN NPR INTFC
CZDRLB0

AH-E780B-MC
FICHE 1 OF 1

NOV 1980
COPYRIGHT© 79-80
MADE IN USA



IDENTIFICATION

PRODUCT CODE:	AC-E779B-MC
PRODUCT NAME:	CZDRLBO DR11 GEN NPR INTFC
DATE RELEASED:	AUGUST, 1980
MAINTAINER:	DIAGNOSTIC ENGINEERING
AUTHOR:	DAN P. MILLEVILLE

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Coproporation assumes no responsibility for any errors that may appear in this document.

No responsibility is assumed for the use or reliability of software on equipment that is not supplied by Digital or its affiliated companies.

```
                HISTORY
                -------
REV             DATE            NOTE
---             ----            ----
A               1977            Initial Release
B               1980            Correction of Coding Errors
```

TABLE OF CONTENTS

1.0 ABSTRACT

This diagnostic program is capable of testing the DR11-W NPR General Interface in DR11-W or DR11-B mode.

It has the following features:

1. APT11/XXDP compatible
2. Multiple board testing using table created by user
3. Burst Data Late Calibration
4. Independent 'LOGIC WRAP-AROUND' and 'CABLE WRAP-AROUND' testing

2.0 REQUIREMENTS

2.1 EQUIPMENT

1. PDP11 standard computer
2. I/O type terminal
3. 1-16 DR11-W module(s)
4. Loop back cable (Needed to fully check the module with this diagnostic)

2.2 HARDWARE SWITCH SETTINGS

The address selection switch, E120, is set up as below:

	1	2	3	4	5	6	7	8	9	10
Address bits:	12	11	10	9	8	7	6	5	4	3

Example: Device Address 172410, switches 1, 3, 5 & 10 should be OFF, and all others should be ON.

The E105 Switchpack: This switchpack must be in the following positions to run this diagnostic:

1 - OFF
2 - ON
3 - OFF
4 - OFF
5 - ON for -W mode, OFF for -B mode

Single switch near the E105 switchpack:

2 cycle mode - switch handle towards pack E105
N cycle mode - switch handle towards E94

The vector selection switch, E15, is set up as below:

	1	2	3	4	5	6	7	8
Vector bits:	1	2	3	4	5	6	7	8

Example: Vector Address 300, switches 6 & 7 should be OFF, and all others should be ON.

2.3 STORAGE

The program uses approx. 52200 words of memory

3.0 TESTING MODES

3.1 DEFINITION

The DR11-W diagnostic accomplishes device register bit tests, internal "LOGIC" wrap-around tests, and with the BC06-R wrap-around cable in J1 and J2, provides external "CABLE" wrap-around tests. In order to FULLY check the module, the diagnostic MUST be run with and without the wraparound cable in place, restarting at address 200 each time, or editing to change the cable mode (See Sect. 7.1.1)

There are only TWO legal modes of operation of this diagnostic:

1. DR11 with no cable(s) in user slots.
2. DR11 with Wrap-Around cable from J1 to J2.

This diagnostic is NOT meant to be run in the following modes:

1. DR11 connected to another DR11.
2. DR11 connected to a user device.

3.2 IMPLEMENTATION

Device register bit tests and internal LOGIC wrap-around tests are executed UNCONDITIONALLY. Cable wrap-around tests are executed ONLY if the BC06-R cable is in place between the J1 and J2 connectors on the DR11-W under test. The presence of this cable is "SIZED" for automatically for each board when the diagnostic is started at address 200. The user *MUST* verify that the "SIZING" occurred correctly by observing the output of the program when starting at 200. (refer to section 5.1 for example) If this summary is not needed, raise bit 12 of the switch register before program execution.

In manual mode (starting address = 204), the user can force uniform testing parameters for ALL modules through use of the edit function (refer to section 7.1.1).

4.0 LOAD AND START PROCEDURE

1. Load program into memory.
2. Load starting address 200, 204 or 210. (See Sects. 7.1, 7.2, 7.3 respectively)
3. Press start.

5.0 SWITCH REGISTER

5.1 Options

SWITCH	OCTAL	FUNCTION
SW15=1	100000	HALT ON ERROR

This will cause the processor to halt at the next error.

SW14=1 040000 LOOP ON TEST

This will cause the processor to loop on the test it is then executing.

SW13=1 020000 INHIBIT ERROR TYPEOUTS

This will cause error typeouts to be inhibited.

SW12=1 010000 DO NOT PRINT BOARD CONFIGURATION

This will cause the list of all boards and their setup data that the autosize routine found to not print.

SW11=1 004000 NOT USED

SW10=1 002000 BELL ON ERROR

This function causes the terminal bell to sound when an error occurs. this can be used in conjunction with LOOP-ON-TEST and INHIBIT-ERROR-TYPEOUTS to see if a loose connection may be causing the error.

SW09=1 001000 LOOP ON ERROR

This function will cause looping on error. It can be used in conjunction with INHIBIT-ERROR-TYPEOUTS when using a scope to find a faulty component.

SW08=1 000400 LOOP ON TEST IN SWR<6:0>

This function causes the CPU to jump to the test in bits <6:0> and execute that test unconditionaly. Change the switch register to exit. to create a tighter loop on that particular test, set LOOP-ON-TEST (40000) in the swr once the test is executing.

SW07=1 000200 INHIBIT MULTIPLE ERROR TYPEOUTS

On error calls in loops where multiple errors are possible, this function inhibits any additional data that may print in that loop. Example

MULTIPLE TYPEOUTS ENABLED:

```
  [ERROR MESSAGE]
  [DATA HEADER]
  XXXXXX  XXXXXX  XXXXXX  XXXXXX
  XXXXXX  XXXXXX  XXXXXX  XXXXXX
  XXXXXX  XXXXXX  XXXXXX  XXXXXX
  XXXXXX  XXXXXX  XXXXXX  XXXXXX
  XXXXXX  XXXXXX  XXXXXX  XXXXXX
```

>>>>>>NOTE<<<<<<

A maximum of 17 (octal) data lines will print.
if there are more, a message will print
as follows:

```
THERE ARE STILL MORE ERRORS, BUT WILL NOT BE PRINTED.
ERRORS WILL STILL BE COUNTED AND PRINTED AT THE EOP.
```

MULTIPLE TYPEOUTS DISABLED:

```
[ERROR MESSAGE]
[DATA HEADER]
XXXXXX  XXXXXX  XXXXXX  XXXXXX
```

(no more data will print) the total number of errors will still be totaled and printed at the EOP or EOD.

5.2 SOFTWARE SWITCH REGISTER

If the hardware switch register does not exist, or if one does and it contains '-1' (177777) then the software switch register (location 176) is used, which allows the user the same switch options as the hardware switch register.

5.3 LOADING THE SOFTWARE SWITCH REGISTER

This program supports the dynamic loading of the software switch register (location 176) from the TTY. This is accomplished as follows:

1. Type CONTROL G <^G> repeatedly, as resets and inits done in the diagnostic may clear the character before the character is recognized. once input is recognized, this allows the TTY to enter data into location 176 at the end of a test.

2. The machine will type: SWR=XXXXXX NEW= (XXXXXX is the octal contents of the software switch register)

3. After the 'NEW=' the operator can do one of the following:

   A. Type a number to be loaded into location 176 followed by a <CR> (only numbers between 0-7 will be accepted and only 6 numbers will be allowed).
   If a <CR> is the first entry the software switch register will not be changed.

   B. If a CONTROL U <^U> is depressed, the program will go back to step 2.

5.4 PROGRAM AND/OR OPERATOR ACTION

Loading and starting at 200 with all switches down is normal logic testing. If an error is detected, there will be a printout. When an error is detected and it is necessary to scope on it, place 100000 (bit 15) in the switch register to halt on error. After halting at the error to be looped on, enter 60000, loop-on-error and inhibit printouts. If there is more than one error called in a test, and you wish to loop on other than the 1st error, you MUST correct the condition causing the previous error(s) before you can loop on that error. NOP'ing the previous errors will produce unpredictable results for any subsequent errors in the test.

6.0 ERROR REPORTING

Each test will call an error containing the test number, error PC and data that is significant to the problem that caused the error.

In the case of multiple board testing, the failing module is identified by the device register address, and the END-OF-DEVICE-TEST message following all errors for that particular module.

7.0 OPERATING MODES

7.1 MANUAL MODE (STARTING ADDRESS = 204)

Defined as NON-AUTOMATIC use of the diagnostic.

This mode is intended for use in manufacturing when apt is not available.

In manual mode, all DR11-W hardware modules *MUST*BE*CONFIGURED* *AS*FOLLOWS*:

> W/B, PRIORITY LEVEL, 2/N CYCLE and CABLE states set IDENTICAL *IN*ALL*MODULES*.

> All device addresses MUST be set in a series spaced 10 locations apart, starting with the address inputed to the prompt 'STARTING DEVICE ADDRESS XXXXXX :'. (all modules MUST be addressed within the legal address range of 171000 to 177000)

> All vector addresses MUST be set in a series spaced 10 locations apart. (all modules MUST be vectored within the legal vector range of 300 to 770)

> The module with the lowest device address must also have the lowest vector address, the module with the next to the lowest device address must also have the next to the lowest vector address, etc. for example:

BOARD #	DEVICE ADDRESS	VECTOR ADDRESS	
0	172410	300	
1	172420	310	
2	172430	320	
3	172440	330	ETC.

Only under MANUAL mode does the diagnostic offer 'BURST DATA LATE' calibration. After loading program, depositing SA 204, and pressing START, the program types the following:

```
MULTIPLE BOARD DIALOGUE

ENTER COMMAND ([E]DIT, [L]IST, [B]URST CALIBRATION, [R]UN):
```

The program will allow only 1 character input, automatically printing a <CRLF> when the character is inputed.

7.1.1 when [E] is entered, the program enters the edit function

NOTE: To exit this routine at any response and return to the MBD prompt, enter CONTROL 'C' (^C). This does nothing but exit the routine, and does not change any values present or changed. To return to the previous prompt, type <ESC>.

'EDIT' responds first by printing:

```
  # OF BOARDS UNDER TEST  X:
```

Program accepts a maximum of 2 decimal characters. An appropriate er-or message is printed if the number inputed is out of range, or an illegal character was inputed. enter <CR> if present value is OK. Next:

```
  STARTING DEVICE ADDRESS  XXXXXX :
```

The user should respond with the lowest device address in the series. Program accepts a maximum of 6 octal digits between 171000 and 177000. An appropriate error message is printed if the number inputed is out of range, or an illegal character was inputed. Enter <CR> if present value is OK. next:

```
  STARTING VECTOR ADDRESS  XXX :
```

The user should respond with the lowest vector address in the series. program accepts a maximum of 3 octal digits between 300 and 777. An appropriate error message is printed if the number inputed is out of range, or an illegal character was inputed. enter <CR> if present value is OK. next:

```
  DR11-W OR B (W=0) CURRENT STATE = X :
```

Program accepts either a 0 or 1, repeating the prompt if any other character is inputed. Enter <CR> if present value is OK. next:

```
  DEVICE PRIORITY PRESENT LEVEL = X :
```

Program accepts 1 character between 0 and 7, repeating the prompt if another character is inputed. Enter <CR> if present value is OK. next:

```
  2 OR N CYCLE BURST (2 CY=0) PRESENT STATE = X :
```

Program accepts a 0 or 1, repeating the prompt if any other character is inputed. Enter <CR> if present value is OK. next:

```
  DO CABLE TESTS (NO=0) PRESENT STATE = X :
```

Program accepts a 0 or 1, repeating the prompt if any other character is inputed. Enter <CR> if present value is OK. Then the command prompt is reprinted.

7.1.2 When [L] is entered, the program enters the list function

The diagnostic then prints the following:

```
 # OF     START                             2-N     CABLE
 BOARDS   REGADR    VECADR      W-B   P-LEV  CYCLE   TESTS

     XX   XXXXXX      XXX       X       X       X       X
```

As previously mentioned, all boards must be spaced 10 address locations apart starting with the 'REGADR' value above, and vectors spaced 10 address locations apart starting with the 'VECADR' value above. The expected W-B, PRIORITY LEVEL, 2-N CYCLE and CABLE test states will be the same for all modules.

7.1.3 When [B] is entered, the program enters the BURST DATA LATE CALIBRATION routine, and the following is typed:

```
 BURST DATA LATE CALIBRATION IN PROGRESS..
 ATTACH SCOPE PROBE...
 TO CALIBRATE NEXT BOARD, TYPE ANY CHARACTER
 DEVICE #  0 UNDER CALIBRATION
```

This routine will not execute if you have not used edit to deposit a legal starting address and vector address, or the program has already been started at 200. The multiple board dialogue (MBD) prompt will be returned if this is the case. As stated in the DR11 engineering specification, the 'BURST DLT' multivibrator time out must be calibrated so as to be compatible with the user defined transfer rate in burst mode operation. The program software routine sets the cycle bit in the CSR of the DR11, a short delay is executed, and then the cycle bit is cleared. The diagnostic then tests for any character waiting, indicating the user wishes to go on to the next board. If none, it re-executes the setting and clearing of the cycle bit. If a character was inputed, it checks for the next board, and if any, sets up the addresses for that module, then prints the following:

```
 DEVICE #  X UNDER CALIBRATION
```

'X' being the device number. It then reaccomplishes the setting and clearing of the cycle bit for that device. If no further modules are found, the message:

```
 BURST CALIBRATION COMPLETE
```

is issued, and the MBD prompt is then returned for another command. To accomplish the burst data late calibration, attach a scope probe to E83-7 on the DR11-W (refer to print set M8716-0-1). A positive pulse will be observed. The pulse should be set between 3-30 us. by adjusting pot. R80.

7.1.4 When [R] is entered, the program begins diagnostic test execution. This will be blocked if legal starting device addresses and vector addresses have not been set up. If they are, the register and vector tables are filled, and normal start is executed.

7.2 AUTO-SIZE MODE (STARTING ADDRESS = 200)

This mode is the normal field service mode. It supports standalone operation as well as script operation under ACT11 or XXDP (chain).

The DR11 diagnostic has the following run characteristics when operating in auto mode:

a. The program will test the boards recognized by the autosize routine. The autosize routine will look at addresses between 172414 and 172604 in steps of 10 (20 octal locations). It will initially determine if the location it found to exist is a DR11 by forcing an interrupt. IF THE BOARD FAILS TO INTERRUPT, YOU MUST USE MANUAL MODE TO FORCE TEST EXECUTION OF THAT MODULE. The purpose of this initial test is to eliminate testing a module that is not a DR11, and determine the interrupt priority and vector of that module. The only legal interrupt vectors the DR11 can be set up for are as follows: 40, 50-174, and 254-774, all in steps of 4. Each board can have a vector anywhere in the stated ranges with no restrictions, allowing complete flexibility in the test sequence.

   In the case of multiple DR11-W's on the same CPU, each DR11-W MUST have its own unique DEVICE/VECTOR addresses. There are no constraints that the boards must start with the first device address 172410, or that multiple boards are assigned consecutive device addresses. When operating in auto-size mode, the user should verify the "SIZED" configuration by knowing how the boards are set up and comparing with the autosize output when starting at 200.

   Auto-sizing will determine the Interrupt priority, Interrupt vector, W/B, 2/N CYCLE, and Cable states of each board, independent of the states of other boards.

b. The following will NOT be offered to the user in autosize mode:

   1. BURST DATA LATE CALIBRATION
   2. MULTIPLE BOARD DIALOGUE

The diagnostic will print the following:

```
  DIAGNOSTIC HAS DETERMINED THE FOLLOWING ABOUT THE
  DR11-W(S) IT HAS FOUND.  USER *MUST* DETERMINE ACCURACY

     BOARD#  REGADR   VECADR   W/B    P-LEV   2-N CY  CABLE
       X     XXXXXX    XXX      X       X       X       X

        Data will continue to print until data for all modules
        has been printed.

  (^X) INHIBITS EOP'S, (^Y) FOR ERROR SUMMARY
  UNIBUS HANG?  RESTART AT ADDRESS XXXXXX

  CZDRLBO DR11 GEN NPR INTFC LOGIC TEST
```

The CONTROL X (^X) feature bypasses the sections that print the END-OF-PASS and END-OF-DEVICE messages. This is to improve the number of passes executed over any period of time, as well as make overnight or weekend runs use less paper. Error typeouts are NOT disabled in this mode. When an error occurs, the END-OF-PASS (EOP) WILL print for that pass, and, if more than one module is being tested, an END-OF-DEVICE (EOD) as well as END-OF-PASS will print so you will know which device and pass was executing when the error occured. In order to get a progress report, hit any key repeatedly, since inits and resets done during the execution of the diagnostic may clear the character waiting flag before the check for this bit. When the character is recognized, an EOP, and if more than one module, an EOD message will print giving the user a progress report. To disable this feature, repeatedly enter (^X) again until the CPU recognizes your input.

The CONTROL Y (^Y) function calls for a summary of device(s) and pass(es) that had errors. If no errors occured since the beginning of the diagnostic, or since the last error report, the following is printed:

```
  NO ERROR TOTALS TO REPORT
```

If there were errors, the following is printed:

```
  SUMMATION OF ERRORS SINCE BEGINNING OR LAST REPORT
    BOARD #  PASS #  ERRTTL
       X        X        X
       X        X        X
       X        X        X (etc.)
```

The information is stored on a stack that will hold up to 150 (decimal) device-pass error data lines above. If the limit is reached, diagnostic will continue, but further data will not be stored. The data accumulated is not written over, but when (^Y) is entered, the following is printed just before the 'SUMMATION...' statement above:

```
  STACK IS FULL - DATA MAY HAVE BEEN LOST
```

When the data is printed, the stack is reinitialized and will start storing up to another 150 error data lines.

In the event the UNIBUS becomes hung, and you have non-volatile memory or battery backup, restart the program at the address specified by the 'UNIBUS HUNG...' prompt at the start of the diagnostic. The printout will be as follows:

```
  DEVICE ADDRESS - XXXXXX, TEST NUMBER - XXXXXX, PASS NUMBER - XXXXXX
```

CPU will halt. Hitting continue will cause the program to restart as though you had started at 200.

7.3 RESTARTING PROGRAM IN MEMORY (STARTING ADDRESS = 210)

Whenever the program is halted, all history of previous testing is saved. It will remain intact until:

1. Another program is loaded into memory
2. The user re-edits the table

To restart the program, enter SA 210 and start. This start precludes any setup and negates the start message obtained wnen starting at 200. Do not start at this location if the diagnostic has not been previously "STARTED" at either 200 or 204.

7.4 TESTING UNDER APT (AUTOMATED PRODUCT TESTING)

To set up for multiple boards for testing under APT control, the APT system manager should answer the APT queries to the following items as indicated below:

```
SOFTWARE ENVIRONMENT:       000 - Dump mode
                            001 - Script mode (apt monitors
                                  diagnostic)

ENVIRONMENT MODE ($ENVM):   000 - Let diagnostic auto-size
                                  configurator and test
                                  accordingly

                            200 - Diagnostic must use configura-
                                  tion specified by APT ($VECT1,
                                  $VASE, $DEVM, $DDWX)

VECTOR ADDRESS ($VECT1):    300

DEVICE ADDRESS ($BASE):     172410

DEVICE MAP ($DEVM):         XXXXXX - Each set bit indicates that
                                     board is present and should
                                     be tested. examples:

                                      BIT 0 = BOARD #0 (DEVICE ADR = 172410, VEC ADR = 300)
                                      BIT 1 = BOARD #1 (DEVICE ADR = 172420, VEC ADR = 310)
                                      BIT 2 = BOARD #2 (DEVICE ADR = 172430, VEC ADR = 320)
                                                         .
                                                         .
                                                         .
                                      BIT 15 = BOARD #15 (DEVICE ADR = 172600, VEC ADR = 470)

DEVICE DESCRIPTOR WORDS:    XXXXXX - There is 1 descriptor word
                                     for each device:

                                     $DDW0 IS FOR DEVICE 0
                                     $DDW1 IS FOR DEVICE 1, ETC.

                                     Each descriptor word MUST be
                                     set up as follows:

                                      BIT 0 - DR11-W or -B Mode
                                              (W=0, B=1)
                                      BIT 1 - 2/N CYCLE
                                              (0=2 CY, 1=N CY)
                                      BIT 2 - Cable Tests
                                              (0=NO, 1=YES)
                                      BIT 5 \
                                      BIT 6  > Device Priority
                                      BIT 7 /
```

8.0 MISCELLANEOUS

8.1 POWER FAIL

If a power failure occurs and battery backup maintains the program in memory, or a non-volatile memory exists, the program will restart printing the following:

```
  POWER FAILURE - RESTARTING PROGRAM
```

The diagnosic will then restart at address 210.

If CPU is turned off while running, the above procedure is followed. If the processor is halted first, then turned off, the processor will come back up halted. To restart the program, hit CONTINUE, and the remaining procedure is the same as above.

8.2 END-OF-PASS MESSAGE

The EOP will print as follows with no errors on that pass:

```
        END PASS # XXXXXX
```

The EOP will print as follows with some errors when testing 1 device:

```
        END PASS # XXXXXX   TOTAL ERRORS SINCE LAST REPORT XXXXXX
```

The EOP will print the same as with no errors on any particular pass when testing more than one device and one or more devices has failed, since 'total errors' is meaningless and will more than likely be incorrect.

The pass number is capable of going up to 99,999,999 decimal, or about 3 months running with EOP disabled and no errors. In other words, 32767 is not the limit as with other diagnostics.

9.0 EXECUTION TIME

On a PDP11/44:

In all modes: Approximately 8 passes per second with EOP messages disabled and no errors.

10.0 SUBROUTINE ABSTRACTS

10.1 READ

The READ subroutine is used in the EDIT routine to input up to 6 digits in octal, 2 digits in decimal, or a single non-numeric character. R4 is used as the location to hold the number in octal, and is cleared for that purpose at the start of the subroutine. R3 is to be preloaded with the number of digits expected, since a <CRLF> is printed when the limit is reached. Entering a <CRLF> before the limit is acceptable, as it will be interpreted as a non-numeric character and exit. In any case, the last inputed ASCII character is left in location 'ANSWER'. If a numeric character is inputed, it will clear all but the 1st 4 bits in location 'ANSWER', exposing the value of the digit inputed, rotate R4 to the left 3 places to make room for the inputed digit, and add it to R4. Location

'LRGSTC' is to be loaded with the largest ASCII number digit acceptable for this number, I.E. 7 or 9 (for octal or decimal input respectively). ANY character outside ASCII '0' or '7/9' is treated as a non-numeric, triggering an automatic <CRLF> and exit.

10.2 ERCAPT

This subroutine saves the unit number, pass number and total errors for that device/pass whenever it encountered errors. This routine saves data for 150 (decimal) passes. If the stack should become full, data starting with the 151st pass containing errors is lost.

10.3 PTCAPT

This subroutine prints the data stored by the ERCAPT subroutine and resets the special stack pointer. If no data was stored, a message stating no data was stored is printed. If the stack is found full, a message announcing this finding is printed, warning that data may have been lost.

10.4 FIXTBL

This subroutine fills the 17 octal locations starting at 'REGADR' and 'VECADR' from the starting values already loaded in the first locations in steps of 10 for each table.

10.5 LODBUF

The INBUF buffer is loaded with an incrementing pattern (0,1,2,3,...) beginning at the starting address of INBUF. The number of words loaded is determined by the contents of BUFLEN.

10.6 CHKBFF

The CHKBUF buffer is loaded with a modified incrementing pattern (0,0,2,2,4,4,6,6,...) beginning at the starting address of CHKBUF. The number of words loaded is determined by the contents of BUFLEN. This buffer is loaded only for tests which use the maintenance mode of the DR11-W which has a special alternating DATI-DATO sequence of operation.

10.7 INTA

The IE bit is cleared in the CSR then the CSR is checked for the absence of the error bit and the presence of READY. The WCR is checked to see that it is equal to zero. The correct contents of the BAR are calculated and checked. The program will fail to update the PC return address by 2 if ERROR is set, READY is clear, READY and ERROR are clear of the CSR, WCR is not zero or the BAR contents is not zero. This will call the error that is just after the jsr call in the test. If all data is acceptable, the PC is updated, and the return from the subroutine is after the error call.

10.8 DATCHK

This routine is entered to check inbuf after a maintenance mode operation. The contents of INBUF and the contents of CHKBUF are checked to see that they are the same. The number of comparisons made is determined by the contents of BUFLEN. Any errors result in an RTS to the test to call the error there. A JSR back to the subroutine is executed to resume its checking. When returning, SP return address is updated by 6 to return after the error call and JSR return.

10.9 CLENUP

The routine is entered at the end of several tests to clear any data that may have been left in any registers, and to restore the interrupt vectors.

10.10 CHKCAB

This routine is used in various tests to alter the expected data if the WRAP-AROUND cable is out.

10.11 DATOCK

After a string of DATO'S has been completed this routine checks that the correct data pattern was transferred to INBUF. The number of comparisons made is determined by the contents of BUFLEN. An error in the check results in an RTS to the test to call the first error after the JSR call, where a JSR returns control back to the subroutine for further checking. An additional check is made on BUFLEN+2 to insure that not too many words were transferred. If they were, the PC return address is altered so that the second error after the JSR is called. If no errors, return is altered to just after the second error call.

10.12 ERRCHK

This routine clears IE and updates the PC for return after the error in the test if error is clear. If set, return is executed without updating the PC return so the error call after the JSR call in the test will be called.

10.13 DEVADS

This routine generates an address table located at REGADR starting with the base device address (contents of $BASE) in steps of 10.

10.14 BPINIT

This subroutine reloads the ".+2" and "BPT" into the unused locations between 4 and 776.

10.15 DRGET

This subroutine extracts information about the DR11 that interrupted and loads the accumulated data into the device descriptor word for that board.

10.16 TYPCNF

This subroutine prints the board configurations that the ASIZE subroutine found on the UNIBUS.

10.17 CHK4DR

This subroutine checks for a location as belonging to a DR11 by trying to force an interrupt a total of 4 times with the CPU at priorities 6 through 3. If the attempt fails, routine corrects the stack to return after the DR11 extraction routine. If the location does belong to a DR11, the return address of the subroutine on the stack is moved down one location, and the address+4 of the interrupt vector of the DR11 is put in the return addresses previous location. The stack is then popped 3 times by adjusting the pointer up 6, and a normal return is executed.

10.18 ASIZE

This routine autosizes the board configuration and prints the configuration if bit 12 (10000) is set in the SWR.

10.19 VCTADS

This routine generates the vector address table starting with the address in location 'VECADR'.

10.20 CATCH

This routine reports unexpected or erroneous traps or interrupts through the BREAK-POINT-TRAP loaded in locations 4-776. The stack is cleaned 4 times before the error call, and restored twice after the error call for returning to the source of the trap.

10.21 PSTATE

This routine prints the state of the bit in the DDW that was preloaded in location 'BITTST'.

10.22 PNTPRI

This routine prints the device priority in the DDW location.

10.23 SETTUP

This subroutine initializes the trap and interrupt vectors.

10.24 TSTMM

This subroutine checks for existence of Memory Management and if it exists, checks for the error condition of no memory location, but no ERROR and NEX bit sets. If memory management is not there, an exit updating the return address by 2 is done. If there, the XBA16 and XBA17 bits of the expected data are checked. If both zero, an exit updating the return address by 2 is done. If either or both are set, the upper byte of the Memory Management location is checked for the existence of upper memory, initialized at the beginning of the diagnostic. If not there (bits 0, 1 or 2 of upper byte clear), a normal exit is executed so the branch immediately following the JSR call will cause a check for the error bits in the expected to be set for another check.

11.0 DATA STACKS

11.1 PATRNS

This set of 7 data words is used to check any location for stuck or shorted bits.

11.2 EXPAT0

This set of data words is used in test 31 to check all possible combinations of set bits in the CSR with the maintenance bit clear. It contains the expected data that the CSR should contain after the bit combination is written to the CSR.

11.3 EXPAT1

This set of data words is used in test 3 to check all possible combinations of set bits in the CSR with the maintenance bit set. It contains the expected data that the CSR should contain after the bit combination is written to the CSR.

```
.NLIST  MC,MD,CND
.TITLE  CZDRLBO-DR11 GEN NPR INTFC
;*COPYRIGHT (C) 1980
;*DIGITAL EQUIPMENT CORP.
;*MAYNARD, MASS. 01754
;*
;*PROGRAM BY DAN MILLEVILLE
;*
;*        THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
;*        PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977, MODIFIED FOR
;*        THE CZDRLB DIAGNOSTIC.  CHANGES ARE NOTED BY [;&& ] IN THE
;*        COMMENT FIELDS OF THE $SCOPE, $EOP, $TYPE, $ERROR, $CKSWR
;*        $PWRDN, $PWRUP (ELIMINATED), $ERRTYP AND $TYPDS ROUTINES.
;*        NEWTST WAS MODIFIED IN FUNCTION AS DESCRIBED BELOW.  CHANGES
;*        WERE AS FOLLOWS:
;*
;*        $SCOPE:    END-OF-PASS MESSAGE DISABLING AND REENABLING CAPABILITY,
;*                   PLUS UPDATING $TESTN JUST AFTER $TSTNM IS UPDATED, AS
;*                   WELL AS ANY NEEDED MESSAGES.
;*
;*        $EOP:      CHANGED TO RECOGNIZE WHETHER OR NOT THE USER WISHES
;*                   THE EOP MESSAGES PRINTED, AND PRINTS THE NUMBER OF
;*                   ERRORS IN THAT PASS IF THERE WERE ANY, AND TYPES AN
;*                   EXTRA <CRLF> IF THERE WERE ERRORS TO SPACE EOP FROM
;*                   THE ERROR.  CHANGED ALSO TO RECOGNIZE WHEN THE PASS
;*                   COUNT GOES NEGATIVE, AND IF SO, CLEARS THE PASS COUNT,
;*                   AND INCREMENTS THE NEXT LOCATION AFTER $PASS TO COUNT
;*                   A BLOCK OF 32768 PASSES HAS OCCURED.  THIS LOCATION
;*                   IS USED IN CONJUNCTION WITH $PASS TO PRINT UP TO
;*                   PASS # 99,999,999 DECIMAL.
;*
;*        $TYPE:     INSTEAD OF USING THE STACK TO LOAD A CHARACTER INPUTED
;*                   WHILE PRINTING, LOOSING THE CHARACTER IN THE PROCESS,
;*                   LOCATION 'CHARCT' IS USED TO SAVE IT FOR $SCOPE TO USE.
;*
;*        $ERROR:    INCREMENT LOCATION 'ERRCNT' FOR POSSIBLE USE IN MULTIPLE
;*                   ERROR PRINTOUTS.
;*
;*        $CKSWR:    TESTING AND PROCESSING OF THE CONTENTS OF LOCATION
;*                   'CHARCT' WAS ADDED TO INCREASE CHANCES OF DIAGNOSTIC
;*                   CATCHING USER REQUEST FOR A SOFTWARE SWITCH REGISTER
;*                   CHANGE.
;*
;*        $ERRTYP:   ADDED CAPABILITY TO PROCESS ERRORS WITHIN LOOPS (ERRORS
;*                   WITH ERROR NUMBERS BETWEEN 201-377) SO THE MESSAGE AND
;*                   DATA HEADER ARE PRINTED DURING THE 1ST ERROR ONLY, WITH
;*                   DATA ONLY PRINTED FOR 2ND AND SUBSEQUENT ERRORS.  IT
;*                   CANCELS DATA PRINTING AFTER 20 (OCTAL) ERRORS HAVE BEEN
;*                   DONE SO AS TO ELIMINATE MASSIVE ERROR TYPEOUTS, BUT
;*                   CONTINUES TO TALLY THE ERRORS IN LOCATION '$ERTTL' SO THE
;*                   EOP MESSAGE WILL SHOW THE TOTAL NUMBER OF ERRORS IN THAT
;*                   PASS.  IF AN ERROR NUMBER BELOW 201 IS CALLED, 'ERRCNT'
;*                   IS CLEARED SO IF THIS ERROR IS IN A LOOP, ANY SUBSEQUENT
;*                   201+ ERRORS WILL HAVE THERE HEADER REPRINTED.
```

```
                                    ;*      NEWTST:     '.PAGE' WAS ADDED SO EACH NEW TEST WOULD BE ON A NEW PAGE.
                                    ;*                  AT THE BEGINING OF EACH NEW TEST, THE TITLE AND TEST NUMBER
                                    ;*                  ARE WRITTEN IN A SUBTITLE SO THAT EACH TEST WILL APPEAR IN
                                    ;*                  THE TABLE OF CONTENTS AT THE BEGINING OF THE DIAGNOSTIC.
                                    ;*
                                    ;*      $PWRDN:     THE OPERATIONS TO SAVE REGISTER CONTENTS WERE ELIMINATED
                                    ;*                  DUE TO THE LACK OF THE NEED.  A LOAD OF THE $PWRUP ADDRESS,
                                    ;*                  LOCATED JUST AFTER THE POWER DOWN HALT, IS LOADED INTO THE
                                    ;*                  POWER TRAP VECTOR SO THAT ON POWER UP, THE PROGRAM WILL
                                    ;*                  RESTART.  IF PROCESSOR IS UNABLE TO GET TO THE POWER DOWN
                                    ;*                  ROUTINE ON A POWER FAIL (CPU HALTED WHEN POWER FAILURE
                                    ;*                  OCCURED), PROCESSOR WILL EXECUTE THE POWER DOWN ROUTINE AND
                                    ;*                  HALT.  HITTING CONTINUE WILL RESULT IN THE POWER UP ROUTINE
                                    ;*                  EXECUTING AS IT WOULD IN THE EVENT OF A RESTORATION OF POWER
                                    ;*                  AFTER A POWER FAILURE WITH THE CPU RUNNING.
                                    ;*
                                    ;*      $TYPDS:     THE ADDITION OF THE $TYPDE FUNCTION WAS ADDED.  THIS FUNCTION
                                    ;*                  ALLOWS THE PRINTING OF NUMBERS LARGER THAN 32767 DECIMAL.
                                    ;*                  THE LOCATION THAT CONTAINS THE COUNT IS TO BE TESTED AFTER
                                    ;*                  BEING INCREMENTED.  IF NEGATIVE, IT IS TO BE CLEARED AND A
                                    ;*                  SECOND (OVERFLOW) LOCATION IS TO BE INCREMENTED.  WHEN
                                    ;*                  CALLING THE ROUTINE, THE OVERFLOW LOCATION IS TO BE PUT ON
                                    ;*                  THE STACK, THEN THE NUMBER, THEN THE CALL.  IF THE OVERFLOW
                                    ;*                  LOCATION IS NON-ZERO, IT WILL ADD 32768 TO THE ASCII NUMBER
                                    ;*                  FOR EACH COUNT IN THAT OVERFLOW LOCATION.
```

```
     41                           .SBTTL  OPERATIONAL SWITCH SETTINGS
                                  ;*
                                  ;*        SWITCH              USE
                                  ;*        ------        --------------------
                                  ;*          15          HALT ON ERROR
                                  ;*          14          LOOP ON TEST
                                  ;*          13          INHIBIT ERROR TYPEOUTS
                                  ;*          12          DO NOT PRINT BOARD CONFIGURATION
                                  ;*          11          NOT USED
                                  ;*          10          BELL ON ERROR
                                  ;*           9          LOOP ON ERROR
                                  ;*           8          LOOP ON TEST IN SWR<6:0>
     42                           ;*           7          INHIBIT MULTIPLE ERROR TYPEOUTS
```

```
                              .SBTTL  BASIC DEFINITIONS
                              ;*INITIAL ADDRESS OF THE STACK POINTER *** 1300 ***
        001300                STACK=  1300
        104000                        ERROR=EMT
        000004                        SCOPE=IOT
                              ;*MISCELLANEOUS DEFINITIONS
        000011                HT=     11                    ;;CODE FOR HORIZONTAL TAB
        000012                LF=     12                    ;;CODE FOR LINE FEED
        000015                CR=     15                    ;;CODE FOR CARRIAGE RETURN
        000200                CRLF=   200                   ;;CODE FOR CARRIAGE RETURN-LINE FEED
        177776                PS=     177776                ;;PROCESSOR STATUS WORD
        177776                        PSW=PS
        177774                STKLMT= 177774                ;;STACK LIMIT REGISTER
        177772                PIRQ=   177772                ;;PROGRAM INTERRUPT REQUEST REGISTER
        177570                DSWR=   177570                ;;HARDWARE SWITCH REGISTER
        177570                DDISP=  177570                ;;HARDWARE DISPLAY REGISTER
                              ;*GENERAL PURPOSE REGISTER DEFINITIONS
        000000                R0=     %0                    ;;GENERAL REGISTER
        000001                R1=     %1                    ;;GENERAL REGISTER
        000002                R2=     %2                    ;;GENERAL REGISTER
        000003                R3=     %3                    ;;GENERAL REGISTER
        000004                R4=     %4                    ;;GENERAL REGISTER
        000005                R5=     %5                    ;;GENERAL REGISTER
        000006                R6=     %6                    ;;GENERAL REGISTER
        000007                R7=     %7                    ;;GENERAL REGISTER
        000006                SP=     %6                    ;;STACK POINTER
        000007                PC=     %7                    ;;PROGRAM COUNTER
                              ;*PRIORITY LEVEL DEFINITIONS
        000000                PR0=    0                     ;;PRIORITY LEVEL 0
        000040                PR1=    40                    ;;PRIORITY LEVEL 1
        000100                PR2=    100                   ;;PRIORITY LEVEL 2
        000140                PR3=    140                   ;;PRIORITY LEVEL 3
        000200                PR4=    200                   ;;PRIORITY LEVEL 4
        000240                PR5=    240                   ;;PRIORITY LEVEL 5
        000300                PR6=    300                   ;;PRIORITY LEVEL 6
        000340                PR7=    340                   ;;PRIORITY LEVEL 7
                              ;*"SWITCH REGISTER" SWITCH DEFINITIONS
        100000                SW15=   100000
        040000                SW14=   40000
        020000                SW13=   20000
        010000                SW12=   10000
        004000                SW11=   4000
        002000                SW10=   2000
        001000                SW09=   1000
        000400                SW08=   400
        000200                SW07=   200
        000100                SW06=   100
        000040                SW05=   40
        000020                SW04=   20
        000010                SW03=   10
        000004                SW02=   4
        000002                SW01=   2
        000001                SW00=   1
        001000                        SW9=SW09
        000400                        SW8=SW08
        000200                        SW7=SW07
        000100                        SW6=SW06
        000040                          SW5=SW05
        000020                          SW4=SW04
        000010                          SW3=SW03
        000004                          SW2=SW02
        000002                          SW1=SW01
        000001                          SW0=SW00
                                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
        100000                  BIT15=  100000
        040000                  BIT14=  40000
        020000                  BIT13=  20000
        010000                  BIT12=  10000
        004000                  BIT11=  4000
        002000                  BIT10=  2000
        001000                  BIT09=  1000
        000400                  BIT08=  400
        000200                  BIT07=  200
        000100                  BIT06=  100
        000040                  BIT05=  40
        000020                  BIT04=  20
        000010                  BIT03=  10
        000004                  BIT02=  4
        000002                  BIT01=  2
        000001                  BIT00=  1
        001000                          BIT9=BIT09
        000400                          BIT8=BIT08
        000200                          BIT7=BIT07
        000100                          BIT6=BIT06
        000040                          BIT5=BIT05
        000020                          BIT4=BIT04
        000010                          BIT3=BIT03
        000004                          BIT2=BIT02
        000002                          BIT1=BIT01
        000001                          BIT0=BIT00
                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
        000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
        000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
        000014                  TBITVEC=14              ;;"T" BIT
        000014                  TRTVEC= 14              ;;TRACE TRAP
        000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
        000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
        000024                  PWRVEC= 24              ;;POWER FAIL
        000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
        000034                  TRAPVEC=34              ;;"TRAP" TRAP
        000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
        000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
        000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
        000004                  BUSERR  =ERRVEC
        172410                  ABASE   =172410         ;BASE DEVICE ADDRESS
        000300                  AVECT1  =300            ;BASE VECTOR ADDRESS
```

```
                                          .SBTTL  DEFINITIONS OF THE CSR BITS
                                   ;*******************************************************************
        000001                     GO      =1       ;GO
        000002                     F1      =2       ;FNCT1
        000004                     F2      =4       ;FNCT2
        000010                     F3      =10      ;FNCT3
        000016                     FNC     =16      ;FNCT1 & FNCT2 & FNCT3
        000020                     X6      =20      ;XBA16
        000040                     X7      =40      ;XBA17
        000100                     IE      =100     ;IE
        000200                     RY      =200     ;READY
        000400                     CY      =400     ;CYCLE
        000400                     N2      =400     ;2/N BIT
        001000                     DSC     =1000    ;DSTAT C
        002000                     DSB     =2000    ;DSTAT B
        004000                     DSA     =4000    ;DSTAT A
        006000                     DAB     =6000    ;DSTAT A & B
        005000                     DAC     =5000    ;DSTAT A & C
        003000                     DBC     =3000    ;DSTAT B & C
        007000                     DST     =7000    ;DSTAT A & B & C
        010000                     MA      =10000   ;MAINT
        020000                     AT      =20000   ;ATTN
        040000                     NX      =40000   ;NEX
        100000                     EIR     =100000  ;EIR
        100000                     ER      =100000  ;ERROR
```

```
                                        .SBTTL  CSR BIT COMPLIMENT DEFINITIONS
                                ;*********************************************************************
        177776                  CGO     =177776 ;COMPLIMENT OF GO
        177775                  CF1     =177775 ;COMPLIMENT OF FNCT1
        177773                  CF2     =177773 ;COMPLIMENT OF FNCT2
        177767                  CF3     =177767 ;COMPLIMENT OF FNCT3
        177761                  CFNC    =177761 ;COMPLIMENT OF FNCT1 & FNCT2 & FNCT3
        177757                  CX6     =177757 ;COMPLIMENT OF XBA16
        177737                  CX7     =177737 ;COMPLIMENT OF XBA17
        177677                  CIE     =177677 ;COMPLIMENT OF IE
        177577                  CRY     =177577 ;COMPLIMENT OF READY
        177377                  CCY     =177377 ;COMPLIMENT OF CYCLE
        176777                  CDSC    =176777 ;COMPLIMENT OF DSTAT C
        175777                  CDSB    =175777 ;COMPLIMENT OF DSTAT B
        173777                  CDSA    =173777 ;COMPLIMENT OF DSTAT A
        171777                  CDAB    =171777 ;COMPLIMENT OF DSTAT A & B
        172777                  CDAC    =172777 ;COMPLIMENT OF DSTAT A & C
        174777                  CDBC    =174777 ;COMPLIMENT OF DSTAT B & C
        170777                  CDST    =170777 ;COMPLIMENT OF DSTAT A & B & C
        167777                  CMA     =167777 ;COMPLIMENT OF MAINT
        157777                  CAT     =157777 ;COMPLIMENT OF ATTN
        137777                  CNX     =137777 ;COMPLIMENT OF NEX
        077777                  CEIR    =77777  ;COMPLIMENT OF EIR
        077777                  CER     =77777  ;COMPLIMENT OF ERROR
```

```
                                        .SBTTL  COMPLEMENTS OF BIT DEFINITIONS
                                ;********************************************************************
        177776                  CBIT0   =177776 ;COMPLIMENT OF BIT0
        177775                  CBIT1   =177775 ;COMPLIMENT OF BIT1
        177773                  CBIT2   =177773 ;COMPLIMENT OF BIT2
        177767                  CBIT3   =177767 ;COMPLIMENT OF BIT3
        177757                  CBIT4   =177757 ;COMPLIMENT OF BIT4
        177737                  CBIT5   =177737 ;COMPLIMENT OF BIT5
        177677                  CBIT6   =177677 ;COMPLIMENT OF BIT6
        177577                  CBIT7   =177577 ;COMPLIMENT OF BIT7
        177377                  CBIT8   =177377 ;COMPLIMENT OF BIT8
        176777                  C9IT9   =176777 ;COMPLIMENT OF BIT9
        175777                  CBIT10  =175777 ;COMPLIMENT OF BIT10
        173777                  CBIT11  =173777 ;COMPLIMENT OF BIT11
        167777                  CBIT12  =167777 ;COMPLIMENT OF BIT12
        157777                  CBIT13  =157777 ;COMPLIMENT OF BIT13
        137777                  CBIT14  =137777 ;COMPLIMENT OF BIT14
        077777                  CBIT15  =77777  ;COMPLIMENT OF BIT15
        057777                  CB1513  =57777  ;COMPLIMENT OF BIT15 & BIT 13
```

```
                                   .SBTTL  PRIORITY LEVELS AND OTHER DEFINITIONS
                              ;******************************************************************
      000140                  LEVEL3  =140
      000200                  LEVEL4  =200
      000240                  LEVEL5  =240
      000300                  LEVEL6  =300
      000340                  LEVEL7  =340
      000033                  ESC     =33
      000003                  CNTLC   =3
      000015                  CARETN  =15
      177572                  MMR0    =177572
      172304                  K!PDR2  =172304
      172324                  KDPDR2  =172324
      172344                  KIPAR2  =172344
      172364                  KDPAR2  =172364
      000250                  MMVECT  =250
      000252                  MMPS    =252
      000004                  TOVECT  =4
      000006                  TMOPSW  =6
      000003                  BPT     =3
      023074                  TST40=ENDEV     ;BRANCH TO TEST 40 = BRANCH TO ENDEV (THERE IS NO TEST 40)
```

```
                                ;***********************************************************************
                                        ;* ALL UNUSED LOCATIONS FROM 4-776 WILL CONTAIN A ".+2,BPT" SEQUENCE
                                        ;* TO CATCH ILLEGAL TRAPS & INTERRUPTS TO THE 'CATCH' LOCATION
                                        ;* 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                                ;***********************************************************************
        000014                          .=14                    ;THE BPT TRAP VECTOR POINTS TO THE
000014  005536                  BPTVCT: .WORD   CATCH           ;   ILLEGAL TRAP HANDLER "CATCH"
000016  000340                          .WORD   LEVEL7
        000042                          .=42
000042  000000                          .WORD   0               ;CLEAR THIS LOCATION (FOR APT MONITOR STARTING ADDRESS)
        000174                          .=174
000174  000000                  DISPRE: .WORD   0
000176  000000                  SWREG:  .WORD   0
                                ;***********************************************************************
                                ;
                                ;PROGRAM STARTING LOCATIONS
                                ;
                                ;***********************************************************************
000200  000137  010266                  JMP     START1          ;NORMAL START
000204  000137  030644                  JMP     MBD             ;ENTER MULTIPLE BOARD DIALOQUE
000210  005037  001416          STAGIN: CLR     $PASS           ;CLEAR $PASS
000214  005037  001420                  CLR     $PASS+2         ;CLEAR $PASS+2
000220  005037  001424                  CLR     $UNIT           ;CLEAR $UNIT
000224  005037  001422                  CLR     $DEVCT          ;CLEAR $DEVCT
000230  005037  001414                  CLR     $TESTN          ;CLEAR $TESTN
000234  005037  002710                  CLR     EOPLOC          ;CLEAR EOPLOC
000240  012737  041172  041170          MOV     #CAPSTK,CAPNTR  ;RESET THE CAPTURE POINTER
000246  000137  011006                  JMP     BEGIN1          ;JUMP TO BEGIN1 FOR RESTART WITHOUT HEADER PRINTING
        001000                          .=1000
```

```
    167                                   .SBTTL  ACT11 HOOKS
                                          ;*****************************************************************
                                          ;HOOKS REQUIRED BY ACT11
                  001000                          $SVPC=.                         ;SAVE PC
                  000046                          .=46
         000046   023464                          $ENDAD                          ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                  000052                          .=52
         000052   000000                          .WORD   0                       ;;2)SET LOC.52 TO ZERO
                  001000                          .=$SVPC                         ;; RESTORE PC
    168                                   .SBTTL  APT PARAMETER BLOCK
                                          ;*****************************************************************
                                          ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                          ;*****************************************************************
                  001000                          .$X=.    ;;SAVE CURRENT LOCATION
                  000024                          .=24     ;;SET POWER FAIL TO POINT TO START OF PROGRAM
         000024   000200                          200      ;;FOR APT START UP
                  000044                          .=44     ;;POINT TO APT INDIRECT ADDRESS PNTR.
         000044   001000                          $APTHDR  ;;POINT TO APT HEADER BLOCK
                  001000                          .=.$X    ;;RESET LOCATION COUNTER
                                          ;*****************************************************************
                                          ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                          ;INTERFACE SPEC.
         001000                           $APTHD:
         001000   000000                  $HIBTS: .WORD   0        ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
         001002   001410                  $MBADR: .WORD   $MAIL    ;;ADDRESS QF APT MAILBOX (BITS 0-15)
         001004   000010                  $TSTM:  .WORD   10       ;;RUN TIM OF LONGEST TEST
         001006   000010                  $PASTM: .WORD   10       ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
         001010   000000                  $UNITM: .WORD   0        ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
         001012   000053                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                                         .SBTTL  COMMON TAGS
                                         ;*************************************************************
                                         ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                         ;*USED IN THE PROGRAM.
                 001300                          .=1300
        001300                           $CMTAG:                              ;;START OF COMMON TAGS
        001300   000000                          .WORD    0
        001302      000                  $TSTNM: .BYTE    0                   ;;CONTAINS THE TEST NUMBER
        001303      000                  $ERFLG: .BYTE    0                   ;;CONTAINS ERROR FLAG
        001304   000000                  $ICNT:  .WORD    0                   ;;CONTAINS SUBTEST ITERATION COUNT
        001306   000000                  $LPADR: .WORD    0                   ;;CONTAINS SCOPE LOOP ADDRESS
        001310   000000                  $LPERR: .WORD    0                   ;;CONTAINS SCOPE RETURN FOR ERRORS
        001312   000000                  $ERTTL: .WORD    0                   ;;CONTAINS TOTAL ERRORS DETECTED
        001314      000                  $ITEMB: .BYTE    0                   ;;CONTAINS ITEM CONTROL BYTE
        001315      001                  $ERMAX: .BYTE    1                   ;;CONTAINS MAX. ERRORS PER TEST
        001316   000000                  $ERRPC: .WORD    0                   ;;CONTAINS PC OF LAST ERROR INSTRUCTION
        001320   000000                  $GDADR: .WORD    0                   ;;CONTAINS ADDRESS OF 'GOOD' DATA
        001322   000000                  $BDADR: .WORD    0                   ;;CONTAINS ADDRESS OF 'BAD' DATA
        001324   000000                  $GDDAT: .WORD    0                   ;;CONTAINS 'GOOD' DATA
        001326   000000                  $BDDAT: .WORD    0                   ;;CONTAINS 'BAD' DATA
        001330   000000                          .WORD    0                   ;;RESERVED--NOT TO BE USED
        001332   000000                          .WORD    0
        001334      000                  $AUTOB: .BYTE    0                   ;;AUTOMATIC MODE INDICATOR
        001335      000                  $INTAG: .BYTE    0                   ;;INTERRUPT MODE INDICATOR
        001336   000000                          .WORD    0
        001340   177570                  SWR:    .WORD    DSWR                ;;ADDRESS OF SWITCH REGISTER
        001342   177570                  DISPLAY: .WORD   DDISP               ;;ADDRESS OF DISPLAY REGISTER
        001344   177560                  $TKS:   177560                       ;;TTY KBD STATUS
        001346   177562                  $TKB:   177562                       ;;TTY KBD BUFFER
        001350   177564                  $TPS:   177564                       ;;TTY PRINTER STATUS REG. ADDRESS
        001352   177566                  $TPB:   177566                       ;;TTY PRINTER BUFFER REG. ADDRESS
        001354      000                  $NULL:  .BYTE    0                   ;;CONTAINS NULL CHARACTER FOR FILLS
        001355      002                  $FILLS: .BYTE    2                   ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
        001356      012                  $FILLC: .BYTE    12                  ;;INSERT FILL CHARS. AFTER A "LINE FEED"
        001357      000                  $TPFLG: .BYTE    0                   ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
                 000007                  .REPT    7
        001360   000000                  $TMP0:  .WORD    0                   ;;USER DEFINED
        001362   000000                  $TMP1:  .WORD    0                   ;;USER DEFINED
        001364   000000                  $TMP2:  .WORD    0                   ;;USER DEFINED
        001366   000000                  $TMP3:  .WORD    0                   ;;USER DEFINED
        001370   000000                  $TMP4:  .WORD    0                   ;;USER DEFINED
        001372   000000                  $TMP5:  .WORD    0                   ;;USER DEFINED
        001374   000000                  $TMP6:  .WORD    0                   ;;USER DEFINED
        001376   000000                  $ESCAPE:0                            ;;ESCAPE ON ERROR ADDRESS
        001400      207      377      377 $BELL: .ASCIZ   <207><377><377>     ;;CODE FOR BELL
        001404      077                  $QUES:  .ASCII   /?/                 ;;QUESTION MARK
        001405      015                  $CRLF:  .ASCII   <15>                ;;CARRIAGE RETURN
        001406      012      000         $LF:    .ASCIZ   <12>                ;;LINE FEED
                                         ;*************************************************************
```

```
                                        .SBTTL  APT MAILBOX-ETABLE
                                        ;*********************************************************************
                                        .EVEN
     001410                             $MAIL:                    ;;APT MAILBOX
     001410  000000                     $MSGTY: .WORD   AMSGTY    ;;MESSAGE TYPE CODE
     001412  000000                     $FATAL: .WORD   AFATAL    ;;FATAL ERROR NUMBER
     001414  000000                     $TESTN: .WORD   ATESTN    ;;TEST NUMBER
     001416  000000  000000             $PASS:  .WORD   APASS,0   ;;PASS COUNT ;&& ADDITIONAL WORD LOCATION FOR OVERFLOW
     001422  000000                     $DEVCT: .WORD   ADEVCT    ;;DEVICE COUNT
     001424  000000                     $UNIT:  .WORD   AUNIT     ;;I/O UNIT NUMBER
     001426  000000                     $MSGAD: .WORD   AMSGAD    ;;MESSAGE ADDRESS
     001430  000000                     $MSGLG: .WORD   AMSGLG    ;;MESSAGE LENGTH
     001432                             $ETABLE:                  ;;APT ENVIRONMENT TABLE
     001432     000                     $ENV:   .BYTE   AENV      ;;ENVIRONMENT BYTE
     001433     000                     $ENVM:  .BYTE   AENVM     ;;ENVIRONMENT MODE BITS
     001434  000000                     $SWREG: .WORD   ASWREG    ;;APT SWITCH REGISTER
     001436  000000                     $USWR:  .WORD   AUSWR     ;;USER SWITCHES
     001440  000000                     $CPUOP: .WORD   ACPUOP    ;;CPU TYPE,OPTIONS
                                        ;*                        BITS 15-11=CPU TYPE
                                        ;*                                11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                        ;*                                11/70=06,PDQ=07,Q=10
                                        ;*                        BIT 10=REAL TIME CLOCK
                                        ;*                        BIT  9=FLOATING POINT PROCESSOR
                                        ;*                        BIT  8=MEMORY MANAGEMENT
     001442     000                     $MAMS1: .BYTE   AMAMS1    ;;HIGH ADDRESS,M.S. BYTE
     001443     000                     $MTYP1: .BYTE   AMTYP1    ;;MEM. TYPE,BLK#1
                                        ;*                        MEM.TYPE BYTE   --  (HIGH BYTE)
                                        ;*                                900 NSEC CORE=001
                                        ;*                                300 NSEC BIPOLAR=002
                                        ;*                                500 NSEC MOS=003
     001444  000000                     $MADR1: .WORD   AMADR1    ;;HIGH ADDRESS,BLK#1
                                        ;*                          MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
     001446     000                     $MAMS2: .BYTE   AMAMS2    ;;HIGH ADDRESS,M.S. BYTE
     001447     000                     $MTYP2: .BYTE   AMTYP2    ;;MEM.TYPE,BLK#2
     001450  000000                     $MADR2: .WORD   AMADR2    ;;MEM.LAST ADDRESS,BLK#2
     001452     000                     $MAMS3: .BYTE   AMAMS3    ;;HIGH ADDRESS,M.S.BYTE
     001453     000                     $MTYP3: .BYTE   AMTYP3    ;;MEM.TYPE,BLK#3
     001454  000000                     $MADR3: .WORD   AMADR3    ;;MEM.LAST ADDRESS,BLK#3
     001456     000                     $MAMS4: .BYTE   AMAMS4    ;;HIGH ADDRESS,M.S.BYTE
     001457     000                     $MTYP4: .BYTE   AMTYP4    ;;MEM.TYPE,BLK#4
     001460  000000                     $MADR4: .WORD   AMADR4    ;;MEM.LAST ADDRESS,BLK#4
     001462  000300                     $VECT1: .WORD   AVECT1    ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
     001464  000000                     $VECT2: .WORD   AVECT2    ;;INTERRUPT VECTOR#2BUS PRIORITY#2
     001466  172410                     $BASE:  .WORD   ABASE     ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
     001470  000000                     $DEVM:  .WORD   ADEVM     ;;DEVICE MAP
     001472  000000                     $CDW1:  .WORD   ACDW1     ;;CONTROLLER DESCRIPTION WORD#1
     001474  000000                     $CDW2:  .WORD   ACDW2     ;;CONTROLLER DESCRIPTION WORD#2
     001476  000000                     $DDW0:  .WORD   ADDW0     ;;DEVICE DESCRIPTOR WORD#0
     001500  000000                     $DDW1:  .WORD   ADDW1     ;;DEVICE DESCRIPTOR WORD#1
     001502  000000                     $DDW2:  .WORD   ADDW2     ;;DEVICE DESCRIPTOR WORD#2
     001504  000000                     $DDW3:  .WORD   ADDW3     ;;DEVICE DESCRIPTOR WORD#3
     001506  000000                     $DDW4:  .WORD   ADDW4     ;;DEVICE DESCRIPTOR WORD#4
     001510  000000                     $DDW5:  .WORD   ADDW5     ;;DEVICE DESCRIPTOR WORD#5
     001512  000000                     $DDW6:  .WORD   ADDW6     ;;DEVICE DESCRIPTOR WORD#6
     001514  000000                     $DDW7:  .WORD   ADDW7     ;;DEVICE DESCRIPTOR WORD#7
     001516  000000                     $DDW8:  .WORD   ADDW8     ;;DEVICE DESCRIPTOR WORD#8
     001520  000000                     $DDW9:  .WORD   ADDW9     ;;DEVICE DESCRIPTOR WORD#9
```

```
        001522  000000                  $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
        001524  000000                  $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
        001526  000000                  $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
        001530  000000                  $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
        001532  000000                  $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
        001534  000000                  $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
        001536                          $ETEND:
                                        .MEXIT
```

```
                                .SBTTL  ERROR POINTER TABLE
                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT
        001536                  $ERRTB:
                                ;ITEM 1
001536  043502                          .WORD   EM2     ;CANNOT ACCESS DR11 REGISTER
001540  047023                          .WORD   DH2     ;TEST #  ERR PC  ABRTPC  REGISTER
001542  051566                          .WORD   DT2     ;$TESTN,$ERRPC,OLDPC1,DREG,0
001544  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 2
001546  043536                          .WORD   EM3     ;DR11-B OR W MODE INCORRECT (0=B, 1=W)
001550  047064                          .WORD   DH3     ;TEST #  ERR PC  EXPMOD  ACTMOD  CSRADR
001552  051600                          .WORD   DT3     ;$TESTN,$ERRPC,$TMP1,BORW,CSR,0
001554  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 3
001556  043604                          .WORD   EM4     ;INIT FAILED TO CLEAR WCR
001560  047133                          .WORD   DH4     ;TEST #  ERR PC  WCRADR  WCRCONTENTS
001562  051614                          .WORD   DT4     ;$TESTN,$ERRPC,WCR,RWCR,0
001564  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 4
001566  043635                          .WORD   EM5     ;INIT FAILED TO CLEAR BAR
001570  047177                          .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001572  051626                          .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001574  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 5
001576  043666                          .WORD   EM6     ;INIT FAILED TO CLEAR BDR
001600  047246                          .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
001602  051642                          .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
001604  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 6
001606  043717                          .WORD   EM7     ;INIT FAILED TO CLEAR ALL CSR R-W BITS
001610  047312                          .WORD   DH7     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001612  051654                          .WORD   DT7     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001614  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 7
001616  043765                          .WORD   EM10    ;RESET FAILED TO CLEAR WCR
001620  047133                          .WORD   DH4     ;TEST #  ERR PC  WCRADR  WCRCONTENTS
001622  051614                          .WORD   DT4     ;$TESTN,$ERRPC,WCR,RWCR,0
001624  000000                          .WORD   0       ;PRINT ALL DATA OCTAL
```

```

                                   ;ITEM 10
001626  044017                             .WORD    EM11     ;ATTEMPT TO SET ALL WCR BITS FAILED
001630  047133                             .WORD    DH4      ;TEST #  ERR PC  WCRADR  WCRCONTENTS
001632  051614                             .WORD    DT4      ;$TESTN,$ERRPC,WCR,RWCR,0
001634  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 11
001636  044062                             .WORD    EM12     ;RESET FAILED TO CLEAR BAR
001640  047177                             .WORD    DH5      ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001642  051626                             .WORD    DT5      ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001644  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 12
001646  044114                             .WORD    EM13     ;ATTEMPT TO SET ALL BAR BITS TO 1 FAILED
001650  047177                             .WORD    DH5      ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001652  051626                             .WORD    DT5      ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001654  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 13
001656  044164                             .WORD    EM14     ;CSR BIT TEST FAILED (FATAL - DIAGNOSTIC NOT CONTINUED)
001660  047366                             .WORD    DH14     ;                 BIT(S)
                                                             ;TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS
001662  051670                             .WORD    DT14     ;$TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
001664  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 14
001666  044253                             .WORD    EM15     ;CSR BIT TEST FAILED
001670  047366                             .WORD    DH14     ;                 BIT(S)
                                                             ;TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS
001672  051670                             .WORD    DT14     ;$TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
001674  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 15
001676  044277                             .WORD    EM16     ;EIR BIT TEST FAILED
001700  047501                             .WORD    DH16     ;                 BIT(S)
                                                             ;TEST #  ERR PC  TESTED  EIRADR  EIREXP  EIRCONTENTS
001702  051706                             .WORD    DT16     ;$TESTN,$ERRPC,BUT,CSR,EEIR,REIR,0
001704  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 16
001706  044323                             .WORD    EM17     ;READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR
001710  047614                             .WORD    DH17     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001712  051724                             .WORD    DT17     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001714  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 17
001716  044412                             .WORD    EM20     ;ATTN AND ERROR FAILED TO SET PROPERLY
001720  047614                             .WORD    DH17     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001722  051724                             .WORD    DT17     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001724  000000                             .WORD    0        ;PRINT ALL DATA OCTAL


                                   ;ITEM 20
001726  044460                             .WORD    EM21     ;ATTN AND ERROR FAILED TO CLEAR PROPERLY
001730  047614                             .WORD    DH17     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001732  051724                             .WORD    DT17     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001734  000000                             .WORD    0        ;PRINT ALL DATA OCTAL
```

```
                                  ;ITEM 21
001736  044530                          .WORD   EM22    ;ERROR BIT SHOULD HAVE BEEN CLEAR
001740  047614                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001742  051724                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001744  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 22
001746  044640                          .WORD   EM24    ;READY OF CSR WAS NOT SET
001750  047614                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001752  051724                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001754  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 23
001756  044671                          .WORD   EM25    ;BIT 0 OF THE BAR WAS SET
001760  047177                          .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001762  051626                          .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001764  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 24
001766  045016                          .WORD   EM30    ;FUNCTION BIT(S) ARE NOT CLEAR
001770  047614                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001772  051724                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001774  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 25
001776  045054                          .WORD   EM31    ;DSTAT A, B OR C ARE NOT AS EXPECTED
002000  047614                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002002  051724                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002004  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 26
002006  045120                          .WORD   EM32    ;BDR IS NOT CLEAR
002010  047246                          .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
002012  051642                          .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
002014  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 27
002016  045141                          .WORD   EM33    ;ALL BDR BITS ARE NOT SET
002020  047246                          .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
002022  051642                          .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
002024  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 30
002026  045232                          .WORD   EM35    ;BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN
002030  050020                          .WORD   DH34    ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002032  051770                          .WORD   DT34    ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002034  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                  ;ITEM 31
002036  045313                          .WORD   EM36    ;BDR PATTERN NOT CORRECT
002040  050020                          .WORD   DH34    ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002042  051770                          .WORD   DT34    ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002044  000000                          .WORD   0       ;PRINT ALL DATA OCTAL
```

```
                                  ;ITEM 32
002046  045343                            .WORD   EM37      ;READY IS NOT THE ONLY BIT SET
002050  047614                            .WORD   DH17      ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002052  051724                            .WORD   DT17      ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002054  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 33
002056  045401                            .WORD   EM40      ;READY SHOULD NOT BE SET
002060  047614                            .WORD   DH17      ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002062  051724                            .WORD   DT17      ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002064  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 34
002066  045431                            .WORD   EM41      ;READY WAS CLEARED BUT NEVER SET AGAIN
002070  047614                            .WORD   DH17      ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002072  051724                            .WORD   DT17      ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002074  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 35
002076  045533                            .WORD   EM43      ;DR11 FAILED TO INTERRUPT
002100  050074                            .WORD   DH43      ;TEST #  ERR PC  CSRADR  CSRCONTENTS
002102  052004                            .WORD   DT43      ;$TESTN,$ERRPC,CSR,RCSR,0
002104  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 36
002106  045564                            .WORD   EM44      ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
002110  050074                            .WORD   DH43      ;TEST #  ERR PC  CSRADR  CSRCONTENTS
002112  052004                            .WORD   DT43      ;$TESTN,$ERRPC,CSR,RCSR,0
002114  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 37
002116  045634                            .WORD   EM45      ;ERROR BIT SHOULD NOT BE CLEAR
002120  047614                            .WORD   DH17      ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002122  051724                            .WORD   DT17      ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002124  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 40
002126  045747                            .WORD   EM47      ;CSR IS WRONG
002130  047614                            .WORD   DH17      ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002132  051724                            .WORD   DT17      ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002134  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 41
002136  045764                            .WORD   EM50      ;TRANSFERS SHOULD HAVE BEEN INHIBITED
002140  050140                            .WORD   DH50      ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BARADR  BAREXP  BARRCV
002142  052016                            .WORD   DT50      ;$TESTN,$ERRPC,WCR,EWCR,RWCR,BAR,EBAR,RBAR,0
002144  000000                            .WORD   0         ;PRINT ALL DATA OCTAL

                                  ;ITEM 42
002146  046031                            .WORD   EM51      ;DR11 SHOULD NOT HAVE INTERRUPTED A SECOND TIME
002150  050074                            .WORD   DH43      ;TEST #  ERR PC  CSRADR  CSRCONTENTS
002152  052004                            .WORD   DT43      ;$TESTN,$ERRPC,CSR,RCSR,0
002154  000000                            .WORD   0         ;PRINT ALL DATA OCTAL
```

```

                                  ;ITEM 43
002156  046110                            .WORD   EM52    ;EXPECTED INTERRUPT DID NOT OCCUR
002160  050074                            .WORD   DH43    ;TEST #  ERR PC  CSRADR  CSRCONTENTS
002162  052004                            .WORD   DT43    ;$TESTN,$ERRPC,CSR,RCSR,0
002164  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 44
002166  046177                            .WORD   EM54    ;BAR IS WRONG
002170  047744                            .WORD   DH26    ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
002172  051754                            .WORD   DT26    ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
002174  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 45
002176  046214                            .WORD   EM55    ;BAD DATA IN BDR
002200  050020                            .WORD   DH34    ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002202  051770                            .WORD   DT34    ;$TESTN,$ERRPC,BDR,EBDR,RBDR,
002204  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 46
002206  046272                            .WORD   EM57    ;BUFFER DATA NOT CORRECT
002210  050316                            .WORD   DH57    ;                CHECK   CHECK   INPUT   INPUT
                                                          ;TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR
002212  052056                            .WORD   DT57    ;$TESTN,$ERROC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
002214  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 47
002216  046322                            .WORD   EM60    ;TOO MANY WORDS WERE TRANSFERED
002220  050463                            .WORD   DH60    ;                DIDNOT
                                                          ;TEST #  ERR PC  EXPECT  ADRESS  CSRADR
002222  052076                            .WORD   DT60    ;$TESTN,$ERRPC,$TMP2,$TMP3,CSR,0
002224  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 50
002226  046361                            .WORD   EM61    ;UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW
002230  050561                            .WORD   DH61    ;TEST #  ERR PC  WCRADR  OLDPC   TRAP ADR
002232  052112                            .WORD   DT61    ;$TESTN,$ERRPC,WCR,OLDPC2,BDVECT,0
002234  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 51
002236  046444                            .WORD   EM62    ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
002240  050632                            .WORD   DH62    ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  CSREXP  CSRRCV  BAREXP  BAR
002242  052126                            .WORD   DT62    ;$TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
002244  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 52
002246  046513                            .WORD   EM63    ;DR11 INTERRUPTED AT WRONG LEVEL
002250  050741                            .WORD   DH63    ;TEST #  ERR PC  EXPLVL  RCVLVL  CSRADR
002252  052152                            .WORD   DT63    ;$TESTN,$ERRPC,DRLEV,LEVEL,CSR,0
002254  000000                            .WORD   0       ;PRINT ALL DATA OCTAL


                                  ;ITEM 53
002256  045533                            .WORD   EM43    ;DR11 FAILED TO INTERRUPT
002260  051010                            .WORD   DH64    ;TEST #  ERR PC  EXPLVL  CSRADR
002262  052166                            .WORD   DT64    ;$TESTN,$ERRPC,$TMP1,CSR,0
002264  000000                            .WORD   0       ;PRINT ALL DATA OCTAL
```

```
    429                                  ;ITEM 54
    430 002266  046553                          .WORD   EM65    ;2-N CYCLE BURST SWITCH IN WRONG POSITION
    431 002270  051047                          .WORD   DH65    ;TEST #  ERR PC  CSRADR  EIREXP  EIRRCV
    432 002272  052200                          .WORD   DT65    ;$TESTN,$ERRPC,CSR,EEIR,REIR,0
    433 002274  000000                          .WORD   0       ;PRINT ALL DATA OCTAL
```

```
002276                    ER200:                                  ;THIS IS THE STARTING POINT FOR ERROR MESSAGES 201
                                                                  ;THROUGH 277.  THEY ARE USED FOR MULTIPLE ERROR MESSAGES.

                          ;ITEM 201
002276  046272                      .WORD     EM57                ;BUFFER DATA NOT CORRECT
002300  050316                      .WORD     DH57                ;                    CHECK    CHECK    INPUT    INPUT
                                                                  ;TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR
002302  052056                      .WORD     DT57                ;$TESTN,$ERRPC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
002304  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 202
002306  046667                      .WORD     EM202               ;CSR PATTERN NOT CORRECT
002310  051165                      .WORD     DH202               ;TEST #  ERR PC  CSRADR  PATLDD  CSREXP  CSRRCV
002312  052230                      .WORD     DT202               ;$TESTN,$ERRPC,CSR,BUT,ECSR,RCSR,0
002314  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 203
002316  044722                      .WORD     EM26                ;BIT PATTERN TEST FAILED IN BAR
002320  047744                      .WORD     DH26                ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
002322  051754                      .WORD     DT26                ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
002324  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 204
002326  044761                      .WORD     EM27                ;WCR DATA PATTERN NOT CORRECT
002330  047670                      .WORD     DH23                ;TEST #  ERR PC  WCRADR  WCREXP  WCRCONTENTS
002332  051740                      .WORD     DT23                ;$TESTN,$ERRPC,WCR,EWCR,RWCR,0
002334  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 205
002336  045313                      .WORD     EM36                ;BDR PATTERN NOT CORRECT
002340  050020                      .WORD     DH34                ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002342  051770                      .WORD     DT34                ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002344  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 206
002346  046151                      .WORD     EM53                ;WCR NOT EQUAL TO ZERO
002350  051404                      .WORD     DH210               ;TEST #  ERR PC  WCRADR  WCRCONTENTS
002352  052300                      .WORD     DT210               ;$TESTN,$ERRPC,WCR,RWCR,0
002354  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 207
002356  046177                      .WORD     EM54                ;BAR IS WRONG
002360  047744                      .WORD     DH26                ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
002362  051754                      .WORD     DT26                ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
002364  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 210
002366  046234                      .WORD     EM56                ;DATA NOT TRANSFERED CORRECTLY
002370  050237                      .WORD     DH56                ;TEST #  ERR PC  NPR1AD  NPR1EX  NPR1RC  CSRADR
002372  052040                      .WORD     DT56                ;$TESTN,$ERRPC,ANPR1,ENPR1,NPR1,CSR,0
002374  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL


                          ;ITEM 211
002376  046717                      .WORD     EM211               ;BDR AND-OR WCR AND-OR BAR ARE INCORECT
002400  051450                      .WORD     DH211               ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BDREXP  BDRRCV  BAREXP  BAR
002402  052312                      .WORD     DT211               ;$TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
002404  000000                      .WORD     0                   ;PRINT ALL DATA OCTAL
```

```
                                          ;ITEM 212
 002406  045672                                   .WORD   EM46     ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
 002410  047614                                   .WORD   DH17     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
 002412  051724                                   .WORD   DT17     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
 002414  000000                                   .WORD   0        ;PRINT ALL DATA OCTAL
```

```
                                   .SBTTL  STORAGE LOCATIONS
                          ;*****************************************************************
                          ;
                          ;        STORAGE LOCATIONS
                          ;
                          ;***************************** ***********************************

 002416  000001           QTYBRD: .WORD   1       ;TOTAL # DR11 BOARDS BEING TESTED (DEFAULT = 1)

 002420                   REGADR: .BLKW   16.     ;TOTAL: 16 LOCATIONS FOR BOARD ADDRESSES
 002460                   VECADR: .BLKW   16.     ;TOTAL: 16 LOCATIONS FOR VECTOR ADDRESSES

                          ;REGISTER AND VECTOR ADDRESS STORAGE LOCATIONS FOR THE DR11 UNDER TEST

                          ;*****************************************************************
                          ;DO NOT INSERT ANY ITEMS BETWEEN ANY OF THE LOCATIONS BELOW
                          ;*****************************************************************
 002520  000000           WCR:    .WORD   0
 002522  000000           BAR:    .WORD   0
 002524  000000           CSR:    .WORD   0
 002526  000000           BDR:    .WORD   0
 002530  000000           DRINV:  .WORD   0
 002532  000000           DRVS:   .WORD   0
 002534  000000           SDRINV: .WORD   0
 002536  000000           SDRVS:  .WORD   0
                          ;*****************************************************************
                          ;DO NOT INSERT ANY ITEMS BETWEEN ANY OF THE LOCATIONS ABOVE
                          ;*****************************************************************
 002540  000000           BUT:    .WORD   0       ;BIT(S) UNDER TEST LOCATION
 002542  000000           LEVEL:  .WORD   0       ;BR LEVEL LOCATION
 002544  000000           BDVECT: .WORD   0
 002546  000000           DEVMSK: .WORD   0
 002550  000000           TABINX: .WORD   0
 002552  000000           DREG:   .WORD   0
 002554  000000           DRLEV:  .WORD   0
 002556  000000           NXTTST: .WORD   0
 002560  000000           PASCNT: .WORD   0

 002562  000000           RCSR:   .WORD   0       ;CSR ACTUALLY READ FROM DEVICE UNDER TEST
 002564  000000           REIR:   .WORD   0       ;EIR ACTUALLY READ FROM DEVICE UNDER TEST
 002566  000000           RBDR:   .WORD   0       ;BDR ACTUALLY READ FROM DEVICE UNDER TEST
 002570  000000           RBAR:   .WORD   0       ;BAR ACTUALLY READ FROM DEVICE UNDER TEST
 002572  000000           RWCR:   .WORD   0       ;WCR ACTUALLY READ FROM DEVICE UNDER TEST

 002574  000000           ECSR:   .WORD   0       ;CSR EXPECTED
 002576  000000           EEIR:   .WORD   0       ;EIR EXPECTED
 002600  000000           EBDR:   .WORD   0       ;BDR EXPECTED
 002602  000000           EBAR:   .WORD   0       ;BAR EXPECTED
 002604  000000           EWCR:   .WORD   0       ;WCR EXPECTED
 002606  000000           ENPR1:  .WORD   0       ;EXPECTED OF NPR1
 002610  002614           ANPR1:  .WORD   NPR1    ;ADDRESS OF NPR1
 002612  000000           BORW:   .WORD   0
 002614  052525           NPR1:   .WORD   52525
 002616  173000           DIOMEM: .WORD   173000
 002620  037164           INBUF:  .WORD   XINBUF
 002622  040166           CHKBUF: .WORD   XCHKBU
 002624  000000           BUFLEN: .WORD   0
```

```
002626  000000          LENCHK: .WORD   0
002630  000000          BRWAIT: .WORD   0
002632  000000          WCLEN:  .WORD   0
002634  000000          RDYCHK: .WORD   0
002636  177560          TKS:    .WORD   177560
002640  177562          TKB:    .WORD   177562
002642  177564          TPS:    .WORD   177564
002644  177566          TPB:    .WORD   177566
002646  000000          MSG:    .WORD   0
002650  000000          ADDR:   .WORD   0
002652  000000          MESSAG: .WORD   0
002654  000000          FLAG:   .WORD   0
002656  000000          FNCCNT: .WORD   0
002660  000000          INBUF1: .WORD   0
002662  000000          TIME:   .WORD   0       ;GENERAL PURPOSE TIMER
002664  000000          LOOP:   .WORD   0       ;GENERAL PURPOSE LOOP COUNTER
002666  000000          ANSWER: .WORD   0
002670  000000          BDFAIL: .WORD   0
002672  000000          MANSIZ: .WORD   0
002674  000000          OLDPC1: .WORD   0       ;LOCATION TO STORE RETURN PC IN SUBROUTINES WITH ERROR CALLS
002676  000000          OLDPS1: .WORD   0       ;LOCATION TO STORE PS
002700  000000          OLDPC2: .WORD   0       ;LOCATION TO STORE RETURN PC IN SUBROUTINES WITH ERROR CALLS
002702  000000          OLDPS2: .WORD   0       ;LOCATION TO STORE PS
002704  000000          OFL:    .WORD   0       ;FIRST CHAR FLAG
002706  000000          LRGSTC: .WORD   0       ;LOCATION FOR LARGEST NUMBER CHARACTER FOR THE READ SUBROUTINE
002710  000000          EOPLOC: .WORD   0       ;LOCATION TO HOLD FLAG DECIDING IF EOP MSGS ARE TO BE PRINTED
002712  000000          BITTST: .WORD   0       ;LOCATION TO PUT THE BIT STATE TO PRINT - USED BY SUBROUTINE PSTATE
002714  000000          MEMGMT: .WORD   0       ;LOCATION TO HOLD FLAG SAYING MEMORY MANAGEMENT IS AVAILABLE
002716  000000          ERRCNT: .WORD   0
```

```
                                 .SBTTL  DEVICE DESCRIPTOR WORD BIT DESCRIPTION
                         ;******************************************************************
                         ;       DESCRIPTION OF BITS IN THE DDW (DEVICE DESCRIPTOR WORD):

                         ;       BIT 0   DR11-W=0, DR11-B=1
                         ;       BIT 1   2 CYCLE=0, N CYCLE=1
                         ;       BIT 2   CABLE DOESN'T EXIST=0, CABLE DOES EXIST=1
                         ;       BIT 5   \
                         ;       BIT 6    > BR PRIORITY
                         ;       BIT 7   /

002720  000000           DDW:    .WORD   0       ;LOCATION FOR STORAGE OF THE DEVICE DESCRIPTOR WORD
```

```
                                        .SBTTL  SUBROUTINE TO INPUT A CHARACTER OR UP TO A 6 DIGIT NUMBER
                                ;*****************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED IN THE EDIT ROUTINE TO INPUT NUMBERS AND A
                                ;*      SINGLE CHARACTER.  R3 IS TO BE LOADED WITH THE NUMBER OF DIGITS
                                ;*      EXPECTED.  THIS SUBROUTINE WILL EXIT IF A NON-NUMERIC CHARACTER IS
                                ;*      INPUTED, LEAVING THE CHARACTER IN LOCATION 'ANSWER'.  IF A NUMERIC
                                ;*      CHARACTER IS INPUTED, IT WILL CLEAR ALL BUT THE 1ST 4 BITS EXPOSING
                                ;*      THE VALUE OF THE DIGIT INPUTED, AND ADD IT TO R4, WHICH WAS CLEARED
                                ;*      AT THE BEGINING OF THIS SUBROUTINE.  LOCATION 'LRGSTC' IS TO BE LOADED
                                ;*      WITH THE LARGEST ASCII CHARACTER ACCEPTABLE FOR THIS NUMBER, I.E. 7
                                ;*      OR 9 (FOR OCTAL OR DECIMAL INPUT RESPECTIVELY).  IT WILL ONLY ACCEPT
                                ;*      THE NUMBER DIGIT EQUAL TO OR LESS THAN THIS DIGIT.  IT WILL ONLY ACCEPT
                                ;*      THE MAXIMUM NUMBER OF DIGITS SPECIFIED BY R3, PRINTING A <CRLF> WHEN
                                ;*      THAT LIMIT IS REACHED.  IF A <CR> IS INPUTED BEFORE THE MAXIMUM IS
                                ;*      REACHED, ROUTINE EXITS LEAVING THE INPUTED NUMBER IN R4.
                                ;*
                                ;*****************************************************************
002722  005004                  READ:   CLR     R4              ;CLEAR THE CHARACTER RECEIVER
002724  105737  027423                  TSTB    CHARCT          ;SEE IF A CHARACTER WAS INPUTED DURING PRINTING
002730  001406                          BEQ     1$              ;BRANCH TO INPUT A CHARACTER IF NOT
002732  113737  027423  002666          MOVB    CHARCT,ANSWER   ;MOVE THE CHARACTER TO THE ANSWER LOCATION
002740  105037  027423                  CLRB    CHARCT          ;CLEAR THAT SUCKER
002744  000403                          BR      2$              ;GO CHECK IT OUT, YOU DUMMY
002746  104411                  1$:     RDCHR                   ;GET A CHARACTER
002750  012637  002666                  MOV     (SP)+,ANSWER    ;POP INPUTED CHARACTER OFF STACK
002754  022737  000003  002666  2$:     CMP     #CNTLC,ANSWER   ;SEE IF A ^C WAS INPUTED
002762  001003                          BNE     3$              ;BRANCH AROUND ITS PRINTING IF NOT
002764  104401  033607                  TYPE    ,CNTRLC         ;TYPE:  '^C'
002770  000453                          BR      6$              ;KICK OUT OF THIS ROUTINE
002772  022737  000033  002666  3$:     CMP     #ESC,ANSWER     ;SEE IF AN <ESC> WAS INPUTED
003000  001003                          BNE     4$              ;BRANCH AROUND ITS PRINTING IF NOT
003002  104401  033476                  TYPE    ,ESCAPE         ;TYPE:  '<ESC>'
003006  000444                          BR      6$              ;KICK OUT OF THIS ROUTINE
003010  113737  002666  033605  4$:     MOVB    ANSWER,LETNCR   ;MOVE CHARACTER FOR PRINTING
003016  104401  033605                  TYPE    ,LETNCR         ;GO TYPE THE INPUTED CHARACTER
003022  022737  000057  002666          CMP     #'/,ANSWER      ;SEE IF A NON-NUMERIC/ALPH CHARACTER WAS INPUTED
003030  100016                          BPL     5$              ;BRANCH TO R4 TEST IF SO
003032  123737  002706  002666          CMPB    LRGSTC,ANSWER   ;SEE IF A NON-OCTAL/NUMERIC CHARACTER WAS INPUTED
003040  100427                          BMI     6$              ;BRANCH TO EXIT IF SO
003042  013746  002666                  MOV     ANSWER,-(SP)    ;MOVE ASCII TO STACK FOR PREPARATION
003046  042716  000060                  BIC     #60,(SP)        ;CLEAR ALL BUT THE NUMBER INPUTED
003052  006304                          ASL     R4              ;SHIFT R4 THREE PLACES
003054  006304                          ASL     R4              ;TO MAKE ROOM FOR
003056  006304                          ASL     R4              ;THIS CHARACTER
003060  062604                          ADD     (SP)+,R4        ;ADD THE OCTAL NUMBER TO R4
003062  005303                          DEC     R3              ;SUBTRACT 1 FROM THE LOOP COUNTER AND
003064  001330                          BNE     1$              ;BRANCH BACK IF NOT ALL CHARACTERS INPUTED
003066  122737  000071  002706  5$:     CMPB    #'9,LRGSTC      ;SEE IF NUMBER IS TO BE DECIMAL
003074  001011                          BNE     6$              ;BRANCH IF NOT
003076  022704  000007                  CMP     #7,R4           ;SEE IF INPUTED NUMBER IS 7 OR LESS
003102  100006                          BPL     6$              ;BRANCH IF SO
003104  022737  000015  002666          CMP     #CARETN,ANSWER  ;SEE IF CARRIAGE RETURN WAS INPUTED
003112  001402                          BEQ     6$              ;BRANCH IF SO - R4 IS CORRECT
003114  062704  000002                  ADD     #2,R4           ;ADD 2 TO R4 TO MAKE OCTAL NUMBER THE DECIMAL EQUIVALENT
003120  104401  001405          6$:     TYPE    ,$CRLF          ;PRINT A <CRLF>
003124  000207                          RTS     PC              ;EXIT
```

```
                                                .SBTTL  SUBROUTINE TO CAPTURE UNIT #, PASS # & TOTAL ERRORS
                                        ;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS CALLED BY $EOP AND ENDEV TO SAVE THE UNIT NUMBER,
                                        ;*      PASS NUMBER, AND TOTAL ERRORS FOR THAT DEVICE/PASS FOR SAVING WHENEVER
                                        ;*      A DEVICE PASS CONTAINS ERRORS.
                                        ;*
                                        ;*******************************************************************
003126  022737  043452  041170  ERCAPT: CMP     #ENDSTK,CAPNTR  ;SEE IF STACK IS FULL OF BULL
003134  001414                          BEQ     1$              ;KICK OUT IF FULL
003136  013700  041170                  MOV     CAPNTR,R0       ;MOVE CAPNTR CONTENTS TO R0
003142  013720  001424                  MOV     $UNIT,(R0)+     ;PUT UNIT NUMBER ON STACK
003146  013720  001420                  MOV     $PASS+2,(R0)+   ;PUT OVERFLOW PASS NUMBER ON STACK
003152  013720  001416                  MOV     $PASS,(R0)+     ;PUT PASS NUMBER ON STACK
003156  013720  001312                  MOV     $ERTTL,(R0)+    ;PUT TOTAL ERRORS ON STACK
003162  010037  041170                  MOV     R0,CAPNTR       ;RESTORE CAPNTR TO NEW POINTER VALUE
003166  000207                  1$:     RTS     PC              ;EXIT
```

```
                                                .SBTTL  SUBROUTINE TO PRINT THE DATA STORED BY SUBROU.INE ERCAPT
                                        ;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE IS INVOKED BY ENTERING (^Y) DURING THE EXECUTION OF THE
                                        ;*      TEST.  IT PRINTS ALL DATA STORED IN THE 'CAPSTK' STACK STORED BY THE
                                        ;*      'ERCAPT' SUBROUTINE, REINITIALIZES THE POINTER, AND RETURNS.  *DATA*
                                        ;*      *PRINTED*IS*LOST* BECAUSE OF THE REINITIALIZATION OF THE COUNTER.
                                        ;*
                                        ;*******************************************************************
003170  022737  041172  041170  PTCAPT: CMP     #CAPSTK,CAPNTR  ;SEE IF THERE IS ANY DATA TO PRINT
003176  001003                          BNE     1$              ;BRANCH TO PRINT IT IF THERE IS
003200  104401  032725                  TYPE    ,NODATA         ;TYPE:  'NO ERROR TOTALS TO REPORT'
003204  000462                          BR      7$              ;KICK OUT
003206  022737  043452  041170  1$:     CMP     #ENDSTK,CAPNTR  ;SEE IF STACK IS FULL OF BULL
003214  001002                          BNE     2$              ;BRANCH AROUND STACK IS FULL MESSAGE IF NOT
003216  104401  032534                  TYPE    ,STKIFL         ;TYPE:  'STACK IS FULL - DATA MAY HAVE BEEN LOST'
003222  104401  032607          2$:     TYPE    ,ERCHDR         ;TYPE:  'SUMMATION OF ERRORS SINCE BEGINNING OR LAST REPORT'
                                                                ;        'BOARD #   PASS #   ERRTTL'
003226  012700  041172                  MOV     #CAPSTK,R0      ;MOVE ADDRESS OF STACK TO PRINT TO R0
003232  012701  000020                  MOV     #16.,R1         ;MOVE 16 BOARDS TO SEARCH TO R0
003236  005037  001362                  CLR     $TMP1           ;CLEAR $TMP1, DEVICE POINTER
003242  021037  001362          3$:     CMP     (R0),$TMP1      ;SEE IF UNIT NUMBER IS TO PRINT
003246  001403                          BEQ     4$              ;BRANCH TO PRINT DATA IF SO
003250  062700  000010                  ADD     #10,R0          ;GO TO NEXT SET OF DATA AND
003254  000420                          BR      6$              ;GO SEE IF ANY MORE TO CHECK
003256  012046                  4$:     MOV     (R0)+,-(SP)     ;MOVE UNIT NUMBER TO STACK FOR PRINTING
003260  104405                          TYPDS                   ;GO TYPE UNIT NUMBER IN DECIMAL
003262  104401  033764                  TYPE    ,SPACES         ;TYPE 2 SPACES
003266  012046                          MOV     (R0)+,-(SP)     ;MOVE OVERFLOW PASS NUMBER TO STACK FOR PRINTING
003270  001002                          BNE     5$              ;BRANCH IF NON-ZERO
003272  104401  033764                  TYPE    ,SPACES         ;TYPE AN EXTRA 2 SPACES - NUMBER WILL NOT BE EXTENDED
003276  012046                  5$:     MOV     (R0)+,-(SP)     ;MOVE PASS NUMBER TO STACK FOR PRINTING
003300  104406                          TYPDE                   ;GO TYPE PASS NUMBER IN EXTENDED DECIMAL
003302  104401  033764                  TYPE    ,SPACES         ;TYPE 2 SPACES
003306  012046                          MOV     (R0)+,-(SP)     ;MOVE ERROR TOTAL TO STACK FOR PRINTING
003310  104405                          TYPDS                   ;GO TYPE ERROR TOTAL IN DECIMAL
003312  104401  001405                  TYPE    ,$CRLF          ;TYPE <CRLF>
003316  020037  041170          6$:     CMP     R0,CAPNTR       ;SEE IF ALL DATA HAS BEEN PRINTED
003322  001347                          BNE     3$              ;BRANCH BACK IF NOT
003324  005237  001362                  INC     $TMP1           ;INCREMENT DEVICE POINTER
003330  012700  041172                  MOV     #CAPSTK,R0      ;INITIALIZE TO BEGINNING FOR ANOTHER POSSIBLE PASS
003334  005301                          DEC     R1              ;DECREMENT THE LOOP COUNTER AND
003336  001341                          BNE     3$              ;BRANCH UNTIL ALL DEVICE DATA PRINTED
003340  012737  041172  041170          MOV     #CAPSTK,CAPNTR  ;REINITIALIZE CAPNTR
003346  104401  001405                  TYPE    ,$CRLF          ;TYPE ANOTHER <CRLF>
003352  105037  027423          7$:     CLRB    CHARCT          ;CLEAR ANY CHARACTER ENTERED DURING PRINTING
003356  000207                          RTS     PC              ;EXIT
```

```
                                                .SBTTL  SUBROUTINE TO FILL ALL TABLE BOARD ENTRIES
                                        ;*****************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE FILLS ALL TABLE BOARD ENTRIES FOR THE ADDRESSES AND
                                        ;*      VECTORS FROM THE VALUES IN 'REGADR' AND 'VECADR', AND SHOULD BE SET
                                        ;*      UP BEFORE ENTERING THIS SUBROUTINE.
                                        ;*
                                        ;*****************************************************************
003360  005037  001470                  FIXTBL: CLR     $DEVM                   ;CLEAR THE DEVICE MASK
003364  000261                                  SEC                             ;SET THE CARRY BIT AND
003366  006137  001470                          ROL     $DEVM                   ;ROTATE IT INTO $DEVM FOR 1 BOARD
003372  022737  000001  002416                  CMP     #1,QTYBRD               ;SEE IF ONLY 1 BOARD PRESENT
003400  001433                                  BEQ     2$                      ;KICK OUT IF SO - TABLE DOESN'T NEED FILLING
003402  013701  002416                          MOV     QTYBRD,R1               ;FILL ALL TABLE BOARD ENTRIES FROM FIRST
003406  005301                                  DEC     R1                      ;DECREMENT SINCE 1ST POSITION IS ALREADY FILLED
003410  005002                                  CLR     R2                      ;CLEAR INDEX TO SEND POINTER
003412  012703  000002                          MOV     #2,R3                   ;PUT 2 IN INDEX TO RECEIVE POINTER
003416  000261                          1$:     SEC                             ;SET THE CARRY BIT AND
003420  006137  001470                          ROL     $DEVM                   ;ROTATE IT INTO $DEVM
        002420                          RA=REGADR                       ;REDEFINE REGADR AS RA FOR SPACE REASONS
003424  016263  002420  002420                  MOV     RA(R2),RA(R3)           ;TRANSFER ADDRESS TO NEXT POSITION AND
003432  062763  000010  002420                  ADD     #10,RA(R3)              ;ADD 10 FOR NEXT POSITION
        002460                          VA=VECADR                       ;REDEFINE VECADR AS VA FOR SPACE REASONS
003440  016263  002460  002460                  MOV     VA(R2),VA(R3)           ;TRANSFER VECTOR TO NEXT POSITION AND
003446  062763  000010  002460                  ADD     #10,VA(R3)              ;ADD 10 FOR NEXT POSITION
003454  013763  001476  001476                  MOV     $DDWO,$DDWO(R3)         ;MOVE DEVICE DESCRIPTOR WORD TO NEXT POSITION
003462  022223                                  CMP     (R2)+,(R3)+             ;UPDATE INDEX POINTERS
003464  005301                                  DEC     R1                      ;DECREMENT THE LOOP COUNTER
003466  001353                                  BNE     1$                      ;BRANCH BACK IF NOT DONE
003470  000207                          2$:     RTS     PC                      ;EXIT
```

```
                                                 .SBTTL  SUBROUTINE TO LOAD INBUF WITH AN INCREMENTING PATTERN
                                        ;*******************************************************************
                                        ;*
                                        ;*       THIS SUBROUTINE CLEARS THE FIRST LOCATION OF THE BUFFER AND LOADS
                                        ;*       NUMBERS STARTING WITH 1 INTO THE BUFFER.
                                        ;*
                                        ;*******************************************************************
003472  013702  002620                  LODBUF: MOV     INBUF,R2        ;MOVE STARTING ADDRESS OF INBUF TO R2
003476  013703  002624                          MOV     BUFLEN,R3       ;MOVE LOOP COUNTER TO R3
003502  005203                                  INC     R3              ;CORRECT COUNTER
003504  005001                                  CLR     R1              ;CLEAR THE LOADING COUNTER
003506  010122                          1$:     MOV     R1,(R2)+        ;LOAD NEXT BUFFER WORD
003510  005201                                  INC     R1              ;INCREMENT THE LOADING COUNTER
003512  005303                                  DEC     R3              ;DECREMENT THE LOOP COUNTER AND
003514  001374                                  BNE     1$              ;BRANCH BACK IF NOT DONE
003516  000207                                  RTS     PC              ;EXIT
```

```
                                  .SBTTL  SUBROUTINE TO LOAD THE CHKBUF WITH EVEN #'S STARTING WITH 0
                        ;*********************************************************************
                        ;*
                        ;*        THIS SUBROUTINE CLEARS THE FIRST LOCATION OF THE BUFFER AND LOADS
                        ;*        EVEN NUMBERS STARTING WITH 0 INTO THE BUFFER.
                        ;*
                        ;*********************************************************************
003520  013702  002622  CHKBFF: MOV     CHKBUF,R2       ;STARTING ADDRESS OF CHECK-BUFFER TO R2
003524  013701  002624          MOV     BUFLEN,R1       ;MOVE LOOP COUNTER TO R1
003530  005003                  CLR     R3              ;WIPE OUT R3
003532  010322          1$:     MOV     R3,(R2)+        ;MOVE R3 TO CHKBUF ADDRESS AND INC BY 2
003534  010322                  MOV     R3,(R2)+        ;MOVE R3 TO NEXT CHKBUF ADDRESS AND INC BY 2
003536  022341                  CMP     (R3)+,-(R1)     ;ADD 2 TO NUMBER FOR BUFFER & SUBTRACT 2 FROM LOOP COUNTER
003540  005701                  TST     R1              ;SEE IF R1 HAS REACHED ZERO YET
003542  001373                  BNE     1$              ;BRANCH BACK IF NOT DONE
003544  000207          2$:     RTS     PC              ;EXIT
```

```
                                          .SBTTL  SUBROUTINE TO CLEAR IE, CHECK ERROR, READY, WCR=0, AND BAR
                                 ;*******************************************************************
                                 ;*
                                 ;*       THIS SUBROUTINE HAS THE NEED TO CALL AN ERROR IN THE TEST.  THE ERROR
                                 ;*       IS TO BE LOCATED IN THE TEST JUST AFTER THE JSR CALL.  FUTURE USE OF
                                 ;*       THIS SUBROUTINE MUST BE HANDLED AS FOLLOWS:
                                 ;*
                                 ;*               JSR     PC,INTA         ;SUBROUTINE CALL
                                 ;*               ERROR   +51             ;ERROR CALL
                                 ;*               CONTINUE                ;SUBROUTINE RETURNS HERE IF NO ERROR
                                 ;*
                                 ;*******************************************************************
003546  042777  000100  176750  INTA:   BIC     #IE,@CSR        ;CLEAR IE
003554  013702  002624                  MOV     BUFLEN,R2       ;BUFFER LENGTH TO R2
003560  063702  002624                  ADD     BUFLEN,R2       ;NUMBER OF XFERS TIMES 2
003564  063702  002620                  ADD     INBUF,R2        ;CORRECT BAR
003570  017737  176730  002562          MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
003576  032737  010000  002562          BIT     #MA,RCSR        ;SEE IF WE ARE IN MAINTENANCE MODE
003604  001005                          BNE     1$              ;BRANCH AROUND CABLE TEST IF WE ARE, BIT 0 WILL BE CLEAR
003606  032737  000004  002720          BIT     #BIT2,DDW       ;SEE IF THERE IS A CABLE
003614  001401                          BEQ     1$              ;BRANCH IF NO CABLE
003616  005202                          INC     R2              ;CABLE MODE TESTING LEAVES BIT 0 OF BAR SET. CHECK ODD ADRS
003620  017737  176676  002570  1$:     MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
003626  005037  002604                  CLR     EWCR            ;CLEAR EXPECTED LOCATION
003632  010237  002602                  MOV     R2,EBAR         ;MOVE EXPECTED DATA TO EBAR
003636  013737  002562  002574          MOV     RCSR,ECSR       ;MOVE EXPECTED DATA TO ECSR
003644  042737  100000  002574          BIC     #ER,ECSR        ;MAKE SURE ERROR BIT IS CLEAR
003652  052737  000200  002574          BIS     #RY,ECSR        ;MAKE SURE READY BIT IS SET
003660  017737  176634  002572          MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
003666  001012                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003670  023737  002562  002574          CMP     RCSR,ECSR       ;DOES CSR CONTAIN WHAT IT SHOULD
003676  001006                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003700  023737  002570  002602          CMP     RBAR,EBAR       ;DOES BAR CONTAIN WHAT IT SHOULD
003706  001002                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003710  062716  000002                  ADD     #2,(SP)         ;CORRECT PC RETURN TO AFTER THE ERROR CALL
003714  000207                  2$:     RTS     PC              ;EXIT
```

```
                                        .SBTTL  SUBROUTINE TO CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
                                ;*******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE HAS THE NEED TO CALL AN ERROR IN THE TEST AND RETURN
                                ;*      TO THE SUBROUTINE.  THE ERROR AND RETURN JSR ARE TO BE LOCATED IN THE
                                ;*      TEST JUST AFTER THE JSR CALL.  YOU *MUST* CLEAR LOCATION 'ERRCNT'
                                ;*      BEFORE EXECUTION OF THIS SUBROUTINE, OTHERWISE YOU MAY NOT GET ANY
                                ;*      ERRORS PRINTED, OR IF SO, JUST THE DATA WITHOUT THE HEADER. FUTURE
                                ;*      USE OF THIS SUBROUTINE MUST BE HANDLED AS FOLLOWS:
                                ;*
                                ;*      JSR     PC,DATCHK       ;SUBROUTINE CALL
                                ;*      ERROR   +201            ;ERROR CALL
                                ;*      JSR     PC,DATCH2       ;RETURN TO SUBROUTINE AFTER ERROR RTS
                                ;*      CONTINUE                ;SUBROUTINE RETURNS HERE IF NO ERROR(S) OR WHEN DONE
                                ;*
                                ;*******************************************************************
003716  011637  001362          DATCHK: MOV     (SP),$TMP1      ;SAVE PC RETURN
003722  013702  002622                  MOV     CHKBUF,R2       ;STARTING ADDRESS OF CHECK BUFFER TO R2
003726  013703  002620                  MOV     INBUF,R3        ;STARTING ADDRESS OF IN BUFFER TO R3
003732  005037  002626                  CLR     LENCHK          ;CLEAR LENGTH CHECK
003736  005237  002626          DATCH1: INC     LENCHK          ;MAKE A COMPARISON
003742  022223                          CMP     (R2)+,(R3)+     ;IS THE DATA CORRECT?
003744  001423                          BEQ     DATCH2          ;BRANCH IF OK
003746  013716  001362                  MOV     $TMP1,(SP)      ;RESTORE ORIGINAL PC RETURN
003752  016237  177776  001364          MOV     -2(R2),$TMP2    ;MOVE CHECK BUFFER CONTENTS TO $TMP2
003760  010237  001370                  MOV     R2,$TMP4        ;MOVE ADDRESS +2 TO $TMP4
003764  162737  000002  001370          SUB     #2,$TMP4        ;CORRECT SO IT POINTS TO ADDRESS CAUSING ERROR
003772  016337  177776  001366          MOV     -2(R3),$TMP3    ;MOVE INPUT BUFFER CONTENTS TO $TMP3
004000  010337  001372                  MOV     R3,$TMP5        ;MOVE ADDRESS +2 TO $TMP5
004004  162737  000002  001372          SUB     #2,$TMP5        ;CORRECT SO IT POINTS TO ADDRESS CAUSING ERROR
004012  000207                          RTS     PC              ;RETURN TO ERROR CALL - PC ON STACK ALREADY POINTS THERE
004014  023737  002626  002624  DATCH2: CMP     LENCHK,BUFLEN   ;SEE IF THE BUFFER HAS BEEN CHECKED
004022  001345                          BNE     DATCH1          ;GO BACK FOR ANOTHER TRY IF NOT
004024  013716  001362                  MOV     $TMP1,(SP)      ;RESTORE PC RETURN
004030  062716  000006                  ADD     #6,(SP)         ;CORRECT IT SO RETURN IS AFTER THE ERROR CALL
004034  000207                          RTS     PC              ;RETURN
```

```
                                              .SBTTL  SUBROUTINE TO RESTORE DR11 INT VECT & SET CPU PRIORITY TO 7.
                                        ;*****************************************************************************
                                        ;*
                                        ;*       THIS ROUTINE IS USED IN VARIOUS TESTS TO CLEAR ANY DATA THAT
                                        ;*       MAY BE LEFT IN ANY REGISTERS, AND RESTORE CPU PRIORITY TO 7.
                                        ;*
                                        ;*****************************************************************************
 004036  012737  000340  177776  CLENUP: MOV     #LEVEL7,PSW          ;RESTORE CPU TO PRIORITY LEVEL 7
 004044  012777  010000  176452          MOV     #MA,@CSR             ;DO AN INIT CLEARING WCR, BAR & BDR BY SETTING
 004052  005077  176446                  CLR     @CSR                 ;AND CLEARING THE MAINT BIT AND CLEAR THE CSR
 004056  000207                          RTS     PC                   ;EXIT
```

```
                                                 .SBTTL  SUBROUTINE TO CHECK FOR CABLE MODE AND ALTER EXPECTED DATA
                                         ;*********************************************************************************
                                         ;*
                                         ;*      THIS SUBROUTINE CHECKS THE DDW (DEVICE DESCRIPTOR WORD) FOR THE CABLE
                                         ;*      BEING IN OR OUT AND SETS BITS 12, 10, 8 AND 6 IN THE EXPECTED DATA
                                         ;*      LOCATION IF THE CABLE IS OUT.
                                         ;*
                                         ;*********************************************************************************
 004060  032737  000004  002720          CHKCAB: BIT     #BIT2,DDW               ;CHECK FOR CABLE STATUS
 004066  001006                                  BNE     1$                      ;EXIT IF CABLE DOES EXIST
 004070  052737  127000  002574                  BIS     #127000,ECSR            ;SET BITS 12, 10, 8, 7 & 6 - CABLE DOESN'T EXIST
 004076  052737  127000  002540                  BIS     #127000,BUT             ;SET BITS 12, 10, 8, 7 & 6 IN BITS UNDER TEST LOCATION TOO
 004104  000207                          1$:     RTS     PC                      ;RETURN
```

```
                                                .SBTTL  SUBROUTINE TO CHECK CORRECT DATA PATTERN WAS MOVED TO INBUF
                                        ;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE HAS THE NEED TO CALL 2 ERRORS.  THE ERRORS ARE TO BE
                                        ;*      LOCATED IN THE TEST JUST AFTER THE JSR CALL.  FUTURE USE OF THIS
                                        ;*      SUBROUTINE MUST BE HANDLED AS FOLLOWS:
                                        ;*
                                        ;*      JSR     PC,DATOCK               ;SUBROUTINE CALL
                                        ;*      ERROR   +46                     ;ERROR CALL
                                        ;*      JSR     PC,DATOC2               ;RETURN TO SUBROUTINE AFTER ERROR RTS
                                        ;*      ERROR   +47                     ;2ND ERROR CALL
                                        ;*      CONTINUE                        ;SUBROUTINE RETURNS HERE WHEN   .NE
                                        ;*
                                        ;*******************************************************************
004106  011637  001362                  DATOCK: MOV     (SP),$TMP1              ;SAVE PC RETURN
004112  012702  052525                          MOV     #52525,R2               ;DATO NUMBER TO R2
004116  013703  002620                          MOV     INBUF,R3                ;STARTING ADDRESS OF IN BUFFER TO R3
004122  005037  002626                          CLR     LENCHK                  ;CLEAR LENGTH CHECK
004126  005237  002626                  DATOC1: INC     LENCHK                  ;MAKE A COMPARISON
004132  020223                                  CMP     R2,(R3)+                ;IS THE DATA CORRECT?
004134  001415                                  BEQ     DATOC2                  ;BRANCH IF OK
004136  013716  001362                          MOV     $TMP1,(SP)              ;MOVE OLD PC RETURN TO STACK
004142  010237  001364                          MOV     R2,$TMP2                ;MOVE EXPECTED DATA TO $TMP2
004146  016337  177776  001366                  MOV     -2(R3),$TMP3            ;MOVE RECEIVED DATA TO $TMP3
004154  010337  001370                          MOV     R3,$TMP4                ;MOVE ADDRESS +2 TO $TMP4
004160  162737  000002  001370                  SUB     #2,$TMP4                ;CORRECT ADDRESS SO IT POINTS TO ADDRESS CAUSING ERROR
004166  000207                                  RTS     PC                      ;RETURN TO ERROR CALL
004170  023737  002626  002624          DATOC2: CMP     LENCHK,BUFLEN           ;SEE IF THE BUFFER HAS BEEN CHECKED
004176  001353                                  BNE     DATOC1                  ;BUFFER CHECKED?
004200  020223                                  CMP     R2,(R3)+                ;CHECK END OF BUFFER + 1
004202  001017                                  BNE     1$                      ;BRANCH IF NOT LOADED
004204  010237  001364                          MOV     R2,$TMP2                ;MOVE EXPECTED DATA TO $TMP2
004210  016337  177776  001366                  MOV     -2(R3),$TMP3            ;MOVE RECEIVED DATA TO $TMP3
004216  010337  001370                          MOV     R3,$TMP4                ;MOVE ADDRESS +2 TO $TMP4
004222  162737  000002  001370                  SUB     #2,$TMP4                ;CORRECT ADDRESS SO IT POINTS TO ADDRESS CAUSING ERROR
004230  013716  001362                          MOV     $TMP1,(SP)              ;CORRECT PC RETURN
004234  062716  000006                          ADD     #6,(SP)                 ;POINT TO 2ND ERROR CALL AFTER JSR PC,DATOCK
004240  000207                                  RTS     PC                      ;RETURN TO ERROR CALL
004242  013716  001362                  1$:     MOV     $TMP1,(SP)              ;RESTORE RETURN ADDRESS
004246  062716  000010                          ADD     #10,(SP)                ;POINT TO PROPER RETURN AFTER THE ERROR CALLS
004252  000207                                  RTS     PC                      ;EXIT
```

```
                                                 .SBTTL  SUBROUTINE TO CLEAR IE AND HALT IF ERROR IS SET
                                        ;*************************************************************************
                                        ;*
                                        ;*       THIS SUBROUTINE HAS THE NEED TO CALL AN ERROR IN THE TEST.  THE ERROR
                                        ;*       IS TO BE LOCATED IN THE TEST JUST AFTER THE JSR CALL.  FUTURE USE OF
                                        ;*       THIS SUBROUTINE MUST BE HANDLED AS FOLLOWS:
                                        ;*       JSR     PC,ERRCHK       ;SUBROUTINE CALL
                                        ;*       ERROR   +21             ;ERROR CALL
                                        ;*       CONTINUE                ;SUBROUTINE RETURNS HERE IF NO ERROR
                                        ;*
                                        ;*************************************************************************
 004254  042777  000100  176242         ERRCHK: BIC     #IE,@CSR        ;CLEAR IE
 004262  017737  176236  002562                 MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
 004270  013737  002562  002574                 MOV     RCSR,ECSR       ;MOVE EXPECTED DATA TO ECSR
 004276  042737  100000  002574                 BIC     #ER,ECSR        ;CLEAR THE ERROR BIT
 004304  052737  000200  002574                 BIS     #RY,ECSR        ;SET THE READY BIT
 004312  013701  002562                         MOV     RCSR,R1         ;MOVE DATA TO R1 FOR CHECKING
 004316  012737  000200  001360                 MOV     #RY,$TMPO       ;MOVE EXPECTED DATA TO $TMPO
 004324  042701  077577                         BIC     #77577,R1       ;CLEAR ALL BUT THE ERROR AND READY BITS
 004330  022701  000200                         CMP     #RY,R1          ;SEE IF ERROR BIT IS CLEAR AND READY IS SET
 004334  001002                                 BNE     1$              ;BRANCH AROUND PC CORRECTION SO ERROR WILL CALL
 004336  062716  000002                         ADD     #2,(SP)         ;CORRECT PC RETURN - DATA OK
 004342  000207                         1$:     RTS     PC              ;EXIT
```

```
                                             .SBTTL  SUBROUTINE TO GENERATE DEVICE ADDRESS TABLE
                                     ;*******************************************************************
                                     ;*
                                     ;*         THIS SUBROUTINE GENERATES AN ADDRESS TABLE LOCATED AT REGADR STARTING
                                     ;*         WITH THE BASE DEVICE ADDRESS (CONTENTS OF $BASE) IN STEPS OF 10.
                                     ;*
                                     ;*******************************************************************
 004344  012702  002420              DEVADS: MOV     #REGADR,R2              ;POINT R2 TO THE DEVICE ADDRESS TABLE
 004350  013700  001466                      MOV     $BASE,R0                ;LOAD BASE DEVICE ADDRESS IN R0
 004354  012701  000020                      MOV     #16.,R1                 ;MOVE LOOP COUNTER TO R1
 004360  010022                      1$:     MOV     R0,(R2)+                ;MOVE DEVICE ADDRESS TO TABLE
 004362  062700  000010                      ADD     #10,R0                  ;POINT R0 TO NEXT DEVICE ADDRESS
 004366  005301                              DEC     R1                      ;DECREMENT THE LOOP COUNTER AND
 004370  001373                              BNE     1$                      ;BRANCH IF NOT ALL DONE YET
 004372  000207                              RTS     PC                      ;EXIT
```

```
                                                 .SBTTL  SUBROUTINE TO RESET THE ".+2" AND "BPT" LOCATIONS
                                        ;*************************************************************************
                                        ;*
                                        ;*       THIS SUBROUTINE LOADS ".+2" AND "BPT" INTO ALL UNUSED LOCATIONS
                                        ;*       BETWEEN 4-776.
                                        ;*
                                        ;*************************************************************************
004374  012700  004436                  BPINIT: MOV     #BPTINT,R0      ;POINT R0 TO TABLE OF BPT INIT LOCATIONS
004400  012701  000003                          MOV     #3,R1           ;DO 3 SETS OF ".+2" AND "BPT" SETUPS
004404  012002                          1$:     MOV     (R0)+,R2        ;MOVE START ADDRESS TO R2
004406  012003                                  MOV     (R0)+,R3        ;MOVE END ADDRESS TO R3
004410  010204                                  MOV     R2,R4           ;MOVE ADDRESS TO R4
004412  005724                                  TST     (R4)+           ;INCREMENT R4 TO PRODUCE THE ".+2" NUMBER
004414  010422                          2$:     MOV     R4,(R2)+        ;MOVE THE NUMBER TO THE LOCATION
004416  012722  000003                          MOV     #BPT,(R2)+      ;MOVE "BPT" TO THE NEXT LOCATION
004422  022424                                  CMP     (R4)+,(R4)+     ;ADD 4 TO R4
004424  020203                                  CMP     R2,R3           ;SEE IF WE HAVE DONE ALL FOR THIS LOCATION
004426  001372                                  BNE     2$              ;BRANCH BACK FOR ANOTHER TRANSFER IF NOT
004430  005301                                  DEC     R1              ;DECREMENT R1
004432  001364                                  BNE     1$              ;BRANCH BACK IF 3 GROUPS NOT DONE
004434  000207                                  RTS     PC              ;EXIT

004436  000004  000014  000050          BPTINT: .WORD   4,14,50         ;ADDRESSES USED TO PUT ".+2" & "BPT" BACK
004444  000174  000254  001000                  .WORD   174,254,1000
```

```
                                              .SBTTL  SUBROUTINE TO EXTRACT INFORMATION ABOUT THE DR11
                                      ;*******************************************************************
                                      ;*
                                      ;*      THIS SUBROUTINE EXTRACTS INFORMATION ABOUT THE DR11 THAT INTERRUPTED
                                      ;*      AND LOADS THE DATA FOUND INTO THE DEVICE DESCRIPTOR WORD FOR THAT
                                      ;*      BOARD.
                                      ;*
                                      ;*******************************************************************
004452  012710  010000                DRGET:  MOV     #MA,(R0)          ;SET THE MAINTENANCE BIT AND
004456  005010                                CLR     (R0)              ;CLEAR THE CSR TO DO AN INIT
004460  016612  000002                        MOV     2(SP),(R2)        ;MOVE VECTOR+4 FOR THIS MODULE TO VECTOR LOCATION
004464  012616                                MOV     (SP)+,(SP)        ;MOVE RETURN OF THIS SUBROUTINE TO ITS PROPER POSITION
004466  162712  000004                        SUB     #4,(R2)           ;DUMB VECTOR IS WRONG - CORRECT IT
004472  013711  002542                        MOV     LEVEL,(R1)        ;PUT THE PRIORITY LEVEL INTO THE $DDWXX LOCATION
004476  005237  001470                        INC     $DEVM             ;INDICATE DEVICE EXISTENCE IN DEVICE MAP
004502  005237  002416                        INC     QTYBRD            ;INCREMENT DEVICE COUNT
004506  052710  100000                        BIS     #EIR,(R0)         ;GO TO EIR TO GET B/W STATE
004512  011037  002564                        MOV     (R0),REIR         ;MOVE EIR TO REIR
004516  005010                                CLR     (R0)              ;GO BACK TO CSR
004520  012710  010000                        MOV     #MA,(R0)          ;SET THE MAINT BIT
004524  005010                                CLR     (R0)              ;DO AN INIT
004526  032737  000001  002564                BIT     #BIT0,REIR        ;TEST FOR B/W STATE
004534  001003                                BNE     1$                ;BRANCH IF A W
004536  052711  000001                        BIS     #BIT0,(R1)        ;SET STATE IN DEVICE DESCRIPTOR WORD
004542  000406                                BR      2$                ;GO TO CABLE STATUS TEST
004544  032737  000400  002564        1$:     BIT     #N2,REIR          ;CHECK 2/N CYCLE STATE
004552  001402                                BEQ     2$                ;BRANCH IF 2 CYCLE
004554  052711  000002                        BIS     #BIT1,(R1)        ;N CYCLE - SET BIT IN DEVICE DESC
004560  011037  002562                2$:     MOV     (R0),RCSR         ;MOVE RECEIVED DATA TO RCSR TO GET CABLE STATUS
004564  032737  127000  002562                BIT     #127000,RCSR      ;CHECK IF ANY BITS ARE SET - THEY ARE IF NO CABLE
004572  001015                                BNE     3$                ;BRANCH IF NO CABLE
004574  112710  000004                        MOVB    #F2,(R0)          ;CABLE IS POSSIBLY IN - SET FNCT2
004600  011037  002562                        MOV     (R0),RCSR         ;MOVE RECEIVED DATA TO RCSR
004604  052710  010000                        BIS     #MA,(R0)          ;SET THE MAINTENANCE BIT
004610  005010                                CLR     (R0)              ;CLEAR THE CSR TO DO AN INIT
004612  032737  020000  002562                BIT     #AT,RCSR          ;TEST THE ATTN BIT
004620  001402                                BEQ     3$                ;BRANCH IF NOT SET - NO CABLE
004622  052711  000004                        BIS     #BIT2,(R1)        ;SET CABLE BIT IN DEVICE DESC
004626  000207                        3$:     RTS     PC                ;EXIT
```

```
                                                .SBTTL  SUBROUTINE TO PRINT THE AUTOSIZED BOARD CONFIGURATIONS
                                        ;*************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE PRINTS THE BOARD CONFIGURATIONS FOUND BY ASIZE
                                        ;*
                                        ;*************************************************************
004630  005037  002664                  TYPCNF: CLR     LOOP                    ;CLEAR THE BOARD NUMBER COUNTER
004634  013705  001470                          MOV     $DEVM,R5                ;GET DEVICE MAP
004640  012701  002420                          MOV     #REGADR,R1              ;MOVE THE ADDRESS OF THE REGISTER ADDRESS TABLE TO R1
004644  012702  002460                          MOV     #VECADR,R2              ;MOVE THE ADDRESS OF THE VECTOR ADDRESS TABLE TO R2
004650  005003                                  CLR     R3                      ;CLEAR THE DEVICE DESCRIPTOR ADDRESS POINTER
004652  104401  034147                          TYPE    ,NOBUT                  ;TYPE:  'NO. BOARDS UNDER TEST:  '
004656  013746  002416                          MOV     QTYBRD,-(SP)            ;MOVE THE QUANTITY TO THE STACK FOR TYPEOUT
004662  104405                                  TYPDS                           ;TYPE THE NUMBER
004664  104401  034206                          TYPE    ,BRVWPC                 ;TYPE THE HEADER
004670  012700  000020                          MOV     #16.,R0                 ;SET UP LOOP COUNTER FOR 16 BOARDS
004674  032705  000001                  1$:     BIT     #BIT0,R5                ;DEVICE UNDER TEST?
004700  001466                                  BEQ     8$                      ;BRANCH IF NO
004702  013746  002664                          MOV     LOOP,-(SP)              ;PUT BOARD # ON STACK FOR TYPEOUT
004706  104405                                  TYPDS                           ;PRINT BOARD # (0 TO 16)
004710  104401  033773                          TYPE    ,SPACE6                 ;TYPE 6 SPACE CHARACTERS
004714  011146                                  MOV     (R1),-(SP)              ;SAVE REGISTER ADDRESS FOR TYPEOUT
004716  104402                                  TYPOC                           ;PRINT DEVICE REGISTER ADDRESS
004720  104401  033773                          TYPE    ,SPACE6                 ;TYPE 6 SPACE CHARACTERS
004724  011246                                  MOV     (R2),-(SP)              ;SAVE VECTOR ADDRESS FOR TYPEOUT
004726  104403                                  TYPOS                           ;PRINT VECTOR ADDRESS
004730     003     000                          .BYTE   3,0                     ;PRINT 3 DIGITS, LEADING ZEROS SUPPRESSED
004732  104401  034002                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
004736  016337  001476  002720                  MOV     $DDW0(R3),DDW           ;MOVE DEVICE DESCRIPTOR WORD TO DDW
004744  032737  000001  002720                  BIT     #BIT0,DDW               ;TEST WHICH STATE, B OR W, FOR THIS BOARD
004752  001403                                  BEQ     2$                      ;GO PRINT W STATE IF W
004754  104401  034017                          TYPE    ,B                      ;TYPE A 'B'
004760  000402                                  BR      3$                      ;GO TO NEXT CHECK
004762  104401  034021                  2$:     TYPE    ,W                      ;'TYPE A 'W'
004766  104401  034002                  3$:     TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
004772  004737  005630                          JSR     PC,PNTPRI               ;PRINT DEVICE PRIORITY
004776  104401  034002                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005002  032737  000002  002720                  BIT     #BIT1,DDW               ;TEST 2/N CYCLE STATE
005010  001403                                  BEQ     4$                      ;GO PRINT 2 STATE IF 2
005012  104401  034034                          TYPE    ,N                      ;TYPE AN 'N'
005016  000402                                  BR      5$                      ;GO TO NEXT CHECK
005020  104401  034032                  4$:     TYPE    ,TWO                    ;TYPE A '2'
005024  104401  034002                  5$:     TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005030  032737  000004  002720                  BIT     #BIT2,DDW               ;TEST CABLE STATE
005036  001403                                  BEQ     6$                      ;GO PRINT 'NO' IF NO CABLE
005040  104401  034026                          TYPE    ,YES                    ;TYPE 'YES'
005044  000402                                  BR      7$                      ;GO TO LOOP CHECK
005046  104401  034023                  6$:     TYPE    ,NO                     ;TYPE 'NO'
005052  104401  001405                  7$:     TYPE    ,$CRLF                  ;TYPE A <CRLF>
005056  005237  002664                  8$:     INC     LOOP                    ;INCREMENT BOARD COUNT FOR POSSIBLE NEXT PASS
005062  022122                                  CMP     (R1)+,(R2)+             ;INCREMENT COUNTERS
005064  006205                                  ASR     R5                      ;SHIFT R5 TO THE RIGHT TO MOVE BOARD BIT INTO BIT 0
005066  062703  000002                          ADD     #2,R3                   ;ADD 2 TO THE DEVICE DESCRIPTOR WORD POINTER
005072  005300                                  DEC     R0                      ;DECREMENT THE LOOP COUNTER AND
005074  001277                                  BNE     1$                      ;BRANCH BACK FOR CHECK IF 16 BOARDS NOT DONE
005076  104401  001405                          TYPE    ,$CRLF                  ;TYPE ANOTHER <CRLF>
005102  000207                                  RTS     PC                      ;EXIT
```

```
                                                .SBTTL  SUBROUTINE TO CHECK FOR LOCATION BELONGING TO A DR11
                                        ;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE CHECKS FOR THE LOCATION BELONGING TO A DR11.
                                        ;*
                                        ;*******************************************************************
005104  012737  000340  002542  CHK4DR: MOV     #LEVEL7,LEVEL   ;MOVE PRIORITY 7 TO LEVEL
005112  012703  005264                  MOV     #LEVELS,R3      ;MOVE ADDRESS OF PRIORITY LEVELS TO R3
005116  012704  000004                  MOV     #4,R4           ;DO 4 PRIORITY CHECKS
005122  012737  000400  002662  1$:     MOV     #400,TIME       ;SET UP WAIT LOOP COUNTER
005130  012710  010000                  MOV     #MA,(R0)        ;SET THE MAINTENANCE BIT AND
005134  005010                          CLR     (R0)            ;CLEAR TO POSSIBLY DO AN INIT
005136  013737  000014  001362          MOV     BPTVCT,$TMP1    ;SAVE BPT TRAP VECTOR
005144  012737  005222  000014          MOV     #3$,BPTVCT      ;INTERRUPTS TO 3$
005152  012337  177776                  MOV     (R3)+,PSW       ;SET CPU PRIORITY TO NEXT LEVEL
005156  000240                          NOP                     ;KILL A LITTLE TIME
005160  012710  000105                  MOV     #IE+F2+GO,(R0)  ;SET IE, FNCT2 AND GO ATTEMPTING ANOTHER INTERRUPT
005164  005337  002662          2$:     DEC     TIME            ;DECREMENT TIME
005170  001375                          BNE     2$              ;BRANCH BACK UNTIL ZERO
005172  012737  000340  177776          MOV     #LEVEL7,PSW     ;SET CPU PRIORITY BACK TO 7
005200  013737  001362  000014          MOV     $TMP1,BPTVCT    ;RESTORE BPT TRAP VECTOR
005206  162737  000040  002542          SUB     #40,LEVEL       ;PUT LOCATION 'LEVEL' AT NEXT PRIORITY - INTERRUPT FAILED
005214  005304                          DEC     R4              ;DECREMENT LOOP COUNTER
005216  001341                          BNE     1$              ;BRANCH BACK IF NOT ALL PRIORITY LEVELS CHECKED YET
005220  000416                          BR      4$              ;EXIT - THIS LOCATION DOESN'T BELONG TO A DR11
005222  012737  000340  177776  3$:     MOV     #LEVEL7,PSW     ;AHAH - THIS *IS* A DR11 - SET CPU PRIORITY BACK TO 7
005230  013737  001362  000014          MOV     $TMP1,BPTVCT    ;RESTORE BPT TRAP VECTOR
005236  016666  000010  000006          MOV     10(SP),6(SP)    ;MOVE THIS SUBROUTINE'S RETURN UP ONE SPOT ON STACK
005244  011666  000010                  MOV     (SP),10(SP)     ;MOVE TRAP ADDRESS TO RETURN'S OLD LOCATION
005250  062706  000006                  ADD     #6,SP           ;KICK GARBAGE' OFF STACK - GOT TO KEEP IT CLEAN
005254  000402                          BR      5$              ;BRANCH TO KICK OUT
005256  062716  000012          4$:     ADD     #12,(SP)        ;CORRECT RETURN TO NOT DO DR11 SETUP
005262  000207                  5$:     RTS     PC              ;KICK OUT

005264  000300  000240          LEVELS: .WORD   LEVEL6,LEVEL5   ;PRIORITY LEVELS TO LOAD INTO THE PSW
005270  000200  000140                  .WORD   LEVEL4,LEVEL3
```

```
                                              .SBTTL  SUBROUTINE TO AUTO SIZE DR11 BOARD CONFIGURATION
                                     ;*******************************************************************
                                     ;*
                                     ;*       THIS SUBROUTINE AUTOSIZES THE BOARD CONFIGURATION AND CALLS FOR THE
                                     ;*       PRINTING OF THE CONFIGURATION IF BIT 12 OF THE SWITCH REGISTER IS
                                     ;*       CLEAR.
                                     ;*
                                     ;*******************************************************************
005274  012700  001476               ASIZE:  MOV     #$DDW0,R0           ;MOVE ADDRESS OF FIRST DEVICE DESCRIPTOR WORD TO R0
005300  012701  000020                       MOV     #16.,R1             ;CLEAR 16 WORDS OUT OF THE DICTIONARY
005304  005020                       1$:     CLR     (R0)+               ;CLEAR THE WORD - SORRY CAN'T LOOK IT UP ANY MORE
005306  005301                               DEC     R1                  ;DECREMENT THE LOOP COUNTER AND
005310  001375                               BNE     1$                  ;BRANCH BACK IF NOT DONE YET
005312  004737  004374                       JSR     PC,BPINIT           ;GO RESET THE ".+2" AND "BPT" LOCATIONS
005316  004737  004344                       JSR     PC,DEVADS           ;GENERATE DEVICE ADDRESS TABLE
005322  005037  002416                       CLR     QTYBRD              ;CLEAR DEVICE COUNT
005326  005037  001470                       CLR     $DEVM               ;CLEAR DEVICE MAP
005332  013737  000004  002674               MOV     TOVECT,OLDPC1       ;SAVE TIMEOUT VECTOR
005340  012737  005416  000004               MOV     #3$,TOVECT          ;SET TIMEOUT POINTER TO 3$
005346  013737  000006  002676               MOV     TMOPSW,OLDPS1       ;SAVE TIMEOUT PS
005354  012737  000340  000006               MOV     #LEVEL7,TMOPSW      ;CPU PRIORITY TO 7
005362  012700  172604                       MOV     #172604,R0          ;POINT R0 TO UNIT #16 CSR ADDRESS LOCATION
005366  012701  001534                       MOV     #$DDW15,R1          ;LOAD DEVICE DESC ADDRESS
005372  012702  002516                       MOV     #VECADR+36,R2       ;POINT R2 TO UNIT #16 VECTOR ADDRESS LOCATION
005376  012705  000020                       MOV     #16.,R5             ;DO 16 BOARDS
005402  005010                       2$:     CLR     (R0)                ;CHECK FOR REGISTER EXISTENCE
005404  004737  005104                       JSR     PC,CHK4DR           ;GO CHECK FOR A DR11 AT THIS LOCATION IF IT DOES
005410  004737  004452                       JSR     PC,DRGET            ;GO EXTRACT INFO FROM THE DR11
005414  000402                               BR      4$                  ;BRANCH OVER THE STACK CORRECTION
005416  062706  000004               3$:     ADD     #4,SP               ;CORRECT STACK AFTER TIMEOUT
005422  162700  000010               4$:     SUB     #10,R0              ;POINT R0 TO NEXT DEVICE ADDRESS
005426  024142                               CMP     -(R1),-(R2)         ;POINT R1 AND R2 TO NEXT DEVICE & VECTOR LOCATIONS
005430  005305                               DEC     R5                  ;DECREMENT LOOP COUNTER
005432  001403                               BEQ     5$                  ;EXIT IF ALL DONE WITH 16 BOARDS
005434  006337  001470                       ASL     $DEVM               ;ADJUST DEVICE MAP FOR NEXT UNIT CHECK
005440  000760                               BR      2$                  ;GO CHECK NEXT LOCATION
005442  013737  002676  000006       5$:     MOV     OLDPS1,TMOPSW       ;RESTORE TIMEOUT PS
005450  013737  002674  000004               MOV     OLDPC1,TOVECT       ;RESTORE TIMEOUT VECTOR
005456  032777  010000  173654               BIT     #BIT12,@SWR         ;CHECK FOR CONFIGURATION PRINT
005464  001005                               BNE     6$                  ;BRANCH IF PRINT NOT REQUESTED
005466  005737  002416                       TST     QTYBRD              ;SEE IF ANY BOARDS WERE FOUND
005472  001402                               BEQ     6$                  ;BRANCH TO RETURN IF NOT - NO BOARD INFO TO PRINT
005474  004737  004630                       JSR     PC,TYPCNF           ;GO TYPE THE BOARD CONFIGURATIONS
005500  000207                       6$:     RTS     PC                  ;EXIT
```

```
                                        .SBTTL  SUBROUTINE TO GENERATE VECTOR ADDRESS TABLE
                                ;*******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE GENERATES THE VECTOR ADDRESS TABLE.
                                ;*
                                ;*******************************************************************
005502  012702  002460          VCTADS: MOV     #VECADR,R2              ;GET LOCATION OF VECTOR TABLE
005506  013700  001462                  MOV     $VECT1,R0               ;COPY BASE VECTOR
005512  042700  177400                  BIC     #177400,R0              ;CLEAR UPPER BYTE
005516  012701  000020                  MOV     #16.,R1                 ;DO 16 VECTORS
005522  010022                  1$:     MOV     R0,(R2)+                ;PUT VECTOR ADDRESS IN TABLE
005524  062700  000010                  ADD     #10,R0                  ;POINT R0 TO NEXT VECTOR ADDRESS
005530  005301                          DEC     R1                      ;DECREMENT LOOP COUNTER
005532  001373                          BNE     1$                      ;BRANCH IF NOT ALL DONE YET
005534  000207                          RTS     PC                      ;EXIT
```

```
                                           .SBTTL  ROUTINE TO REPORT UNEXPECTED OR ERRONEOUS TRAPS OR INTERRUPTS
                                  ;**********************************************************************
                                  ;*
                                  ;*       THIS IS THE ROUTINE TO REPORT UNEXPECTED OR ERRONEOUS TRAPS OR INTERRUPTS
                                  ;*
                                  ;**********************************************************************
005536  012737  000340  177776  CATCH:  MOV     #LEVEL7,PSW       ;REESTABLISH CPU PRIORITY AT 7
005544  012637  002544                  MOV     (SP)+,BDVECT      ;GET ADDRESS OF TRAP VECTOR + 4
005550  012637  002676                  MOV     (SP)+,OLDPS1      ;SAVE PS
005554  012637  002700                  MOV     (SP)+,OLDPC2      ;SAVE PC OF ADDRESS OF INSTRUCTION CAUSING TRAP
005560  012637  002702                  MOV     (SP)+,OLDPS2      ;SAVE 2ND PS
005564  162737  000004  002544          SUB     #4,BDVECT         ;ADJUST TO POINT TO TRAP ADDRESS
005572  104050                          ERROR   +50               ;UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW
005574  013746  002702                  MOV     OLDPS2,-(SF)      ;RESTORE PS RETURN ON STACK
005600  013746  002700                  MOV     OLDPC2,-(SP)      ;RESTORE PC RETURN ON STACK
005604  000002                          RTI                       ;RETURN
```

```
                                                .SBTTL  SUBROUTINE TO PRINT STATE OF A DDW BIT
                                        ;*****************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE PRINTS THE STATE OF THE BIT IN THE DDW THAT WAS
                                        ;*      PRELOADED INTO BITTST.
                                        ;*
                                        ;*****************************************************************
005606  005046                          PSTATE: CLR     -(SP)           ;SHOW STATE AS ZERO INITIALLY
005610  033737  002712  002720                  BIT     BITTST,DDW      ;CHECK STATE OF BIT IN DDW USING BIT SET IN BITTST
005616  001401                                  BEQ     1$              ;BRANCH IF NOT SET
005620  005216                                  INC     (SP)            ;SHOW A '1' STATE FOR THAT BIT
005622  104403                          1$:     TYPOS                   ;TYPE THE STATE, LEADING ZEROS SUPPRESSED
005624     001     000                          .BYTE   1,0             ;TYPE 1 CHARACTER, SUPPRESS LEADING ZEROS
005626  000207                                  RTS     PC              ;EXIT
```

```
                                         .SBTTL  SUBROUTINE TO PRINT DEVICE PRIORITY
                               ;*************************************************************************
                               ;*
                               ;*        THIS SUBROUTINE PRINTS THE DEVICE PRIORITY
                               ;*
                               ;*************************************************************************
005630  013746  002720         PNTPRI: MOV     DDW,-(SP)         ;PUT DEVICE DESCRIPTOR WORD ON STACK
005634  006216                         ASR     (SP)              ;SHIFT RIGHT STACK LOCATION 5 PLACES
005636  006216                         ASR     (SP)
005640  006216                         ASR     (SP)
005642  006216                         ASR     (SP)
005644  006216                         ASR     (SP)
005646  042716  177770                 BIC     #177770,(SP)      ;MASK TO GET PRIORITY
005652  104403                         TYPOS                     ;TYPE THE DEVICE PRIORITY
005654     001     000                 .BYTE   1,0               ;TYPE 1 CHARACTER, SUPPRESS LEADING ZEROS
005656  000207                         RTS     PC                ;EXIT
```

```
                                                 .SBTTL  INITIALIZE THE COMMON TAGS SUBROUTINE
                                        ;*****************************************************************
                                        ;*
                                        ;*       THIS SUBROUTINE INITIALIZES THE INTERRUPT VECTORS. USE IS AS FOLLOWS:
                                        ;*       MOV     #STACK,SP         ;INITIALIZE THE STACK
                                        ;*       JSR     PC,SETTUP         ;CALL THE SUBROUTINE
                                        ;*
                                        ;*****************************************************************
005660  011637  001360                  SETTUP:  MOV     (SP),$TMPO        ;SAVE RETURN ADDRESS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
005664  012706  001300                           MOV     #$CMTAG,R6        ;;FIRST LOCATION TO BE CLEARED
005670  005026                          100$:    CLR     (R6)+             ;;CLEAR MEMORY LOCATION
005672  022706  001340                           CMP     #SWR,R6 ;;DONE?
005676  001374                                   BNE     100$              ;;LOOP BACK IF NO
005700  012706  001300                           MOV     #STACK,SP         ;;SETUP THE STACK POINTER
                                        ;;INITIALIZE A FEW VECTORS
005704  012737  026352  000020                   MOV     #$SCOPE,@#IOTVEC;;IOT VECTOR FOR SCOPE ROUTINE
005712  012737  000340  000022                   MOV     #340,@#IOTVEC+2 ;;LEVEL 7
005720  012737  027564  000030                   MOV     #$ERROR,@#EMTVEC;;EMT VECTOR FOR ERROR ROUTINE
005726  012737  000340  000032                   MOV     #340,@#EMTVEC+2 ;;LEVEL 7
005734  012737  026264  000034                   MOV     #$TRAP,@#TRAPVEC;;TRAP VECTOR FOR TRAP CALLS
005742  012737  000340  000036                   MOV     #340,@#TRAPVEC+2;LEVEL 7
005750  012737  030510  000024                   MOV     #$PWRDN,@#PWRVEC;;POWER FAILURE VECTOR
005756  012737  000340  000026                   MOV     #340,@#PWRVEC+2 ;;LEVEL 7
005764  013737  023302  023274                   MOV     $ENDCT,$EOPCT     ;;SETUP END-OF-PROGRAM COUNTER
005772  005037  001376                           CLR     $ESCAPE           ;;CLEAR THE ESCAPE ON ERROR ADDRESS
005776  112737  000001  001315                   MOVB    #1,$ERMAX         ;;ALLOW ONE ERROR PER TEST
006004  012737  011246  001306                   MOV     #TST1+2,$LPADR    ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
006012  012737  011246  001310                   MOV     #TST1+2,$LPERR    ;;SETUP THE ERROR LOOP ADDRESS
                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
006020  013746  000004                           MOV     @#ERRVEC,-(SP)    ;;SAVE ERROR VECTOR
006024  012737  006060  000004                   MOV     #64$,@#ERRVEC     ;;SET UP ERROR VECTOR
006032  012737  177570  001340                   MOV     #DSWR,SWR         ;;SETUP FOR A HARDWARE SWICH REGISTER
006040  012737  177570  001342                   MOV     #DDISP,DISPLAY    ;;AND A HARDWARE DISPLAY REGISTER
006046  022777  177777  173264                   CMP     #-1,@SWR          ;;TRY TO REFERENCE HARDWARE SWR
006054  001011                                   BNE     66$               ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                           ;;AND  THE HARDWARE SWR IS NOT = -1
006056  000402                                   BR      65$               ;;BRANCH IF NO TIMEOUT
006060  062706  000004                  64$:     ADD     #4,SP             ;;CLEAN UP STACK AFTER INTERRUPT
006064  012737  000176  001340          65$:     MOV     #SWREG,SWR        ;;POINT TO SOFTWARE SWR
006072  012737  000174  001342                   MOV     #DISPREG,DISPLAY
006100  012637  000004                  66$:     MOV     (SP)+,@#ERRVEC    ;;RESTORE ERROR VECTOR
006104  005037  001416                           CLR     $PASS             ;;CLEAR PASS COUNT
006110  132737  000200  001433                   BITB    #APTSIZE,$ENVM    ;;TEST USER SIZE UNDER APT
006116  001403                                   BEQ     67$               ;;YES,USE NON-APT SWITCH
006120  012737  001434  001340                   MOV     #$SWREG,SWR       ;;NO,USE APT SWITCH REGISTER
006126                                  67$:
006126  013746  001360                           MOV     $TMPO,-(SP)       ;PUT RETURN ADDRESS ON STACK AND
006132  000207                                   RTS     PC                ;RETURN TO THE CALLING ROUTINE
```

```
                                        .SBTTL  MEMORY MANAGEMENT AND LOCATION CHECK SUBROUTINE
                                ;******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE CHECKS FOR MEMORY MANAGEMENT EXISTENCE AND WHETHER OR
                                ;*      NOT A LOCATION IN UPPER MEMORY EXISTS.
                                ;*
                                ;******************************************************************
006134  005737  002714          TSTMM:  TST     MEMGMT            ;TEST TO SEE IF MEMORY MANAGEMENT EXISTS
006140  001440                          BEQ     4$                ;BRANCH IF NOT
006142  012737  000401  006152          MOV     #CY+GO,1$         ;SET UP BIT TEST DATA
006150  040227                          BIC     R2,(PC)+          ;TEST TO SEE IF BOTH THE CYCLE AND GO BITS ARE SET
006152  000401                  1$:     .WORD   CY+GO             ;LOCATION TO STORE THE CYCLE AND GO BITS
006154  001032                          BNE     4$                ;KICK OUT IF CYCLE AND/OR GO ARE CLEAR
006156  032737  000060  002574          BIT     #X6+X7,ECSR       ;SEE IF XBA16 OR XBA17 WERE SET IN EXPECTED DATA
006164  001426                          BEQ     4$                ;BRANCH OUT IF NOT
006166  032737  000040  002574          BIT     #X7,ECSR          ;SEE IF XBA17 IS SET
006174  001005                          BNE     2$                ;GO CHECK STATUS OF XBA16 IF SET
006176  132737  000001  002715          BITB    #BIT0,MEMGMT+1    ;SEE IF 200000+NOCARE WAS FOUND TO EXIST - IF NOT,
006204  001420                          BEQ     5$                ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
006206  000415                          BR      4$                ;BRANCH OUT IF LOCATION EXISTS
006210  032737  000020  002574  2$:     BIT     #X6,ECSR          ;SEE IF XBA16 IS SET
006216  001005                          BNE     3$                ;BRANCH TO CHECK 600000+NOCARE IF SET
006220  132737  000002  002715          BITB    #BIT1,MEMGMT+1    ;SEE IF 400000+NOCARE WAS FOUND TO EXIST - IF NOT,
006226  001407                          BEQ     5$                ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
006230  000404                          BR      4$                ;BRANCH OUT IF LOCATION EXISTS
006232  132737  000004  002715  3$:     BITB    #BIT2,MEMGMT+1    ;SEE IF 600000+NOCARE WAS FOUND TO EXIST - IF NOT,
006240  001402                          BEQ     5$                ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
006242  062716  000002          4$:     ADD     #2,(SP)           ;CORRECT PC RETURN
006246  000207                  5$:     RTS     PC                ;KICK OUT
```

```
                                        .SBTTL  BIT PATTERN
                                ;*****************************************************************
                                ;*
                                ;*      THIS IS A BIT PATTERN TABLE THAT CAN BE USED TO CHECK ANY LOCATION FOR
                                ;*      ALL COMBINATIONS OF STUCK AND/OR SHORTED BITS.
                                ;*
                                ;*****************************************************************

                000002                  .RADIX  2                       ;THIS ENABLES YOU TO SEE THE PATTERNS IN BINARY
        006250  177777          PATRNS: .WORD   1111111111111111        ;ALL SET BITS
        006252  000000                  .WORD   0000000000000000        ;ALL CLEAR BITS
        006254  052525                  .WORD   0101010101010101        ;EVEN BITS SET, ODD BITS CLEAR
        006256  125252                  .WORD   1010101010101010        ;ODD BITS SET, EVEN BITS CLEAR
        006260  031463                  .WORD   0011001100110011        ;PAIRS OF BITS SET
        006262  007417                  .WORD   0000111100001111        ;GROUPS OF 4 BITS SET
        006264  000377                  .WORD   0000000011111111        ;UPPER BYTE CLEAR, LOWER BYTE SET
                000010                  .RADIX  8                       ;THIS RETURNS MODE BACK TO OCTAL
```

```
                                                   .SBTTL  EXPECTED DATA TABLE FOR CSR CHECK TEST 30
                                           ;*********************************************************
                                           ;*
                                           ;*      THE 'EXPAT' TABLE IS USED TO CHECK THE CONTENTS OF THE CSR AFTER SETTING
                                           ;*      THE BITS IN THE CSR.
                                           ;*
                                           ;*********************************************************

 006266                                    MAICLR: ; X=      0    1    2    3      4      5      6      7
 006266   000200   000000   001202                 .WORD    0200,0000,1202,1002,122204,122204,123206,123206  ;CSR 00000X EXPECTED
 006306   004210   004010   005212                 .WORD    4210,4010,5212,5012,126214,126214,127216,127216  ;CSR 00001X EXPECTED
 006326   000720   000020   001222                 .WORD    0220,0020,1222,1022,122224,122224,123226,123226  ;CSR 00002X EXPECTED
 006346   004230   004030   005232                 .WORD    4230,4030,5232,5032,126234,126234,127236,127236  ;CSR 00003X EXPECTED
 006366   000240   000040   001242                 .WORD    0240,0040,1242,1042,122244,122244,123246,123246  ;CSR 00004X EXPECTED
 006406   004250   004050   005252                 .WORD    4250,4050,5252,5052,126254,126254,127256,127256  ;CSR 00005X EXPECTED
 006426   000260   000060   001262                 .WORD    0260,0060,1262,1062,122264,122264,123266,123266  ;CSR 00006X EXPECTED
 006446   004270   004070   005272                 .WORD    4270,4070,5272,5072,126274,126274,127276,127276  ;CSR 00007X EXPECTED
 006466   000300   000100   001302                 .WORD    0300,0100,1302,1102,122304,022104,123306,023106  ;CSR 00010X EXPECTED
 006506   004310   004110   005312                 .WORD    4310,4110,5312,5112,126314,026114,127316,027116  ;CSR 00011X EXPECTED
 006526   000320   000120   001322                 .WORD    0320,0120,1322,1122,122324,022124,123326,023126  ;CSR 00012X EXPECTED
 006546   004330   004130   005332                 .WORD    4330,4130,5332,5132,126334,026134,127336,027136  ;CSR 00013X EXPECTED
 006566   000340   000140   001342                 .WORD    0340,0140,1342,1142,122344,022144,123346,023146  ;CSR 00014X EXPECTED
 006606   004350   004150   005352                 .WORD    4350,4150,5352,5152,126354,026154,127356,027156  ;CSR 00015X EXPECTED
 006626   000360   000160   001362                 .WORD    0360,0160,1362,1162,122364,022164,123366,023166  ;CSR 00016X EXPECTED
 006646   004370   004170   005372                 .WORD    4370,4170,5372,5172,126374,026174,127376,027176  ;CSR 00017X EXPECTED
 006666   000600   000200   001602                 .WORD    0600,0200,1602,1202,122604,122604,123606,123606  ;CSR 00040X EXPECTED
 006706   004610   004210   005612                 .WORD    4610,4210,5612,5212,126614,126614,127616,127616  ;CSR 00041X EXPECTED
 006726   000620   000220   001622                 .WORD    0620,0220,1622,1222,122624,122624,123626,123626  ;CSR 00042X EXPECTED
 006746   004630   004230   005632                 .WORD    4630,4230,5632,5232,126634,126634,127636,127636  ;CSR 00043X EXPECTED
 006766   000640   000240   001642                 .WORD    0640,0240,1642,1242,122644,122644,123646,123646  ;CSR 00044X EXPECTED
 007006   004650   004250   005652                 .WORD    4650,4250,5652,5252,126654,126654,127656,127656  ;CSR 00045X EXPECTED
 007026   000660   000260   001662                 .WORD    0660,0260,1662,1262,122664,122664,123666,123666  ;CSR 00046X EXPECTED
 007046   004670   004270   005672                 .WORD    4670,4270,5672,5272,126674,126674,127676,127676  ;CSR 00047X EXPECTED
 007066   000700   000300   001702                 .WORD    0700,0300,1702,1302,122704,022304,123706,023306  ;CSR 00050X EXPECTED
 007106   004710   004310   005712                 .WORD    4710,4310,5712,5312,126714,026314,127716,027316  ;CSR 00051X EXPECTED
 007126   000720   000320   001722                 .WORD    0720,0320,1722,1322,122724,022324,123726,023326  ;CSR 00052X EXPECTED
 007146   004730   004330   005732                 .WORD    4730,4330,5732,5332,126734,026334,127736,027336  ;CSR 00053X EXPECTED
 007166   000740   000340   001742                 .WORD    0740,0340,1742,1342,122744,022344,123746,023346  ;CSR 00054X EXPECTED
 007206   004750   004350   005752                 .WORD    4750,4350,5752,5352,126754,026354,127756,027356  ;CSR 00055X EXPECTED
 007226   000760   000360   001762                 .WORD    0760,0360,1762,1362,122764,022364,123766,023366  ;CSR 00056X EXPECTED
 007246   004770   004370   005772                 .WORD    4770,4370,5772,5372,126774,026374,127776,027376  ;CSR 00057X EXPECTED
```

```
                                                   .SBTTL  EXPECTED DATA TABLE FOR CSR CHECK TEST 3

                                                   ; X=      0     1     2     3     4     5     6     7
 007266  010200   010000   011202       MAISET:    .WORD   10200,10000,11202,11002,12204,12004,13206,13006   ;CSR 01000X EXPECTED
 007306  014210   014010   015212                  .WORD   14210,14010,15212,15012,16214,16014,17216,17016   ;CSR 01001X EXPECTED
 007326  010220   010020   011222                  .WORD   10220,10020,11222,11022,12224,12024,13226,13026   ;CSR 01002X EXPECTED
 007346  014230   014030   015232                  .WORD   14230,14030,15232,15032,16234,16034,17236,17036   ;CSR 01003X EXPECTED
 007366  010240   010040   011242                  .WORD   10240,10040,11242,11042,12244,12044,13246,13046   ;CSR 01004X EXPECTED
 007406  014250   014050   015252                  .WORD   14250,14050,15252,15052,16254,16054,17256,17056   ;CSR 01005X EXPECTED
 007426  010260   010060   011262                  .WORD   10260,10060,11262,11062,12264,12064,13266,13066   ;CSR 01006X EXPECTED
 007446  014270   014070   015272                  .WORD   14270,14070,15272,15072,16274,16074,17276,17076   ;CSR 01007X EXPECTED
 007466  010300   010100   011302                  .WORD   10300,10100,11302,11102,12304,12104,13306,13106   ;CSR 01010X EXPECTED
 007506  014310   014110   015312                  .WORD   14310,14110,15312,15112,16314,16114,17316,17116   ;CSR 01011X EXPECTED
 007526  010320   010120   011322                  .WORD   10320,10120,11322,11122,12324,12124,13326,13126   ;CSR 01012X EXPECTED
 007546  014330   014130   015332                  .WORD   14330,14130,15332,15132,16334,16134,17336,17136   ;CSR 01013X EXPECTED
 007566  010340   010140   011342                  .WORD   10340,10140,11342,11142,12344,12144,13346,13146   ;CSR 01014X EXPECTED
 007606  014350   014150   015352                  .WORD   14350,14150,15352,15152,16354,16154,17356,17156   ;CSR 01015X EXPECTED
 007626  010360   010160   011362                  .WORD   10360,10160,11362,11162,12364,12164,13366,13166   ;CSR 01016X EXPECTED
 007646  014370   014170   015372                  .WORD   14370,14170,15372,15172,16374,16174,17376,17176   ;CSR 01017X EXPECTED
 007666  010600   011202   011602                  .WORD   10600,11202,11602,12204,12604,13206,13606,14210   ;CSR 01040X EXPECTED
 007706  014610   015212   015612                  .WORD   14610,15212,15612,16214,16614,17216,17616,10200   ;CSR 01041X EXPECTED
 007726  010620   011222   011622                  .WORD   10620,11222,11622,12224,12624,13226,13626,14230   ;CSR 01042X EXPECTED
 007746  014630   015232   015632                  .WORD   14630,15232,15632,16234,16634,17236,17636,10220   ;CSR 01043X EXPECTED
 007766  010640   011242   011642                  .WORD   10640,11242,11642,12244,12644,13246,13646,14250   ;CSR 01044X EXPECTED
 010006  014650   015252   015652                  .WORD   14650,15252,15652,16254,16654,17256,17656,10240   ;CSR 01045X EXPECTED
 010026  010660   011262   011662                  .WORD   10660,11262,11662,12264,12664,13266,13666,14270   ;CSR 01046X EXPECTED
 010046  014670   015272   015672                  .WORD   14670,15272,15672,16274,16674,17276,17676,10260   ;CSR 01047X EXPECTED
 010066  010700   011302   011702                  .WORD   10700,11302,11702,12304,12704,13306,13706,14310   ;CSR 01050X EXPECTED
 010106  014710   015312   015712                  .WORD   14710,15312,15712,16314,16714,17316,17716,10300   ;CSR 01051X EXPECTED
 010126  010720   011322   011722                  .WORD   10720,11322,11722,12324,12724,13326,13726,14330   ;CSR 01052X EXPECTED
 010146  014730   015332   015732                  .WORD   14730,15332,15732,16334,16734,17336,17736,10320   ;CSR 01053X EXPECTED
 010166  010740   011342   011742                  .WORD   10740,11342,11742,12344,12744,13346,13746,14350   ;CSR 01054X EXPECTED
 010206  014750   015352   015752                  .WORD   14750,15352,15752,16354,16754,17356,17756,10340   ;CSR 01055X EXPECTED
 010226  010760   011362   011762                  .WORD   10760,11362,11762,12364,12764,13366,13766,14370   ;CSR 01056X EXPECTED
 010246  014770   015372   015772                  .WORD   14770,15372,15772,16374,16774,17376,17776,10360   ;CSR 01057X EXPECTED
```

```
                                                 .SBTTL  MAIN PROGRAM - INITIALIZATION ROUTINES
                                         ;*************************************************************
                                         ;
                                         ;MAIN PROGRAM - INITIALIZATION ROUTINES
                                         ;
                                         ;*************************************************************

010266  005037  002672                   START1: CLR     MANSIZE         ;CLEAR THE MANSIZE SO WE WILL AUTOSIZE
010272  005037  001416                   START:  CLR     $PASS           ;CLEAR $PASS
010276  005037  001420                           CLR     $PASS+2         ;CLEAR $PASS+2
010302  005037  001412                           CLR     $FATAL          ;CLEAR ERROR NO.
010306  005037  001410                           CLR     $MSGTYP         ;CLEAR MESSAGE TYPE
010312  005037  001414                           CLR     $TESTN          ;CLEAR TEST NO.
010316  005037  001422                           CLR     $DEVCT          ;CLEAR DEVICE COUNT
010322  005037  001424                           CLR     $UNIT           ;CLEAR UNIT NUMBER
010326  012737  000006  000004                   MOV     #TOVECT+2,TOVECT;INITIALIZE TIMEOUT VECTORS TO 6
010334  012737  000003  000006                   MOV     #BPT,TMOPSW     ;CATCHER ROUTINE
010342  012706  001300                           MOV     #STACK,SP       ;INITIALIZE THE STACK
010346  004737  005660                           JSR     PC,SETTUP       ;GO TO THE SETUP ROUTINE TO INITIALIZE VECTORS
010352  005037  001424                           CLR     $UNIT           ;CLEAR $UNIT
010356  005037  001422                           CLR     $DEVCT          ;CLEAR $DEVCT
010362  005037  001414                           CLR     $TESTN          ;CLEAR $TESTN
010366  005037  002710                           CLR     EOPLOC          ;CLEAR EOPLOC
010372  132737  000001  001432                   BITB    #BIT0,$ENV      ;CHECK IF ON APT
010400  001404                                   BEQ     1$              ;BR IF NOT APT
010402  132737  000200  001433                   BITB    #BIT7,$ENVM     ;DID APT SIZE
010410  001007                                   BNE     2$              ;BR, IF APT SIZED
010412  022737  177777  002672   1$:     CMP     #-1,MANSIZE     ;WAS CONFIGURATION SET UP IN MULT. BOARD ROUTINE?
010420  001422                                   BEQ     BEGIN           ;IF YES, SKIP SELF-SIZING
010422  004737  005274                           JSR     PC,ASIZE        ;AUTOMATICALLY SIZE FOR BOARD CONFIGURATION
010426  000417                                   BR      BEGIN           ;BRANCH
010430  005037  002416                   2$:     CLR     QTYBRD          ;CLEAR  DEVICE CNT
010434  013702  001470                           MOV     $DEVM,R2        ;MOVE DEVICE MAP TO R2
010440  005702                           3$:     TST     R2              ;TEST MSB OF DEVICE MAP
010442  100002                                   BPL     4$              ;BR, IF MSB IS ZERO
010444  005237  002416                           INC     QTYBRD          ;INCREMENT DEVICE COUNT, IF MSB=1
010450  000241                           4$:     CLC                     ;CLEAR THE CARRY BIT FOR THE ROL
010452  006102                                   ROL     R2              ;SHIFT NEXT BIT INTO MSB POSITION
010454  001371                                   BNE     3$              ;CONTINUE CHECKING $DEVM, IF MORE BITS SET
010456  004737  004344                           JSR     PC,DEVADS       ;GENERATE DEVICE ADDRESS TABLE
010462  004737  005502                           JSR     PC,VCTADS       ;GENERATE VECTOR ADDRESS TABLE
```

```
                                          .SBTTL  DETERMINE MEM MGMT AND UPPER MEMORY EXISTENCE
010466  005737  001416           BEGIN:   TST     $PASS             ;SEE IF THIS IS THE FIRST PASS
010472  001145                            BNE     BEGIN1            ;BRANCH IF NOT
010474  005737  001420                    TST     $PASS+2           ;SEE IF UPPER LOCATION HAS BEEN SET
010500  001142                            BNE     BEGIN1            ;BRANCH IF NOT
010502  005037  002714                    CLR     MEMGMT            ;CLEAR THE MEMORY MANAGEMENT FLAG
010506  013737  000004  002674            MOV     TOVECT,OLDPC1     ;SAVE TIMEOUT VECTOR
010514  012737  010750  000004            MOV     #3$,TOVECT        ;TIMEOUT VECTOR TO 3$
010522  013737  000006  002676            MOV     TMOPSW,OLDPS1     ;SAVE TIMEOUT PS
010530  012737  000340  000006            MOV     #LEVEL7,TMOPSW    ;PS TIMEOUT TO PRIORITY 7
010536  005737  177572                    TST     MMR0              ;TEST FOR THE PRESENCE OF MEMORY MANAGEMENT
010542  105237  002714                    INCB    MEMGMT            ;INCREMENT FLAG SHOWING MEMORY MANAGEMENT EXISTS
010546  012737  077406  172304            MOV     #77406,KIPDR2     ;MAKE KIPDR2 RESIDENT
010554  012737  077406  172324            MOV     #77406,KDPDR2     ;MAKE KDPDR2 RESIDENT
010562  013737  000250  002700            MOV     MMVECT,OLDPC2     ;SAVE MEMORY MANAGEMENT VECTOR
010570  012737  010722  000250            MOV     #1$,MMVECT        ;MEMORY MANAGEMENT VECTOR TO 1$
010576  013737  000252  002702            MOV     MMPS,OLDPS2       ;SAVE MEMORY MANAGEMENT PS
010604  012737  000340  000252            MOV     #LEVEL7,MMPS      ;MEMORY MANAGEMENT PS TO PRIORITY 7
010612  005237  177572                    INC     MMR0              ;TURN ON MEMORY MANAGEMENT
010616  012737  002400  172344            MOV     #2400,KIPAR2      ;SET UP KIPAR2 TO ACCESS LOCATION 240000+BITS 12-0 OF NOCARE
010624  012737  002400  172364            MOV     #2400,KDPAR2      ;SET UP KDPAR2 TO ACCESS LOCATION 240000+BITS 12-0 OF NOCARE
010632  005737  052414                    TST     NOCARE            ;SEE IF BITS 12-0 OF NOCARE ADRS +240000 EXISTS
010636  152737  000001  002715            BISB    #BIT0,MEMGMT+1    ;SET BIT 0 OF UPPER BYTE OF MEMGMT IF IT DOES
010644  012737  004400  172344            MOV     #4400,KIPAR2      ;SET UP KIPAR2 TO ACCESS LOCATION 440000+BITS 12-0 OF NOCARE
010652  012737  004400  172364            MOV     #4400,KDPAR2      ;SET UP KDPAR2 TO ACCESS LOCATION 440000+BITS 12-0 OF NOCARE
010660  005737  052414                    TST     NOCARE            ;SEE IF BITS 12-0 OF NOCARE ADRS +440000 EXISTS
010664  152737  000002  002715            BISB    #BIT1,MEMGMT+1    ;SET BIT 1 OF UPPER BYTE OF MEMGMT IF IT DOES
010672  012737  006400  172344            MOV     #6400,KIPAR2      ;SET UP KIPAR2 TO ACCESS LOCATION 640000+BITS 12-0 OF NOCARE
010700  012737  006400  172364            MOV     #6400,KDPAR2      ;SET UP KDPAR2 TO ACCESS LOCATION 640000+BITS 12-0 OF NOCARE
010706  005737  052414                    TST     NOCARE            ;SEE IF BITS 12-0 OF NOCARE ADRS +640000 EXISTS
010712  152737  000004  002715            BISB    #BIT2,MEMGMT+1    ;SET BIT 2 OF UPPER BYTE OF MEMGMT IF IT DOES
010720  000402                            BR      2$                ;BRANCH OVER STACK CORRECTION
010722  062706  000004           1$:      ADD     #4,SP             ;CORRECT STACK AFTER MM TRAP
010726  005037  177572           2$:      CLR     MMR0              ;TURN OFF MEMORY MANAGEMENT
010732  013737  002702  000252            MOV     OLDPS2,MMPS       ;RESTORE MEMORY MANAGEMENT PS
010740  013737  002700  000250            MOV     OLDPC2,MMVECT     ;RESTORE MEMORY MANAGEMENT VECTOR
010746  000402                            BR      4$                ;BRANCH OVER STACK CORRECTION
010750  062706  000004           3$:      ADD     #4,SP             ;CORRECT STACK AFTER TIMEOUT
010754  013737  002676  000006   4$:      MOV     OLDPS1,TMOPSW     ;RESTORE TIMEOUT PS
010762  013737  002674  000004            MOV     OLDPC1,TOVECT     ;RESTORE TIMEOUT VECTOR
010770  104401  035704                    TYPE    ,M1               ;TYPE:  '(^X) INHIBITS EOP'S, (^Y) FOR ERROR SUMMARY'
                                                                    ;       'UNIBUS HANG?  RESTART AT ADDRESS '
010774  012746  052336                    MOV     #UBHANG,-(SP)     ;MOVE ADDRESS OF HANG ROUTINE TO STACK
011000  104402                            TYPOC                     ;GO TYPE THE ADDRESS IN OCTAL
011002  104401  036023                    TYPE    ,M1A              ;       'CZDRLBO DR11 GEN NPR INTFC LOGIC TEST'
```

```
                                        .SBTTL  PREPARE ADDRESSES AND VECTORS FOR UUT
011006  012737  000001  002546  BEGIN1: MOV     #BIT0,DEVMSK      ;SET UP BIT MASK TO TEST $DEVM FOR DEVICES
011014  005037  002550                  CLR     TABINX            ;CLEAR LOCATION TO STORE TABLE OFFSETS
011020  033737  002546  001470  TSTDEV: BIT     DEVMSK,$DEVM      ;CHECK TO SEE IF DEVICE IS TO BE TESTED
011026  001026                          BNE     2$                ;BR, IF YES
011030  005737  002546                  TST     DEVMSK            ;SEE IF BIT 15 IS SET
011034  100013                          BPL     1$                ;BRANCH TO CONTINUE IF NOT SET
011036  005737  001416                  TST     $PASS             ;SEE IF THIS IS THE FIRST PASS
011042  001361                          BNE     BEGIN1            ;BRANCH TO REINITIALIZE THE DEVMSK LOCATION IF NOT
011044  005737  001420                  TST     $PASS+2           ;SEE IF THIS IS THE FIRST PASS
011050  001356                          BNE     BEGIN1            ;BRANCH TO REINITIALIZE THE DEVMSK LOCATION IF NOT
011052  104401  035553                  TYPE    ,NODVPR           ;TYPE:  'NO DEVICES RECOGNIZED - DIAGNOSTIC CANNOT BE RUN'
                                                                  ;        'RESTART AT 204 IF A DEVICE IS PRESENT'
011056  000000                          HALT                      ;FATAL ERROR - HALT HERE
011060  000137  010266                  JMP     START1            ;JUMP TO START1 TO CHECK AGAIN FOR A MODULE
011064  006337  002546          1$:     ASL     DEVMSK            ;SHIFT MASK TO CHECK NEXT $DEVM BIT
011070  062737  000002  002550          ADD     #2,TABINX         ;INCREMENT TABLE INDEX
011076  005237  001424                  INC     $UNIT             ;INCREMENT UNIT NUMBER
011102  000746                          BR      TSTDEV            ;GO TEST NEXT BIT OF DEVICE MAP

011104  006337  002546          2$:     ASL     DEVMSK            ;UPDATE DEVICE MAP TEST MASK
011110  013702  002550                  MOV     TABINX,R2         ;MOVE TABLE OFFSET TO R2
011114  062737  000002  002550          ADD     #2,TABINX         ;UPDATE TABLE OFFSET FOR NEXT DEVICE
011122  016200  002420                  MOV     REGADR(R2),R0     ;PUT UUT ADDRESS INTO R0
011126  012701  002520                  MOV     #WCR,R1           ;POINT R1 TO STORAGE AREA FOR UUT ADDRESSES
011132  012703  000004                  MOV     #4,R3             ;MOVE 4 ADDRESSES
011136  010021                  3$:     MOV     R0,(R1)+          ;TRANSFER UUT ADDRESS
011140  062700  000002                  ADD     #2,R0             ;POINT TO NEXT UUT REGISTER
011144  005303                          DEC     R3                ;DECREMENT THE LOOP COUNTER AND
011146  001373                          BNE     3$                ;BRANCH IF NOT DONE TRANSFERING
011150  016200  002460                  MOV     VECADR(R2),R0     ;PUT UUT VECTOR INTO R0
011154  010021                          MOV     R0,(R1)+          ;TRANSFER UUT VECTORS TO ACTIVE TABLE AREA
011156  062700  000002                  ADD     #2,R0             ;POINT TO NEXT VECTOR
011162  010011                          MOV     R0,(R1)           ;TRANSFER VECTOR TO TABLE AREA
011164  016237  001476  002720          MOV     $DDWO(R2),DDW     ;SET UP DDW TO PROPER DEVICE DESCRIPTOR WORD
011172  013737  002720  002554          MOV     DDW,DRLEV         ;MOVE THE WORD TO THE DRLEV LOCATION
011200  042737  177437  002554          BIC     #177437,DRLEV     ;STRIP ALL BITS EXCEPT BR LEVEL
011206  105037  027423          REINIT: CLRB    CHARCT            ;CLEAR THE CHARACTER LOCATION OF ANY CHARACTER
011212  004737  004374                  JSR     PC,BPINIT         ;GO RESET THE ".+2" AND "BPT" LOCATIONS
011216  004737  004036                  JSR     PC,CLENUP         ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
011222  105737  002710                  TSTB    EOPLOC            ;SEE IF ^X IS ENABLED (IS THE PRINTER DISABLED)
011226  001006                          BNE     TST1              ;GO DO TEST IF NOT
                                ;***********************************************************************
                                ;*      *DO*NOT*REMOVE*THE*WAIT*LOOP*ROUTINE*BELOW*.  BECAUSE OF THE SPEED OF THIS DIAGNOSTI
                                ;*      SOME VIDEO TERMINALS PRINT ERRONEOUS CHARACTER(S) WITH THE EOP MESSAGE DUE TO THE
                                ;*      RESET EXECUTED IN TEST 4.  THIS WAIT LOOP ENABLES THOSE TERMINALS TO 'CATCH UP'
                                ;*      BEFORE ITS EXECUTION.
                                ;***********************************************************************
011230  012737  010000  011240          MOV     #10000,2$         ;REESTABLISH THE WAIT LOOP COUNTER
011236  005327                  1$:     DEC     (PC)+             ;DECREMENT THE LOCATION TO KILL TIME
011240  010000                  2$:     .WORD   10000             ;LOCATION TO BE DECREMENTED
011242  001375                          BNE     1$                ;BRANCH BACK UNTIL ZERO
                                ;***********************************************************************
                                ;
                                ;MAIN PROGRAM - DEVICE TESTS
                                ;
                                ;***********************************************************************
```

```
 1496                                           .SBTTL  TEST #1 - CAN ALL DR11 REG BE ADDRESSED WITHOUT ERROR?
                                                ;*****************************************************************
                                                ;*TEST 1         CAN ALL DR11 REG BE ADDRESSED WITHOUT ERROR?
                                                ;*
                                                ;*      THIS TEST INSURES THAT THE CSR, BAR, BDR AND WCR REGISTERS CAN BE
                                                ;*      ACCESSED FOR THIS DEVICE.  IF NOT, THE REST OF THE DIAGNOSTIC CANNOT
                                                ;*      BE RUN.
                                                ;*
                                                ;*****************************************************************
      011244                                    TST1:
      011244  000004                                    SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      011246  012737  011254  001310                    MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 1497 011254  005037  001312                    999$:   CLR     $ERTTL                  ;CLEAR THE ERROR TOTAL - NEW PASS
 1498 011260  012737  011362  000004                    MOV     #1$,BUSERR              ;CPU ERROR VECTOR TO 1$
 1499 011266  013737  002520  002552                    MOV     WCR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
 1500 011274  005777  171220                            TST     @WCR                    ;ACCESS REGISTER
 1501 011300  013737  002522  002552                    MOV     BAR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
 1502 011306  005777  171210                            TST     @BAR                    ;ACCESS REGISTER
 1503 011312  013737  002524  002552                    MOV     CSR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
 1504 011320  005777  171200                            TST     @CSR                    ;ACCESS REGISTER
 1505 011324  013737  002526  002552                    MOV     BDR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
 1506 011332  005777  171170                            TST     @BDR                    ;ACCESS REGISTER
 1507 011336  013737  002530  002552                    MOV     DRINV,DREG              ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
 1508 011344  005777  171160                            TST     @DRINV                  ;ACCESS REGISTER
 1509 011350  005737  001312                            TST     $ERTTL                  ;SEE IF THERE WERE ANY ERRORS
 1510 011354  001414                                    BEQ     2$                      ;BRANCH TO CONTINUE IF NONE
 1511 011356  000137  023074                            JMP     ENDEV                   ;GO TO END OF DEVICE ROUTINE - FATAL ERRORS
 1512 011362  012637  002674                    1$:     MOV     (SP)+,OLDPC1            ;SAVE PC OF TRAP FOR ERROR PRINTOUT
 1513 011366  012637  002676                            MOV     (SP)+,OLDPS1            ;SAVE PS FOR RESTORATION AFTER ERROR CALL
 1514 011372  104001                                    ERROR   +1                      ;CANNOT ACCESS DR11 REGISTER
 1515 011374  013746  002676                            MOV     OLDPS1,-(SP)            ;PUT PS BACK ON STACK
 1516 011400  013746  002674                            MOV     OLDPC1,-(SP)            ;PUT PC BACK ON STACK
 1517 011404  000002                                    RTI                             ;RETURN TO PROGRAM
 1518 011406  012737  000006  000004            2$:     MOV     #6,BUSERR               ;RESTORE #6 TO BUS ERROR
```

```
   1525                                         .SBTTL  TEST #2 - CHECK B OR W STATUS IS AS EXPECTED
                                                ;*********************************************************************
                                                ;*TEST 2        CHECK B OR W STATUS IS AS EXPECTED
                                                ;*
                                                ;*      THIS TEST INSURES THAT THE B OR W STATUS IN THE DEVICE DESCRIPTOR
                                                ;*      WORD MATCHES WHAT THE EIR SAYS THE MODULE IS.
                                                ;*
                                                ;*********************************************************************
        011414                                  TST2:
        011414  000004                                  SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
        011416  012737  011424  001310                  MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
   1526 011424  005077  171074                  999$:   CLR     @CSR                    ;GO TO CSR
   1527 011430  012777  100000  171066                  MOV     #EIR,@CSR               ;FORCE TO BE EIR
   1528 011436  017737  171062  002612                  MOV     @CSR,BORW               ;ATTEMPT EIR READ
   1529 011444  042737  177776  002612                  BIC     #CBIT0,BORW             ;MASK OFF ALL BITS EXCEPT BIT 0
   1530 011452  013737  002720  001362                  MOV     DDW,$TMP1               ;GET DEVICE DESCRIPTOR WORD
   1531 011460  042737  177776  001362                  BIC     #CBIT0,$TMP1            ;MASK OFF ALL BUT B OR W BIT
   1532 011466  001403                                  BEQ     1$                      ;BRANCH IF IT IS CLEAR
   1533 011470  005037  001362                          CLR     $TMP1                   ;CLEAR THE BIT
   1534 011474  000403                                  BR      2$                      ;GO TEST THE BIT
   1535 011476  012737  000001  001362          1$:     MOV     #1,$TMP1                ;SET THE BIT
   1536 011504  023737  002612  001362          2$:     CMP     BORW,$TMP1              ;B OR W STATE AS EXPECTED?
   1537 011512  001401                                  BEQ     TST3                    ;BRANCH IF OK
   1538 011514  104002                                  ERROR   +2                      ;DR11-B OR W MODE INCORRECT (0=B, 1=W)
```

```
                                .SBTTL  TEST #3 - CHECK CSR BIT PATTERNS WITH MAINT BIT SET
                                ;*********************************************************************
                                ;*TEST 3         CHECK CSR BIT PATTERNS WITH MAINT BIT SET
                                ;*
                                ;*       THIS TEST SETS ALL POSSIBLE COMBINATIONS OF SET BITS IN THE CSR WITH
                                ;*       THE MAINTENANCE BIT SET, AND COMPARES THE RECEIVED CSR CONTENTS WITH
                                ;*       THAT OF THE EXPECTED PATTERNS IN THE 'MAISET' TABLE.
                                ;*
                                ;*********************************************************************
011516                          TST3:
011516  000004                          SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
011520  012737  011602  001310          MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
011526  004737  004036                  JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
011532  012737  000200  001362          MOV     #RY,$TMP1               ;MOVE READY BIT TO $TMP1
011540  032737  000004  002720          BIT     #BIT2,DDW               ;TEST TO SEE IF CABLE IS IN
011546  001003                          BNE     1$                      ;BRANCH AROUND NON-CABLE SETUP IF IN
011550  052737  127000  001362          BIS     #127000,$TMP1           ;SET THE BITS TO BE EXPECTED IN $TMP1
011556  012701  007266          1$:     MOV     #MAISET,R1              ;MOVE ADDRESS OF EXPECTED PATTERNS TO R1
011562  012702  010000                  MOV     #MA,R2                  ;START WITH JUST THE MAINTENANCE BIT
011566  005037  002716                  CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +202
011572  012700  000002                  MOV     #2,R0                   ;DO 2 SETS OF 200 PATTERNS
011576  012703  000200          2$:     MOV     #200,R3                 ;MOVE 200 TO THE LOOP COUNTER
011602  052777  010000  170714  999$:   BIS     #MA,@CSR                ;SET MAINTENANCE AND
011610  005077  170710                  CLR     @CSR                    ;CLEAR TO DO AN INIT
011614  017737  170704  002562          MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
011622  023737  001362  002562          CMP     $TMP1,RCSR              ;MAKE SURE EXPECTED DATA CAME UP
011630  001404                          BEQ     3$                      ;BRANCH IF SO
011632  013737  001362  002574          MOV     $TMP1,ECSR              ;MOVE EXPECTED DATA TO ECSR
011640  104032                          ERROR   +32                     ;CSR IS WRONG
011642  012777  177777  170650  3$:     MOV     #-1,@WCR                ;MOVE 1 WORD COUNT TO WCR IN CASE OF IE ENABLED
011650  012777  052414  170644          MOV     #NOCARE,@BAR            ;MOVE A NOT-CARE ADDRESS TO BAR FOR SAME REASON
011656  010277  170642                  MOV     R2,@CSR                 ;SET THE PARTICULAR FUNCTION BITS IN CSR
011662  017737  170636  002562          MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
011670  011137  002574                  MOV     (R1),ECSR               ;MOVE EXPECTED DATA TO ECSR
011674  023737  002574  002562          CMP     ECSR,RCSR               ;COMPARE EXPECTED WITH RECEIVED
011702  001430                          BEQ     7$                      ;BRANCH IF OK
011704  012737  000401  011714          MOV     #CY+GO,4$               ;REESTABLISH TEST PATTERN
011712  040227                          BIC     R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
011714  000401                  4$:     .WORD   CY+GO                   ;LOCATION TO HOLD BOTH CYCLE AND GO BITS
011716  001016                          BNE     6$                      ;BRANCH TO ERROR ONLY IF CYCLE AND GO WERE SET
011720  005737  002714                  TST     MEMGMT                  ;SEE IF MEMORY MANAGEMENT IS OUT THERE
011724  001404                          BEQ     5$                      ;BRANCH IF SO TO CHECK LOCATION EXISTENCE
011726  032737  000060  002574          BIT     #X6+X7,ECSR             ;SEE IF EITHER XBA16 OR XBA17 ARE SET
011734  001407                          BEQ     6$                      ;BRANCH TO ERROR IF BOTH ARE CLEAR
011736  052737  140000  002574  5$:     BIS     #ER+NX,ECSR             ;SET THE ERROR AND NEX BITS - EXPECT THEM TO SET
011744  023737  002562  002574          CMP     RCSR,ECSR               ;NOW SEE IF DATA MATCHES
011752  001415                          BEQ     10$                     ;BRANCH AROUND ERROR IF IT DOES
011754  010237  002540          6$:     MOV     R2,BUT                  ;MOVE THE BITS SET INTO CSR TO THE BUT LOCATION
011760  104202                          ERROR   +202                    ;CSR PATTERN NOT CORRECT
011762  000411                          BR      10$                     ;BRANCH AROUND MM TESTS
011764  012737  000401  011774  7$:     MOV     #CY+GO,8$               ;REESTABLISH TEST PATTERN
011772  040227                          BIC     R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
011774  000401                  8$:     .WORD   CY+GO                   ;LOCATION TO HOLD BOTH CYCLE AND GO BITS
011776  001003                          BNE     10$                     ;BRANCH AROUND MEM MGMT TEST IF EITHER OR BOTH WERE CLEAR
012000  004737  006134          9$:     JSR     PC,TSTMM                ;GO CHECK FOR MEMORY MANAGEMENT EXISTENCE
012004  000754                          BR      5$                      ;IF RETURN IS HERE, GO BACK TO SET EXPECTED DATA
012006  062701  000002          10$:    ADD     #2,R1                   ;INCREMENT R1 TO NEXT EXPECTED PATTERN
```

```
012012  005202                      INC     R2              ;INCREMENT THE PATTERN
012014  005303                      DEC     R3              ;DECREMENT THE LOOP COUNTER
012016  001271                      BNE     999$            ;BRANCH BACK IF NOT DONE
012020  062702  000200              ADD     #200,R2         ;ADD 200 TO PATTERN LOCATION
012024  005300                      DEC     R0              ;DECREMENT THE LOOP COUNTER AND
012026  001263                      BNE     2$              ;BRANCH BACK IF 2ND OCTAL GROUP NOT DONE
```

```
  1604                                          .SBTTL  TEST #4 - CHECK WCR, BAR & BDR, & RESET CLRS 4 DEV REGS
                                                ;*****************************************************************
                                                ;*TEST 4         CHECK WCR, BAR & BDR, & RESET CLRS 4 DEV REGS
                                                ;*
                                                ;*       THIS TEST INSURES THAT THE WCR, BAR AND BDR REGISTER BITS CAN ALL BE
                                                ;*       SET, AND THAT A RESET CLEARS ALL 3 PLUS THE CSR REGISTER.
                                                ;*
                                                ;*****************************************************************
       012030                                   TST4:
       012030  000004                                   SCOPE                   ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       012032  012737  012040  001310                   MOV     #999$,$LPERR    ;SET LOOP ON ERROR TO 999$
  1605 012040  012777  010000  170456   999$:           MOV     #MA,@CSR        ;SET THE MAINTENANCE BIT AND
  1606 012046  005077  170452                           CLR     @CSR            ;CLEAR TO DO AN INIT
  1607 012052  012777  177777  170440                   MOV     #-1,@WCR        ;ALL ONES TO WCR
  1608 012060  017737  170434  002572                   MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
  1609 012066  022737  177777  002572                   CMP     #-1,RWCR        ;SEE IF DATA WAS LOADED PROPERLY
  1610 012074  001423                                   BEQ     4$              ;BRANCH IF OK
  1611 012076  012737  012106  001310                   MOV     #1$,$LPERR      ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
  1612 012104  000412                                   BR      2$              ;BRANCH OVER LOOP SETUP
  1613 012106  012777  177777  170404   1$:             MOV     #-1,@WCR        ;ALL ONES TO WCR
  1614 012114  017737  170400  002572                   MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
  1615 012122  022737  177777  002572                   CMP     #-1,RWCR        ;SEE IF DATA WAS LOADED PROPERLY
  1616 012130  001401                                   BEQ     3$              ;BRANCH IF OK
  1617 012132  104010                           2$:     ERROR   +10             ;ATTEMPT TO SET ALL WCR BITS FAILED
  1618 012134  032777  001000  167176   3$:             BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
  1619 012142  001361                                   BNE     1$              ;BRANCH BACK IF SO
  1620 012144  012777  177777  170350   4$:             MOV     #-1,@BAR        ;ALL ONES TO BAR
  1621 012152  017737  170344  002570                   MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
  1622 012160  022737  177776  002570                   CMP     #-2,RBAR        ;SEE IF ALL BITS WERE SET (DON'T EXPECT BIT 0 TO SET)
  1623 012166  001426                                   BEQ     8$              ;BRANCH IF OK
  1624 012170  012737  012206  001310                   MOV     #5$,$LPERR      ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
  1625 012176  012737  177776  002602                   MOV     #-2,EBAR        ;MOVE EXPECTED DATA TO EBAR
  1626 012204  000412                                   BR      6$              ;BRANCH OVER LOOP SETUP
  1627 012206  012777  177777  170306   5$:             MOV     #-1,@BAR        ;ALL ONES TO BAR
  1628 012214  017737  170302  002570                   MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
  1629 012222  022737  177776  002570                   CMP     #-2,RBAR        ;SEE IF ALL BITS WERE SET (DON'T EXPECT BIT 0 TO SET)
  1630 012230  001401                                   BEQ     7$              ;BRANCH IF OK
  1631 012232  104012                           6$:     ERROR   +12             ;ATTEMPT TO SET ALL BAR BITS TO 1 FAILED
  1632 012234  032777  001000  167076   7$:             BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
  1633 012242  001361                                   BNE     5$              ;BRANCH BACK IF SO
  1634 012244  017737  170254  002562   8$:             MOV     @CSR,RCSR       ;ACCESS CSR TO SET BIT 0 OF BAR
  1635 012252  012777  177777  170242                   MOV     #-1,@BAR        ;ALL ONES TO BAR
  1636 012260  017737  170236  002570                   MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
  1637 012266  022737  177777  002570                   CMP     #-1,RBAR        ;SEE IF ALL BITS WERE SET (*DO* EXPECT BIT 0 TO SET)
  1638 012274  001431                                   BEQ     12$             ;BRANCH IF OK
  1639 012276  012737  012314  001310                   MOV     #9$,$LPERR      ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
  1640 012304  012737  177777  002602                   MOV     #-1,EBAR        ;MOVE EXPECTED DATA TO EBAR
  1641 012312  000415                                   BR      10$             ;BRANCH OVER LOOP SETUP
  1642 012314  017737  170204  002562   9$:             MOV     @CSR,RCSR       ;ACCESS CSR TO SET BIT 0 OF BAR
  1643 012322  012777  177777  170172                   MOV     #-1,@BAR        ;ALL ONES TO BAR
  1644 012330  017737  170166  002570                   MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
  1645 012336  022737  177777  002570                   CMP     #-1,RBAR        ;SEE IF ALL BITS WERE SET (*DO* EXPECT BIT 0 TO SET)
  1646 012344  001401                                   BEQ     11$             ;BRANCH IF OK
  1647 012346  104012                           10$:    ERROR   +12             ;ATTEMPT TO SET ALL BAR BITS TO 1 FAILED
  1648 012350  032777  001000  166762   11$:            BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
  1649 012356  001356                                   BNE     9$              ;BRANCH BACK IF SO
  1650 012360  012777  177777  170140   12$:            MOV     #-1,@BDR        ;ALL ONES TO BDR
```

```
012366  017737  170134  002566          MOV     @BDR,RBDR         ;MOVE RECEIVED DATA TO RBDR
012374  022737  177777  002566          CMP     #-1,RBDR          ;SEE IF DATA WAS LOADED PROPERLY
012402  001423                          BEQ     16$               ;BRANCH IF OK
012404  012737  012414  001310          MOV     #13$,$LPERR       ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
012412  000412                          BR      14$               ;BRANCH OVER LOOP SETUP
012414  012777  177777  170104  13$:    MOV     #-1,@BDR          ;ALL ONES TO BDR
012422  017737  170100  002566          MOV     @BDR,RBDR         ;MOVE RECEIVED DATA TO RBDR
012430  022737  177777  002566          CMP     #-1,RBDR          ;SEE IF DATA WAS LOADED PROPERLY
012436  001401                          BEQ     15$               ;BRANCH IF OK
012440  104027                  14$:    ERROR   +27               ;ALL BDR BITS ARE NOT SET
012442  032777  001000  166670  15$:    BIT     #BIT9,@SWR        ;SEE IF WE SHOULD LOOP BACK
012450  001361                          BNE     13$               ;BRANCH BACK IF SO
012452  012777  010576  170044  16$:    MOV     #10576,@CSR       ;SET ALL CSR WRITEABLE BITS
012460  000005                          RESET                     ;RESET THE WORLD OF ITS TROUBLES - HOPEFULLY
012462  012737  012040  001310          MOV     #999$,$LPERR      ;RESET THE LOOP ON ERROR LOCATION
012470  017737  170024  002572          MOV     @WCR,RWCR         ;WAS WCR CLEARED?
012476  001401                          BEQ     17$               ;BRANCH IF WCR WAS CLEARED
012500  104007                          ERROR   +7                ;RESET FAILED TO CLEAR WCR
012502  017737  170014  002570  17$:    MOV     @BAR,RBAR         ;MOVE RECEIVED DATA TO RBAR
012510  001403                          BEQ     18$               ;BRANCH IF BAR WAS CLEARED
012512  005037  002602                  CLR     EBAR              ;CLEAR EXPECTED LOCATION
012516  104011                          ERROR   +11               ;RESET FAILED TO CLEAR BAR
012520  017737  170000  002562  18$:    MOV     @CSR,RCSR         ;MOVE RECEIVED DATA TO RCSR
012526  012737  000200  002574          MOV     #RY,ECSR          ;MOVE EXPECTED DATA TO ECSR
012534  004737  004060                  JSR     PC,CHKCAB         ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
012540  023737  002574  002562          CMP     ECSR,RCSR         ;SEE IF EXPECTED DATA WAS RECEIVED
012546  001401                          BEQ     19$               ;BRANCH IF IT WAS
012550  104032                          ERROR   +32               ;READY IS NOT THE ONLY BIT SET
012552  052777  010000  167744  19$:    BIS     #MA,@CSR          ;MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
012560  017737  167742  002566          MOV     @BDR,RBDR         ;MOVE CONTENTS OF BDR TO RBDR
012566  001401                          BEQ     TST5              ;BRANCH IF IT CORRECTLY REMAINS ZERO
012570  104026                          ERROR   +26               ;BDR IS NOT CLEAR
```

```
   1688                                          .SBTTL  TEST #5 - DEVICE INIT CLEARS CSR, WCR, BDR AND BAR
                                                 ;*******************************************************************
                                                 ;*TEST 5         DEVICE INIT CLEARS CSR, WCR, BDR AND BAR
                                                 ;*
                                                 ;*       THIS TEST INSURES THAT DEVICE INIT CLEARS THE CSR, WCR, BDR AND BAR.
                                                 ;*
                                                 ;*******************************************************************
        012572  000004                           TST5:   SCOPE
   1689 012574  005077  167724                   999$:   CLR     @CSR                 ;FORCE ACCESS TO CSR
   1690 012600  012777  177777  167712                   MOV     #-1,@WCR             ;ALL ONES TO WCR
   1691 012606  012777  177777  167712                   MOV     #-1,@BDR             ;ALL ONES TO BDR
   1692 012614  012777  177777  167700                   MOV     #-1,@BAR             ;ALL ONES TO BAR
   1693 012622  012777  010576  167674                   MOV     #10576,@CSR          ;SET ALL WRITEABLE BITS IN THE CSR
   1694 012630  042777  010000  167666                   BIC     #MA,@CSR             ;CLEAR THE MAINT BIT TO DO AN INIT
   1695 012636  017737  167656  002572                   MOV     @WCR,RWCR            ;MOVE RECEIVED CONTENTS TO RWCR
   1696 012644  001401                                   BEQ     1$                   ;BRANCH IF WCR WAS CLEARED
   1697 012646  104003                                   ERROR   +3                   ;INIT FAILED TO CLEAR WCR
   1698 012650  017737  167646  002570   1$:     MOV     @BAR,RBAR            ;MOVE RECEIVED CONTENTS TO RBAR
   1699 012656  001403                                   BEQ     2$                   ;BRANCH IF BAR WAS CLEARED
   1700 012660  005037  002602                           CLR     EBAR                 ;CLEAR EXPECTED LOCATION
   1701 012664  104004                                   ERROR   +4                   ;INIT FAILED TO CLEAR BAR
   1702 012666  017737  167632  002562   2$:     MOV     @CSR,RCSR            ;MOVE RECEIVED DATA TO RCSR
   1703 012674  012737  000200  002574                   MOV     #RY,ECSR             ;EXPECT READY BIT ONLY TO BE SET
   1704 012702  004737  004060                           JSR     PC,CHKCAB            ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
   1705 012706  023737  002574  002562                   CMP     ECSR,RCSR            ;SEE IF EXPECTED DATA WAS RECEIVED
   1706 012714  001401                                   BEQ     3$                   ;BRANCH IF THEY WERE ALL CLEAR
   1707 012716  104006                                   ERROR   +6                   ;INIT FAILED TO CLEAR ALL CSR R-W BITS
   1708 012720  012777  010000  167576   3$:     MOV     #MA,@CSR             ;GO BACK INTO MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
   1709 012726  017737  167574  002566                   MOV     @BDR,RBDR            ;MOVE RECEIVED CONTENTS TO RBDR
   1710 012734  001401                                   BEQ     TST6                 ;BRANCH IF IT WAS CLEARED
   1711 012736  104005                                   ERROR   +5                   ;INIT FAILED TO CLEAR BDR
```

```
                                            .SBTTL  TEST #6 - BIT PATTERN TEST OF WCR, BDR AND BAR REGISTERS
                                            ;*************************************************************************
                                            ;*TEST 6         BIT PATTERN TEST OF WCR, BDR AND BAR REGISTERS
                                            ;*
                                            ;*      THIS TEST RUNS 7 BIT PATTERNS THROUGH THE WCR, BDR AND BAR TO CHECK FOR
                                            ;*      ANY STUCK OR SHORTED PINS.  LOCATION $LPERR IS NOT SET UP AT THE START
                                            ;*      SINCE A DIFFERENT METHOD OF ERROR LOOPING IS DONE.  WHEN AN ERROR IS
                                            ;*      DETERMINED TO EXIST, THE $LPERR IS INITIALIZED TO A ROUTINE SPECIFI-
                                            ;*      CALLY WRITTEN FOR THAT PARTICULAR ERROR TO CREATE A VERY TIGHT LOOP.
                                            ;*
                                            ;*************************************************************************
012740  000004                              TST6:   SCOPE
012742  004737  004036                              JSR     PC,CLENUP           ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
012746  005037  002716                              CLR     ERRCNT              ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +204
012752  012701  006250                              MOV     #PATRNS,R1          ;MOVE ADDRESS OF BIT PATTERNS TO R1
012756  012702  000007                              MOV     #7,R2               ;DO 7 PATTERNS
012762  012777  010000  167534                      MOV     #MA,@CSR            ;GO TO MAINTENANCE MODE
012770  011177  167524                      1$:     MOV     (R1),@WCR           ;MOVE THE DATA TO WCR
012774  017737  167520  002572                      MOV     @WCR,RWCR           ;MOVE RECEIVED DATA TO RWCR
013002  021137  002572                              CMP     (R1),RWCR           ;SEE IF EXPECTED DATA WAS RECEIVED
013006  001423                                      BEQ     5$                  ;BRANCH IF SO
013010  012737  013024  001310                      MOV     #2$,$LPERR          ;SET UP LOOP ON ERROR LOCATION
013016  011137  002604                              MOV     (R1),EWCR           ;MOVE EXPECTED DATA TO EWCR
013022  000410                                      BR      3$                  ;SKIP OVER LOOP ON ERROR SETUP
013024  011177  167470                      2$:     MOV     (R1),@WCR           ;LOAD BIT PATTERN TO WCR
013030  017737  167464  002572                      MOV     @WCR,RWCR           ;MOVE RECEIVED DATA TO RWCR
013036  021137  002572                              CMP     (R1),RWCR           ;SEE IF DATA IS OK NOW
013042  001401                                      BEQ     4$                  ;BRANCH OUT IF SO - OK NOW
013044  104204                              3$:     ERROR   +204                ;WCR DATA PATTERN NOT CORRECT
013046  032777  001000  166264              4$:     BIT     #BIT9,@SWR          ;SEE IF WE SHOULD LOOP BACK
013054  001363                                      BNE     2$                  ;BRANCH BACK IF SO
013056  011177  167440                      5$:     MOV     (R1),@BAR           ;MOVE THE DATA TO BAR
013062  017737  167434  002570                      MOV     @BAR,RBAR           ;MOVE RECEIVED DATA TO RBAR
013070  011137  002602                              MOV     (R1),EBAR           ;MOVE EXPECTED DATA TO EBAR
013074  042737  000001  002602                      BIC     #BIT0,EBAR          ;DO NOT EXPECT BIT 0 TO BE READ
013102  023737  002602  002570                      CMP     EBAR,RBAR           ;SEE IF EXPECTED DATA WAS RECEIVED
013110  001423                                      BEQ     9$                  ;BRANCH IF SO
013112  012737  013126  001310                      MOV     #6$,$LPERR          ;SET UP LOOP ON ERROR LOCATION
013120  011137  002602                              MOV     (R1),EBAR           ;MOVE EXPECTED DATA TO EBAR
013124  000410                                      BR      7$                  ;SKIP OVER LOOP ON ERROR SETUP
013126  011177  167370                      6$:     MOV     (R1),@BAR           ;LOAD BIT PATTERN TO BAR
013132  017737  167364  002570                      MOV     @BAR,RBAR           ;MOVE RECEIVED DATA TO RBAR
013140  021137  002570                              CMP     (R1),RBAR           ;SEE IF DATA IS OK NOW
013144  001401                                      BEQ     8$                  ;BRANCH OUT IF SO - OK NOW
013146  104203                              7$:     ERROR   +203                ;BAR DATA PATTERN NOT CORRECT
013150  032777  001000  166162              8$:     BIT     #BIT9,@SWR          ;SEE IF WE SHOULD LOOP BACK
013156  001363                                      BNE     6$                  ;BRANCH BACK IF SO
013160  011177  167342                      9$:     MOV     (R1),@BDR           ;MOVE THE DATA TO BDR
013164  017737  167336  002566                      MOV     @BDR,RBDR           ;MOVE RECEIVED DATA TO RBDR
013172  021137  002566                              CMP     (R1),RBDR           ;SEE IF EXPECTED DATA WAS RECEIVED
013176  001423                                      BEQ     13$                 ;BRANCH IF SO
013200  012737  013214  001310                      MOV     #10$,$LPERR         ;SET UP LOOP ON ERROR LOCATION
013206  011137  002600                              MOV     (R1),EBDR           ;MOVE EXPECTED DATA TO EBDR
013212  000410                                      BR      11$                 ;SKIP OVER LOOP ON ERROR SETUP
013214  011177  167306                      10$:    MOV     (R1),@BDR           ;LOAD BIT PATTERN TO BDR
013220  017737  167302  002566                      MOV     @BDR,RBDR           ;MOVE RECEIVED DATA TO RBDR
013226  021137  002566                              CMP     (R1),RBDR           ;SEE IF DATA IS OK NOW
```

```
013232  001401                          BEQ     12$             ;BRANCH OUT IF SO - OK NOW
013234  104205                  11$:    ERROR   +205            ;BDR PATTERN NOT CORRECT
013236  032777  001000  166074  12$:    BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
013244  001363                          BNE     10$             ;BRANCH BACK IF SO
013246  005721                  13$:    TST     (R1)+           ;GO TO NEXT PATTERN
013250  005302                          DEC     R2              ;DECREMENT THE LOOP COUNTER AND
013252  001246                          BNE     1$              ;BRANCH BACK IF NOT DONE
```

```
                                        .SBTTL  TEST #7 - TEST CSR AND EIR BIT0
                                        ;*****************************************************************
                                        ;*TEST 7         TEST CSR AND EIR BIT0
                                        ;*
                                        ;*       THIS TEST INSURES THAT BIT 0 OF THE CSR IS CLEAR WHEN IN CSR MODE (BIT
                                        ;*       15 CLEAR), AND SET WHEN IN EIR MODE (BIT 15 SET).
                                        ;*
                                        ;*****************************************************************
013254                                  TST7:
013254  000004                                  SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
013256  012737  013264  001310                  MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
013264  032737  000001  002612          999$:   BIT     #BIT0,BORW              ;TEST TO SEE IF WE ARE TESTING A DR11-W
013272  001444                                  BEQ     TST10                   ;BRANCH TO NEXT TEST IF A DR11-B
013274  005077  167224                          CLR     @CSR                    ;FORCE ACCESS TO CSR
013300  012737  000001  002540                  MOV     #BIT0,BUT               ;MOVE BIT 0 INDICATOR TO BIT UNDER TEST LOCATION
013306  017737  167212  002562                  MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
013314  032737  000001  002562                  BIT     #BIT0,RCSR              ;CLEAR ALL BUT BIT 0
013322  001407                                  BEQ     1$                      ;BRANCH IF A ZERO
013324  013737  002562  002574                  MOV     RCSR,ECSR               ;MOVE CSR TO EXPECTED DATA, ECSR AND
013332  042737  000001  002574                  BIC     #BIT0,ECSR              ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
013340  104014                                  ERROR   +14                     ;CSR BIT TEST FAILED
013342  012777  100000  167154          1$:     MOV     #EIR,@CSR               ;GO TO EIR MODE
013350  017737  167150  002564                  MOV     @CSR,REIR               ;MOVE CSR CONTENTS TO RCSR
013356  032737  000001  002564                  BIT     #BIT0,REIR              ;CLEAR ALL BUT BIT 0
013364  001007                                  BNE     TST10                   ;BRANCH IF NOT A ZERO
013366  013737  002564  002576                  MOV     REIR,EEIR               ;MOVE CONTENTS TO ECSR ALSO AND
013374  052737  000001  002576                  BIS     #BIT0,EEIR              ;SET THE 0 BIT - EXPECTED IT TO BE 1
013402  104015                                  ERROR   +15                     ;EIR BIT TEST FAILED
```

```
                                           .SBTTL  TEST #10 - ATTN CAN BE SET VIA FNCT2 & ERRCR BIT SETS
                                           ;*************************************************************************
                                           ;*TEST 10        ATTN CAN BE SET VIA FNCT2 & ERROR BIT SETS
                                           ;*
                                           ;*       THIS TEST INSURES THAT THE ATTN BIT (BIT 13) SETS VIA FNCT2 AND ERROR
                                           ;*       BIT SETS.
                                           ;*
                                           ;*************************************************************************
 013404                                    TST10:
 013404  000004                                    SCOPE                          ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 013406  012737  013424  001310                    MOV     #999$,$LPERR           ;SET LOOP ON ERROR TO 999$
 013414  032737  000001  002720                    BIT     #BIT0,DDW              ;TEST TO SEE IF WE ARE TESTING A DR11-W
 013422  001073                                    BNE     TST11                  ;BRANCH TO NEXT TEST IF A DR11-B
 013424  005077  167074                    999$:   CLR     @CSR                   ;FORCE ACCESS TO CSR
 013430  012777  010000  167066                    MOV     #MA,@CSR               ;MAINT
 013436  017737  167062  002562                    MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR
 013444  022737  010200  002562                    CMP     #MA+RY,RCSR            ;SEE IF EXPECTED DATA WAS RECEIVED
 013452  001404                                    BEQ     1$                     ;BRANCH IF THEY ARE
 013454  012737  010200  002574                    MOV     #MA+RY,ECSR            ;MOVE EXPECTED DATA TO ECSR
 013462  104016                                    ERROR   +16                    ;READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR
 013464  112777  000004  167032            1$:     MOVB    #F2,@CSR               ;SET FNCT2
 013472  017737  167026  002562                    MOV     @CSR,RCSR              ;MOVE THE CONTENTS TO RCSR
 013500  013701  002562                            MOV     RCSR,R1                ;MOVE CONTENTS TO R1 FOR BIT TEST
 013504  042701  057777                            BIC     #CB1513,R1             ;CLEAR ALL BUT BITS ERROR & ATTN FOR TEST
 013510  022701  120000                            CMP     #ER+AT,R1              ;TEST TO SEE IF ERROR AND ATTN ARE SET
 013514  001411                                    BEQ     2$                     ;BRANCH IF IT IS PROPERLY SET
 013516  013737  002562  002574                    MOV     RCSR,ECSR              ;MOVE EXPECTED DATA TO ECSR
 013524  004737  004060                            JSR     PC,CHKCAB              ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
 013530  052737  120000  002574                    BIS     #ER+AT,ECSR            ;SET THE BITS THAT SHOULD HAVE BEEN SET
 013536  104017                                    ERROR   +17                    ;ATTN AND ERROR FAILED TO SET PROPERLY
 013540  042777  020004  166756            2$:     BIC     #AT+F2,@CSR            ;CLEAR ATTN & FNCT2
 013546  017737  166752  002562                    MOV     @CSR,RCSR              ;MOVE CSR DATA TO RCSR
 013554  032737  120000  002562                    BIT     #ER+AT,RCSR            ;BIT TEST ATTN AND ERROR BITS TO SEE IF THEY ARE CLEAR
 013562  001411                                    BEQ     3$                     ;BRANCH IF ATTN IS CLEAR
 013564  013737  002562  002574                    MOV     RCSR,ECSR              ;MOVE EXPECTED DATA TO ECSR
 013572  042737  120000  002574                    BIC     #ER+AT,ECSR            ;CLEAR THE BITS THAT WERE SUPPOSED TO BE CLEAR
 013600  004737  004060                            JSR     PC,CHKCAB              ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
 013604  104020                                    ERROR   +20                    ;ATTN AND ERROR FAILED TO CLEAR PROPERLY
 013606  005077  166712                    3$:     CLR     @CSR                   ;RETURN TO CSR
```

```
   1838                                             .SBTTL  TEST #11 - FNCT BIT 1 CONTROLS DSTAT BIT 9
                                                    ;*************************************************************
                                                    ;*TEST 11       FNCT BIT 1 CONTROLS DSTAT BIT 9
                                                    ;*
                                                    ;*      THIS TEST INSURES THAT FNCT BIT 1 CONTROLS DSTAT BIT 9.
                                                    ;*
                                                    ;*************************************************************
        013612                                      TST11:
        013612  000004                                      SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
        013614  012737  013622  001310                      MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
   1839 013622  005077  166676              999$:   CLR     @CSR                ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
   1840 013626  012777  010000  166670                      MOV     #MA,@CSR            ;MAINT MODE
   1841 013634  017737  166664  002562                      MOV     @CSR,RCSR           ;MOVE CONTENTS OF CSR TO RCSR
   1842 013642  013737  002562  002574                      MOV     RCSR,ECSR           ;MOVE EXPECTED TO ECSR
   1843 013650  013701  002574                              MOV     ECSR,R1             ;MOVE CONTENTS TO R1 FOR TESTING
   1844 013654  042701  177761                              BIC     #CFNC,R1            ;CLEAR ALL BUT THE FNCT BITS
   1845 013660  001404                                      BEQ     1$                  ;BRANCH IF THE FUNCTION BITS ARE CLEAR
   1846 013662  042737  000016  002574                      BIC     #FNC,ECSR           ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
   1847 013670  104024                                      ERROR   +24                 ;FUNCTION BIT(S) ARE NOT CLEAR
   1848 013672  052777  000002  166624      1$:     BIS     #F1,@CSR            ;SET FNCT1
   1849 013700  017737  166620  002562                      MOV     @CSR,RCSR           ;MOVE CONTENTS OF CSR TO RCSR
   1850 013706  013737  002562  002574                      MOV     RCSR,ECSR           ;MOVE EXPECTED DATA TO ECSR
   1851 013714  013701  002574                              MOV     ECSR,R1             ;MOVE CONTENTS TO R1 FOR TEST
   1852 013720  042701  170777                              BIC     #CDST,R1            ;CLEAR ALL BUT BITS 9, 10 & 11
   1853 013724  022701  001000                              CMP     #DSC,R1             ;SEE IF DSTAT A AND B ARE CLEAR & C IS SET
   1854 013730  001407                                      BEQ     TST12               ;BRANCH TO NEXT TEST IF ALL CLEAR
   1855 013732  042737  006000  002574                      BIC     #DAB,ECSR           ;CLEAR THE DSTAT A & B BITS THAT SHOULD HAVE BEEN CLEAR
   1856 013740  052737  001000  002574                      BIS     #DSC,ECSR           ;SET THE DSTAT C BIT THAT SHOULD HAVE BEEN SET
   1857 013746  104025                                      ERROR   +25                 ;DSTAT A, B OR C ARE NOT AS EXPECTED
```

```
                                      .SBTTL  TEST #12 - FNCT BIT 2 CONTROLS DSTAT BIT 10
                                      ;*****************************************************************
                                      ;*TEST 12        FNCT BIT 2 CONTROLS DSTAT BIT 10
                                      ;*
                                      ;*        THIS TEST INSURES THAT FNCT BIT 2 CONTROLS DSTAT BIT 10.
                                      ;*
                                      ;*****************************************************************
013750                                TST12:
013750  000004                                SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
013752  012737  013760  001310                MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
013760  005077  166540                999$:   CLR     @CSR                ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
013764  012777  010000  166532                MOV     #MA,@CSR            ;MAINT MODE
013772  017737  166526  002562                MOV     @CSR,RCSR           ;MOVE CONTENTS OF CSR TO RCSR
014000  013737  002562  002574                MOV     RCSR,ECSR           ;MOVE EXPECTED TO ECSR
014006  013701  002574                        MOV     ECSR,R1             ;MOVE CONTENTS TO R1 FOR TESTING
014012  042701  177761                        BIC     #CFNC,R1            ;CLEAR ALL BUT THE FNCT BITS
014016  001404                                BEQ     1$                  ;BRANCH IF THE FUNCTION BITS ARE CLEAR
014020  042737  000016  002574                BIC     #FNC,ECSR           ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
014026  104024                                ERROR   +24                 ;FUNCTION BIT(S) ARE NOT CLEAR
014030  052777  000004  166466        1$:     BIS     #F2,@CSR            ;SET FNCT2
014036  017737  166462  002562                MOV     @CSR,RCSR           ;MOVE CONTENTS OF CSR TO RCSR
014044  013737  002562  002574                MOV     RCSR,ECSR           ;MOVE EXPECTED DATA TO ECSR
014052  013701  002574                        MOV     ECSR,R1             ;MOVE CONTENTS TO R1 FOR TEST
014056  042701  170777                        BIC     #CDST,R1            ;CLEAR ALL BUT THE DSTAT BITS
014062  022701  002000                        CMP     #DSB,R1             ;IF DSTAT A AND C ARE CLEAR & B IS SET
014066  001407                                BEQ     TST13               ;BRANCH TO NEXT TEST IF AS EXPECTED
014070  042737  005000  002574                BIC     #DAC,ECSR           ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
014076  052737  002000  002574                BIS     #DSB,ECSR           ;SET THE BIT THAT SHOULD HAVE BEEN SET
014104  104025                                ERROR   +25                 ;DSTAT A, B OR C ARE NOT AS EXPECTED
```

```
                                        .SBTTL  TEST #13 - FNCT BIT 3 CONTROLS DSTAT BIT 11
                                        ;*********************************************************************
                                        ;*TEST 13        FNCT BIT 3 CONTROLS DSTAT BIT 11
                                        ;*
                                        ;*       THIS TEST INSURES THAT FNCT BIT 3 CONTROLS DSTAT BIT 11.
                                        ;*
                                        ;*********************************************************************
     014106                             TST13:
     014106  000004                             SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     014110  012737  014116  001310             MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
     014116  005077  166402             999$:   CLR     @CSR                    ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
     014122  012777  010000  166374             MOV     #MA,@CSR                ;MAINT MODE
     014130  017737  166370  002562             MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
     014136  013737  002562  002574             MOV     RCSR,ECSR               ;MOVE EXPECTED TO ECSR
     014144  013701  002574                     MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TESTING
     014150  042701  177761                     BIC     #CFNC,R1                ;CLEAR ALL BUT THE FNCT BITS
     014154  001404                             BEQ     1$                      ;BRANCH IF THE FUNCTION BITS ARE CLEAR
     014156  042737  000016  002574             BIC     #FNC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
     014164  104024                             ERROR   +24                     ;FUNCTION BIT(S) ARE NOT CLEAR
     014166  052777  000010  166330     1$:     BIS     #F3,@CSR                ;SET FNCT3
     014174  017737  166324  002562             MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
     014202  013737  002562  002574             MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
     014210  013701  002574                     MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TEST
     014214  042701  170777                     BIC     #CDST,R1                ;CLEAR ALL BUT DSTAT BITS
     014220  022701  004000                     CMP     #DSA,R1                 ;SEE IF DSTAT B AND C ARE CLEAR & A IS SET
     014224  001407                             BEQ     TST14                   ;BRANCH TO NEXT TEST IF DATA OK
     014226  042737  003000  002574             BIC     #DBC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
     014234  052737  004000  002574             BIS     #DSA,ECSR               ;SET THE BIT THAT SHOULD HAVE BEEN SET
     014242  104025                             ERROR   +25                     ;DSTAT A, B OR C ARE NOT AS EXPECTED
```

```
                                          .SBTTL  TEST #14 - EIR BLOCKS DATA XFERS FROM ODR TO IDR
                                          ;*********************************************************************
                                          ;*TEST 14        EIR BLOCKS DATA XFERS FROM ODR TO IDR
                                          ;*
                                          ;*       THIS TEST INSURES THAT GOING TO EIR MODE BLOCKS DATA TRANSFERS FROM
                                          ;*       ODR TO IDR (ODR RECEIVES DATA WHEN WRITING TO THE BDR, AND WHEN READING
                                          ;*       THE BDR, THE IDR IS READ).
                                          ;*
                                          ;*********************************************************************
 014244                                   TST14:
 014244  000004                                   SCOPE                      ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 014246  012737  014264  001310                   MOV     #999$,$LPERR       ;SET LOOP ON ERROR TO 999$
 014254  032737  000001  002612                   BIT     #BIT0,BORW         ;TEST TO SEE IF WE ARE TESTING A DR11-W
 014262  001451                                   BEQ     TST15              ;BRANCH TO NEXT TEST IF A DR11-B
 014264  005077  166234                   999$:   CLR     @CSR               ;FORCE ACCESS TO CSR
 014270  012777  010000  166226                   MOV     #MA,@CSR           ;SET MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
 014276  012777  052525  166222                   MOV     #52525,@BDR        ;SET ALT 0'S AND 1'S TO BDR
 014304  017737  166216  002566                   MOV     @BDR,RBDR          ;MOVE RECEIVED DATA TO RBDR
 014312  022737  052525  002566                   CMP     #52525,RBDR        ;SEE IF DATA WAS LOADED PROPERLY
 014320  001404                                   BEQ     1$                 ;BRANCH IF IT WAS
 014322  012737  052525  002600                   MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 014330  104031                                   ERROR   +31                ;BDR PATTERN NOT CORRECT
 014332  052777  100000  166164           1$:     BIS     #EIR,@CSR          ;GO TO EIR
 014340  012737  052525  002600                   MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 014346  012777  125252  166152                   MOV     #125252,@BDR       ;SET ALT 1'S AND 0'S TO BDR
 014354  017737  166146  002566                   MOV     @BDR,RBDR          ;MOVE RECEIVED DATA TO RBDR
 014362  022737  052525  002566                   CMP     #52525,RBDR        ;TEST FOR OLD PATTERN
 014370  001404                                   BEQ     2$                 ;BRANCH IF ORIGINAL PATTERN STILL THERE
 014372  012737  052525  002600                   MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 014400  104030                                   ERROR   +30                ;BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN
 014402  004737  004036                   2$:     JSR     PC,CLENUP          ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
```

```
                                   .SBTTL  TEST #15 - DR11 INTERRUPTS WITH CPU AT LEVEL 3
                                   ;*******************************************************************
                                   ;*TEST 15        DR11 INTERRUPTS WITH CPU AT LEVEL 3
                                   ;*
                                   ;*       THIS TEST INSURES THAT THE DR11 WILL INTERRUPT WITH THE CPU PRIORITY
                                   ;*       AT LEVEL 3.
                                   ;*
                                   ;*******************************************************************
 014406                            TST15:
 014406 000004                             SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 014410 012737 014416 001310               MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 014416 012777 010000 166100       999$:   MOV     #MA,@CSR                ;SET MAINTENANCE BIT AND
 014424 005077 166074                      CLR     @CSR                    ;CLEAR CSR TO DO AN INIT
 014430 012737 000140 177776               MOV     #LEVEL3,PSW             ;STATUS AT LEVEL 3
 014436 017737 166062 002562               MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
 014444 105737 002562                      TSTB    RCSR                    ;SEE IF READY BIT (BIT 7) IS SET
 014450 100406                             BMI     1$                      ;BRANCH IF IT IS
 014452 012737 000200 002574               MOV     #RY,ECSR                ;SET THE BIT THAT SHOULD HAVE BEEN SET
 014460 004737 004060                      JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
 014464 104022                             ERROR   +22                     ;READY OF CSR WAS NOT SET
 014466 017737 166036 002534       1$:     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 014474 017737 166032 002536               MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 014502 012777 014572 166020               MOV     #3$,@DRINV              ;SET UP INTERRUPT VECTOR
 014510 012777 010000 166006               MOV     #MA,@CSR                ;MAINT MODE
 014516 012737 001000 002662               MOV     #1000,TIME              ;SET THE TIME COUNTER
 014524 052777 000105 165772               BIS     #IE+F2+GO,@CSR          ;IE, FNCT2 AND GO
 014532 005337 002662              2$:     DEC     TIME                    ;DECREMENT DOWN TO ZERO
 014536 001375                             BNE     2$                      ;BRANCH IF NOT THERE YET
 014540 017737 165760 002562               MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 014546 013777 002534 165754               MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 014554 013777 002536 165750               MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 014562 104035                             ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 014564 005077 165734                      CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 014570 000410                             BR      TST16                   ;BRANCH TO THE NEXT TEST
 014572 062706 000004              3$:     ADD     #4,SP                   ;CLEAN THE STACK AFTER THE INTERRUPT
 014576 013777 002534 165724               MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 014604 013777 002536 165720               MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
```

```
                                        .SBTTL  TEST #16 - DR11 FAILS TO INTERRUPT WITH CPU AT LEVEL 7
                                        ;*********************************************************************
                                        ;*TEST 16        DR11 FAILS TO INTERRUPT WITH CPU AT LEVEL 7
                                        ;*
                                        ;*       THIS TEST INSURES THAT THE DR11 FAILS TO INTERRUPT WITH THE CPU PRIORITY
                                        ;*       AT LEVEL 7.
                                        ;*
                                        ;*********************************************************************
014612                                  TST16:
014612  000004                                  SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
014614  012737  014622  001310                  MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
014622  004737  004036          999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
014626  017737  165672  002562          MOV     @CSR,RCSR               ;MOVE CSR DATA TO RCSR
014634  105737  002562                  TSTB    RCSR                    ;CLEAR ALL BUT THE READY BIT (BIT 7)
014640  100411                          BMI     1$                      ;BRANCH IF IT IS SET
014642  012737  000200  002574          MOV     #RY,ECSR                ;MOVE EXPECTED DATA TO ECSR
014650  004737  004060                  JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
014654  052737  000200  002574          BIS     #RY,ECSR                ;SET THE BIT THAT SHOULD HAVE BEEN SET
014662  104022                          ERROR   +22                     ;READY OF CSR WAS NOT SET
014664  017737  165640  002534  1$:     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
014672  017737  165634  002536          MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
014700  012777  014766  165622          MOV     #3$,@DRINV              ;SET UP INT VECTOR
014706  012777  000340  165616          MOV     #LEVEL7,@DRVS
014714  012737  001000  002662          MOV     #1000,TIME              ;SET TIME DELAY COUNTER
014722  012777  010000  165574          MOV     #MA,@CSR                ;MAINT MODE
014730  052777  000105  165566          BIS     #IE+F2+GO,@CSR          ;IE, FNCT2 AND GO
014736  005337  002662          2$:     DEC     TIME                    ;DECREMENT UNTIL WE GET TO ZERO
014742  001375                          BNE     2$                      ;BRANCH BACK IF NOT ZERO YET
014744  005077  165554                  CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
014750  013777  002534  165552          MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
014756  013777  002536  165546          MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
014764  000416                          BR      TST17                   ;BRANCH TO THE NEXT TEST
014766  062706  000004          3$:     ADD     #4,SP                   ;RESTORE STACK
014772  017737  165526  002562          MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
015000  005077  165520                  CLR     @CSR                    ;CLEAR IE
015004  013777  002534  165516          MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
015012  013777  002536  165512          MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
015020  104036                          ERROR   +36                     ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
```

```
 2008                                          .SBTTL  TEST #17 - DR11 INTERRUPTS AT CORRECT BR LEVEL
                                               ;*****************************************************************
                                               ;*TEST 17        DR11 INTERRUPTS AT CORRECT BR LEVEL
                                               ;*
                                               ;*       THIS TEST INSURES THAT THE DR11 WILL INTERRUPT AT THE CORRECT LEVEL AS
                                               ;*       DEFINED IN THE DEVICE DESCRIPTOR WORD.
                                               ;*
                                               ;*****************************************************************
      015022                                   TST17:
      015022  000004                                   SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      015024  012737  015106  001310                   MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
 2009 015032  004737  004036                           JSR     PC,CLENUP           ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 2010 015036  013737  002720  001362                   MOV     DDW,$TMP1           ;MOVE DEVICE DESCRIPTOR WORD TO $TMP1
 2011 015044  006237  001362                           ASR     $TMP1               ;SHIFT THE LEVEL TO THE RIGHT 5 PLACES
 2012 015050  006237  001362                           ASR     $TMP1
 2013 015054  006237  001362                           ASR     $TMP1
 2014 015060  006237  001362                           ASR     $TMP1
 2015 015064  006237  001362                           ASR     $TMP1
 2016 015070  042737  177770  001362                   BIC     #177770,$TMP1       ;CLEAR ALL BUT THE PRIORITY
 2017 015076  012700  000003                   1$:     MOV     #3,R0               ;DO 3 PRIORITY LEVELS
 2018 015102  012701  005264                           MOV     #LEVELS,R1          ;MOVE ADDRESS OF CPU PRIORITIES TO R1
 2019 015106  012777  010000  165410           999$:   MOV     #MA,@CSR            ;SET THE MAINTENANCE BIT AND
 2020 015114  005077  165404                           CLR     @CSR                ;CLEAR TO DO AN INIT
 2021 015120  011137  177776                           MOV     (R1),PSW            ;PUT PRIORITY INTO PSW
 2022 015124  017737  165374  002562                   MOV     @CSR,RCSR           ;MOVE RECEIVED DATA TO RCSR
 2023 015132  012737  000200  002574                   MOV     #RY,ECSR            ;MOVE READY BIT TO ECSR
 2024 015140  004737  004060                           JSR     PC,CHKCAB           ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
 2025 015144  023737  002562  002574                   CMP     RCSR,ECSR           ;SEE IF RECEIVED DATA MATCHES EXPECTED
 2026 015152  001412                                   BEQ     2$                  ;BRANCH IF OK
 2027 015154  012737  015076  001310                   MOV     #1$,$LPERR          ;SET UP FOR POSSIBLE LOOP ON ERROR FOR THIS ERROR ONLY
 2028 015162  012737  000200  002574                   MOV     #RY,ECSR            ;MOVE EXPECTED DATA TO ECSR
 2029 015170  104022                                   ERROR   +22                 ;READY OF CSR WAS NOT SET
 2030 015172  012737  015106  001310                   MOV     #999$,$LPERR        ;RETURN ORIGINAL LOOP ON ERROR ADDRESS - DID NOT LOOP
 2031 015200  017737  165324  002534           2$:     MOV     @DRINV,SDRINV       ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 2032 015206  017737  165320  002536                   MOV     @DRVS,SDRVS         ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 2033 015214  012777  015326  165306                   MOV     #4$,@DRINV          ;SET UP INTERRUPT VECTOR
 2034 015222  012777  000340  165302                   MOV     #LEVEL7,@DRVS       ;SET UP INTERRUPT PS
 2035 015230  012777  010000  165266                   MOV     #MA,@CSR            ;MAINT MODE
 2036 015236  012737  000400  002662                   MOV     #400,TIME           ;SET DELAY COUNTER
 2037 015244  052777  000105  165252                   BIS     #IE+F2+GO,@CSR      ;IE, FNCT2 AND GO
 2038 015252  005337  002662                   3$:     DEC     TIME                ;DECREMENT UNTIL WE GET TO ZERO
 2039 015256  001375                                   BNE     3$                  ;BRANCH BACK IF NOT ZERO YET
 2040 015260  005077  165240                           CLR     @CSR                ;CLEAR CSR TO DO AN INIT
 2041 015264  013777  002534  165236                   MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2042 015272  013777  002536  165232                   MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2043 015300  013737  177776  002542                   MOV     PSW,LEVEL           ;SAVE OLD STATUS LEVEL
 2044 015306  005721                                   TST     (R1)+               ;INCREMENT R1 TO POINT TO NEXT PRIORITY LEVEL
 2045 015310  005300                                   DEC     R0                  ;DECREMENT LOOP COUNTER AND
 2046 015312  001275                                   BNE     999$                ;BRANCH BACK FOR ANOTHER TRY IF NOT DONE
 2047 015314  104053                                   ERROR   +53                 ;DR11 FAILED TO INTERRUPT
 2048 015316  013737  002554  002542                   MOV     DRLEV,LEVEL         ;SET LEVEL TO CONTAIN THE ANTICIPATED LEVEL
 2049 015324  000422                                   BR      TST20               ;BRANCH TO THE NEXT TEST
 2050 015326  062706  000004                   4$:     ADD     #4,SP               ;RESTORE STACK
 2051 015332  005077  165166                           CLR     @CSR                ;CLEAR IE
 2052 015336  013777  002534  165164                   MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2053 015344  013777  002536  165160                   MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2054 015352  042737  177437  002542                   BIC     #177437,LEVEL       ;CLEAR ALL BITS BUT THE BR LEVEL
```

```
   2055 015360  023737  002542  002554          CMP     LEVEL,DRLEV     ;SEE IF LEVEL INTERRUPTED MATCHES EXPECTED
   2056 015366  001401                          BEQ     TST20           ;BRANCH AROUND ERROR CALL IF IT IS AS EXPECTED
   2057 015370  104052                          ERROR   +52             ;DR11 INTERRUPTED AT WRONG LEVEL
```

```
                                        .SBTTL  TEST #20 - A GO WITHOUT CLEARING ERROR CAUSES INTRPT
                                        ;*********************************************************************
                                        ;*TEST 20         A GO WITHOUT CLEARING ERROR CAUSES INTRPT
                                        ;*
                                        ;*        THIS TEST INSURES THAT SETTING THE GO BIT WITHOUT CLEARING THE ERROR
                                        ;*        BIT CAUSES AN INTERRUPT.
                                        ;*
                                        ;*********************************************************************
 015372                                 TST20:
 015372  000004                                 SCOPE                          ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 015374  012737  015402  001310                 MOV     #999$,$LPERR           ;SET LOOP ON ERROR TO 999$
 015402  004737  004036                 999$:   JSR     PC,CLENUP              ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 015406  017737  165116  002534                 MOV     @DRINV,SDRINV          ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 015414  017737  165112  002536                 MOV     @DRVS,SDRVS            ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 015422  012777  015524  165100                 MOV     #2$,@DRINV             ;INTERRUPT VECTOR TO 3$
 015430  012777  000140  165074                 MOV     #LEVEL3,@DRVS          ;INTERRUPT STATUS TO LEVEL 3
 015436  005037  177776                         CLR     PSW                    ;LET THE DR11 INTERRUPT
 015442  012737  001000  002662                 MOV     #1000,TIME             ;MOVE DELAY COUNTER TO LOCATION
 015450  012777  010101  165046                 MOV     #MA+IE+GO,@CSR         ;SET MAINT, IE AND GO
 015456  052777  020004  165040                 BIS     #AT+F2,@CSR            ;SET ATTN AND FNCT2
 015464  005337  002662                 1$:     DEC     TIME                   ;DECREMENT UNTIL WE REACH ZERO
 015470  001375                                 BNE     1$                     ;BRANCH IF NOT ZERO YET
 015472  013777  002534  165030                 MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 015500  013777  002536  165024                 MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 015506  017737  165012  002562                 MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR
 015514  104035                                 ERROR   +35                    ;DR11 FAILED TO INTERRUPT
 015516  005077  165002                         CLR     @CSR                   ;CLEAR THE CSR TO DO AN INIT
 015522  000512                                 BR      TST21                  ;BRANCH TO THE NEXT TEST
 015524  062706  000004                 2$:     ADD     #4,SP                  ;READJUST STACK AFTER THE INTERRUPT
 015530  013777  002534  164772                 MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 015536  013777  002536  164766                 MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 015544  017737  164754  002562                 MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR
 015552  100407                                 BMI     3$                     ;BRANCH IF ERROR IS SET
 015554  013737  002562  002574                 MOV     RCSR,ECSR              ;MOVE EXPECTED DATA TO ECSR
 015562  052737  100000  002574                 BIS     #ER,ECSR               ;SET THE BIT THAT SHOULD HAVE BEEN SET
 015570  104037                                 ERROR   +37                    ;ERROR BIT SHOULD NOT BE CLEAR
 015572  017737  164732  002534         3$:     MOV     @DRINV,SDRINV          ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 015600  017737  164726  002536                 MOV     @DRVS,SDRVS            ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 015606  012777  015702  164714                 MOV     #5$,@DRINV             ;INTERRUPT VECTOR TO 6$
 015614  005077  164702                         CLR     @BAR                   ;PREVENT CAUSING ANOTHER ERROR
 015620  012777  177777  164672                 MOV     #-1,@WCR               ;SET-UP WCR
 015626  012737  001000  002662                 MOV     #1000,TIME             ;LOAD 1000 IN LOCATION TIME FOR WAIT LOOP
 015634  052777  000001  164662                 BIS     #GO,@CSR               ;SET 'GO' IN CSR
 015642  005237  002662                 4$:     INC     TIME                   ;DELAY - WAIT FOR INTERRUPT
 015646  001375                                 BNE     4$                     ;BRANCH BACK IF NOT ZERO
 015650  013777  002534  164652                 MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 015656  013777  002536  164646                 MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 015664  017737  164634  002562                 MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR
 015672  104035                                 ERROR   +35                    ;DR11 FAILED TO INTERRUPT
 015674  005077  164624                         CLR     @CSR                   ;CLEAR CSR TO DO AN INIT
 015700  000423                                 BR      TST21                  ;BRANCH TO THE NEXT TEST
 015702  062706  000004                 5$:     ADD     #4,SP                  ;CLEAN UP STACK AFTER INTERRUPT
 015706  013777  002534  164614                 MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 015714  013777  002536  164610                 MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 015722  017737  164576  002562                 MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR - IS ERROR CLEAR
 015730  100007                                 BPL     TST21                  ;BRANCH TO NEXT TEST IF IT IS
 015732  013737  002562  002574                 MOV     RCSR,ECSR              ;MOVE EXPECTED DATA TO ECSR
```

```
   2111 015740  042737  100000  002574          BIC     #ER,ECSR          ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
   2112 015746  104021                          ERROR   +21               ;ERROR BIT SHOULD HAVE BEEN CLEAR
```

```
                                        .SBTTL  TEST #21 - FUNCTION BITS INC WITH MAINT MODE TRANSFERS
                                        ;*****************************************************************
                                        ;*TEST 21        FUNCTION BITS INC WITH MAINT MODE TRANSFERS
                                        ;*
                                        ;*       THIS TEST INSURES THAT THE FUNCTION BITS INCREMENT WITH MAINTENANCE
                                        ;*       MODE TRANSFERS.
                                        ;*
                                        ;*****************************************************************
 015750                                 TST21:
 015750  000004                                 SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 015752  012737  015774  001310                 MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 015760  012737  000016  001364                 MOV     #16,$TMP2               ;SET UP FUNCTION COUNT COMPARE
 015766  012737  177771  001360                 MOV     #-7,$TMP0               ;SET UP WCR LOAD VARIABLE
 015774  004737  004036                 999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 016000  013777  002620  164514                 MOV     INBUF,@BAR              ;SET-UP BAR
 016006  017737  164516  002534         1$:     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 016014  017737  164512  002536                 MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 016022  012777  016132  164500                 MOV     #3$,@DRINV              ;INTERRUPT VECTOR
 016030  013777  002542  164474                 MOV     LEVEL,@DRVS             ;INTERRUPT VECTOR PRIORITY TO LEVEL OF DEVICE
 016036  013777  001360  164454                 MOV     $TMP0,@WCR              ;SET UP FOR NUMBER OF TRANSFERS IN $TMP0
 016044  005037  177776                         CLR     PSW                     ;LET THE DR11 INTERRUPT
 016050  012777  010000  164446                 MOV     #MA,@CSR                ;MAINT MODE
 016056  012737  001000  002662                 MOV     #1000,TIME              ;MOVE WAIT COUNTER TO LOCATION TIME
 016064  052777  000501  164432                 BIS     #IE+CY+GO,@CSR          ;IE, CYCLE & GO
 016072  005337  002662                 2$:     DEC     TIME                    ;DECREMENT UNTIL ZERO
 016076  001375                                 BNE     2$                      ;BRANCH BACK IF NOT
 016100  017737  164420  002562                 MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 016106  013777  002534  164414                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 016114  013777  002536  164410                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 016122  104035                                 ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 016124  005077  164374                         CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 016130  000442                                 BR      TST22                   ;BRANCH TO NEXT TEST
 016132  062706  000004                 3$:     ADD     #4,SP                   ;CLEAN UP STACK AFTER INTERRUPT
 016136  013777  002534  164364                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 016144  013777  002536  164360                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 016152  017737  164346  002562                 MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 016160  013701  002562                         MOV     RCSR,R1                 ;MOVE RECEIVED DATA TO R1 ALSO AND
 016164  042701  177761                         BIC     #CFNC,R1                ;CLEAR ALL BUT THE FUNCTION BITS
 016170  020137  001364                         CMP     R1,$TMP2                ;SEE IF FUNCTION BIT(S) HAD INCREMENTED PROPERLY
 016174  001412                                 BEQ     4$                      ;BRANCH IF THEY HAD
 016176  013737  002562  002574                 MOV     RCSR,ECSR               ;MOVE RECEIVED DATA TO EXPECTED LOCATION
 016204  042737  000016  002574                 BIC     #FNC,ECSR               ;CLEAR THE FUNCTION BIT(S) THAT WERE THERE AND
 016212  053737  001364  002574                 BIS     $TMP2,ECSR              ;PUT FUNCTION BIT(S) EXPECTED IN THEIR PLACE
 016220  104212                                 ERROR   +212                    ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
 016222  005237  001360                 4$:     INC     $TMP0                   ;ADJUST WCR LOAD LOCATION
 016226  162737  000002  001364                 SUB     #2,$TMP2                ;SUBTRACT 2 FROM FUNCTION COUNT TEST LOCATION
 016234  001264                                 BNE     1$                      ;BRANCH BACK FOR ANOTHER TRY
```

```
                                              .SBTTL  TEST #22 - TEST FOR 10 MAINT MODE TRANSFERS
                                              ;*********************************************************************
                                              ;*TEST 22        TEST FOR 10 MAINT MODE TRANSFERS
                                              ;*
                                              ;*       THIS TEST CHECKS IF 10 MAINTENANCE MODE TRANSFERS CAN BE DJNE.
                                              ;*
                                              ;*********************************************************************
     016236                                   TST22:
     016236  000004                                   SCOPE                        ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     016240  012737  016246  001310                   MOV     #999$,$LPERR         ;SET LOOP ON ERROR TO 999$
     016246  005077  164252                   999$:   CLR     @CSR                 ;FORCE ACCESS TO CSR
     016252  012737  000010  002624                   MOV     #10,BUFLEN           ;BUFLEN=10
     016260  013737  002624  002632                   MOV     BUFLEN,WCLEN         ;PREPARE NUMBER FOR WCR
     016266  005437  002632                           NEG     WCLEN                ;2'S COMPLEMENT OF BUFLEN
     016272  004737  003472                           JSR     PC,LODBUF            ;LOAD IN BUFFER WITH INCREMENTING PATTERN
     016276  004737  003520                           JSR     PC,CHKBFF            ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
     016302  013777  002632  164210                   MOV     WCLEN,@WCR           ;SET UP WCR
     016310  013777  002620  164204                   MOV     INBUF,@BAR           ;SET UP BAR
     016316  012777  177777  164202                   MOV     #-1,@BDR             ;MAINT AIDE
     016324  017737  164200  002534                   MOV     @DRINV,SDRINV        ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     016332  017737  164174  002536                   MOV     @DRVS,SDRVS          ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
     016340  012777  016442  164162                   MOV     #2$,@DRINV           ;INTERRUPT VECTOR
     016346  013777  002542  164156                   MOV     LEVEL,@DRVS          ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
     016354  005037  177776                           CLR     PSW                  ;LET DR11 INTERRUPT
     016360  012777  010000  164136                   MOV     #MA,@CSR             ;MAINT MODE
     016366  052777  000501  164130                   BIS     #IE+CY+GO,@CSR       ;IE, CYCLE & GO
     016374  012737  001000  002662                   MOV     #1000,TIME           ;SET LOOP COUNTER FOR WAIT
     016402  005337  002662                   1$:     DEC     TIME                 ;DECREMENT UNTIL WE GET TO ZERO
     016406  001375                                   BNE     1$                   ;BRANCH BACK IF NOT ZERO
     016410  013777  002534  164112                   MOV     SDRINV,@DRINV        ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     016416  013777  002536  164106                   MOV     SDRVS,@DRVS          ;RESTORE LOCATION USED AS THE INTERRUPT PS
     016424  017737  164074  002562                   MOV     @CSR,RCSR            ;MOVE RECEIVED DATA TO RCSR
     016432  104035                                   ERROR   +35                  ;DR11 FAILED TO INTERRUPT
     016434  005077  164064                           CLR     @CSR                 ;CLEAR THE CSR TO DO AN INIT
     016440  000402                                   BR      3$                   ;BRANCH AROUND THE STACK CLEANUP
     016442  062706  000004                   2$:     ADD     #4,SP                ;CLEAN UP STACK AFTER THE INTERRUPT
     016446  013777  002534  164054           3$:     MOV     SDRINV,@DRINV        ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     016454  013777  002536  164050                   MOV     SDRVS,@DRVS          ;RESTORE LOCATION USED AS THE INTERRUPT PS
     016462  004737  003546                           JSR     PC,INTA              ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
     016466  104051                                   ERROR   +51                  ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
     016470  005037  002716                           CLR     ERRCNT               ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
     016474  004737  003716                           JSR     PC,DATCHK            ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
     016500  104201                                   ERROR   +201                 ;BUFFER DATA NOT CORRECT
     016502  004737  004014                           JSR     PC,DATCH2            ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
```

```
  2203                                         .SBTTL  TEST #23 - TEST 10 MAINTENANCE MODE XFERS
                                               ;*****************************************************************
                                               ;*TEST 23        TEST 10 MAINTENANCE MODE XFERS
                                               ;*
                                               ;*       THIS TEST CHECKS THAT 10 MAINTENANCE MODE TRANSFERS, ATTEMPTED BEFORE
                                               ;*       SERVICING A PENDING INTERRUPT OF A PREVIOUS TRANSFER, ARE UNSUCCESSFUL.
                                               ;*
                                               ;*****************************************************************
       016506                                  TST23:
       016506  000004                                  SCOPE                   ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       016510  012737  016516  001310                  MOV     #999$,$LPERR    ;SET LOOP ON ERROR TO 999$
  2204 016516  004737  004036                  999$:   JSR     PC,CLENUP       ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  2205 016522  012737  001000  002662                  MOV     #1000,TIME      ;SET DELAY
  2206 016530  012737  000010  002624                  MOV     #10,BUFLEN      ;BUFLEN=10
  2207 016536  013737  002624  002632                  MOV     BUFLEN,WCLEN    ;PREPARE NUMBER FOR WCR
  2208 016544  005437  002632                          NEG     WCLEN           ;2'S COMPLEMENT OF BUFLEN
  2209 016550  004737  003472                          JSR     PC,LODBUF       ;LOAD IN BUFFER WITH INCREMENTING PATTERN
  2210 016554  004737  003520                          JSR     PC,CHKBFF       ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
  2211 016560  013777  002632  163732                  MOV     WCLEN,@WCR      ;SET UP WCR
  2212 016566  013777  002620  163726                  MOV     INBUF,@BAR      ;SET UP BAR
  2213 016574  012777  177777  163724                  MOV     #-1,@BDR        ;MAINT AIDE
  2214 016602  017737  163722  002534                  MOV     @DRINV,SDRINV   ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  2215 016610  017737  163716  002536                  MOV     @DRVS,SDRVS     ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  2216 016616  012777  016716  163704                  MOV     #2$,@DRINV      ;INTERRUPT VECTOR
  2217 016624  013777  002542  163700                  MOV     LEVEL,@DRVS     ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
  2218 016632  012777  010000  163664                  MOV     #MA,@CSR        ;MAINT MODE
  2219 016640  052777  000501  163656                  BIS     #IE+CY+GO,@CSR  ;IE, CYCLE & GO
  2220 016646  005337  002662                  1$:     DEC     TIME            ;WAIT FOR TRANSFERS TO COMPLETE
  2221 016652  001375                                  BNE     1$              ;BRANCH BACK IF WE ARE STILL WAITING
  2222 016654  013777  002534  163646                  MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2223 016662  013777  002536  163642                  MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2224 016670  004737  003546                          JSR     PC,INTA         ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
  2225 016674  104051                                  ERROR   +51             ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
  2226 016676  005037  002716                          CLR     ERRCNT          ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
  2227 016702  004737  003716                          JSR     PC,DATCHK       ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
  2228 016706  104201                                  ERROR   +201            ;BUFFER DATA NOT CORRECT
  2229 016710  004737  004014                          JSR     PC,DATCH2       ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
  2230 016714  000415                                  BR      3$              ;BRANCH TO CONTINUE
  2231 016716  062706  000004                  2$:     ADD     #4,SP           ;CLEAN UP THE STACK FROM THIS INTERRUPT
  2232 016722  013777  002534  163600                  MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2233 016730  013777  002536  163574                  MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2234 016736  017737  163562  002562                  MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
  2235 016744  104036                                  ERROR   +36             ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
  2236 016746  000523                                  BR      TST24           ;BRANCH TO NEXT TEST
  2237 016750  012777  010000  163546          3$:     MOV     #MA,@CSR        ;MAINT MODE
  2238 016756  012737  001000  002662                  MOV     #1000,TIME      ;SET TIME LOOP COUNTER
  2239 016764  013777  002632  163526                  MOV     WCLEN,@WCR      ;MOVE WCLEN TO WCR
  2240 016772  013777  002620  163522                  MOV     INBUF,@BAR      ;MOVE INBUF TO BAR
  2241 017000  017737  163524  002534                  MOV     @DRINV,SDRINV   ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  2242 017006  017737  163520  002536                  MOV     @DRVS,SDRVS     ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  2243 017014  012777  017166  163506                  MOV     #8$,@DRINV      ;SET UP INTERRUPT VECTOR
  2244 017022  012777  010000  163474                  MOV     #MA,@CSR        ;MAINT MODE
  2245 017030  052777  000501  163466                  BIS     #IE+CY+GO,@CSR  ;IE, CYCLE & GO
  2246 017036  005337  002662                  4$:     DEC     TIME            ;DECREMENT TO ZERO WHILE WAITING
  2247 017042  001375                                  BNE     4$              ;BRANCH BACK IF NOT ZERO
  2248 017044  013777  002534  163456                  MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2249 017052  013777  002536  163452                  MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
```

```
017060  017737  163440  002562          MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
017066  022737  010700  002562          CMP     #10700,RCSR     ;SEE IF ONLY READY, MAINT, IE & CYCLE ARE SET
017074  001404                          BEQ     5$              ;BRANCH IF THEY ARE
017076  012737  010700  002574          MOV     #10700,ECSR     ;MOVE EXPECTED DATA TO ECSR
017104  104040                          ERROR   +40             ;CSR IS WRONG
017106  017737  163410  002570  5$:     MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
017114  022777  177770  163376          CMP     #-10,@WCR       ;CHECK THAT NO TRANSFERS WERE MADE
017122  001004                          BNE     6$              ;BRANCH TO ERROR IF THERE WERE
017124  023737  002620  002570          CMP     INBUF,RBAR      ;CHECK THAT NO TRANSFERS WERE MADE
017132  001412                          BEQ     7$              ;BRANCH AROUND ERROR IF NONE
017134  017737  163360  002572  6$:     MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
017142  012737  177770  002604          MOV     #-10,EWCR       ;MOVE EXPECTED DATA TO EWCR
017150  013737  002620  002602          MOV     INBUF,EBAR      ;MOVE EXPECTED DATA TO EBAR
017156  104041                          ERROR   +41             ;TRANSFERS SHOULD HAVE BEEN INHIBITED
017160  005077  163340          7$:     CLR     @CSR            ;CLEAR THE CSR TO DO AN INIT
017164  000414                          BR      TST24           ;BRANCH TO NEXT TEST
017166  062706  000004          8$:     ADD     #4,SP           ;CLEAN UP STACK AFTER INTERRUPT
017172  013777  002534  163330          MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
017200  013777  002536  163324          MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
017206  017737  163312  002562          MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
017214  104042                          ERROR   +42             ;DR11 SHOULD NOT HAVE INTERRUPTED A 2ND TIME
```

```
                                            .SBTTL  TEST #24 - TEST FOR 200 NPR TRANSFERS IN MAINT MODE
                                            ;*****************************************************************
                                            ;*TEST 24        TEST FOR 200 NPR TRANSFERS IN MAINT MODE
                                            ;*
                                            ;*       THIS TEST CHECKS FOR 200 NPR TRANSFERS IN MAINTENANCE MODE.
                                            ;*
                                            ;*****************************************************************
 017216                                     TST24:
 017216  000004                                     SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 017220  012737  017226  001310                     MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 017226  004737  004036             999$:           JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 017232  005077  163266                             CLR     @CSR                    ;FORCE ACCESS TO CSR
 017236  012737  000200  002624                     MOV     #200,BUFLEN             ;LENGTH OF BUFFER = 200
 017244  013737  002624  002632                     MOV     BUFLEN,WCLEN            ;PREPARE NUMBER FOR WCR
 017252  005437  002632                             NEG     WCLEN                   ;2'S COMPLEMENT OF BUFLEN
 017256  004737  003472                             JSR     PC,LODBUF               ;LOAD INBUF WITH INCREMENTING PATTERN
 017262  004737  003520                             JSR     PC,CHKBFF               ;LOAD CHKBUF WITH MODIFIED INCREMENTED PATTERN
 017266  013777  002632  163224                     MOV     WCLEN,@WCR              ;SET UP WCR
 017274  013777  002620  163220                     MOV     INBUF,@BAR              ;SET UP BAR
 017302  012777  177777  163216                     MOV     #-1,@BDR                ;MAINT AIDE
 017310  017737  163214  002534                     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 017316  017737  163210  002536                     MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 017324  012777  017426  163176                     MOV     #2$,@DRINV              ;INT VECTOR
 017332  013777  002542  163172                     MOV     LEVEL,@DRVS             ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
 017340  005037  177776                             CLR     PSW                     ;LET THE DR11 INTERRUPT
 017344  012777  010000  163152                     MOV     #MA,@CSR                ;MAINT MODE
 017352  012737  001000  002662                     MOV     #1000,TIME              ;SET WAIT LOOP COUNTER
 017360  052777  000501  163136                     BIS     #IE+CY+GO,@CSR          ;IE, CYCLE & GO
 017366  005337  002662             1$:             DEC     TIME                    ;DECREMENT UNTIL WE GET TO ZERO
 017372  001375                                     BNE     1$                      ;BRANCH BACK IF NOT ZERO
 017374  017737  163124  002562                     MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 017402  013777  002534  163120                     MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 017410  013777  002536  163114                     MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 017416  104043                                     ERROR   +43                     ;EXPECTED INTERRUPT DID NOT OCCUR
 017420  005077  163100                             CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 017424  000402                                     BR      3$                      ;BRANCH AROUND THE STACK CLEANUP
 017426  062706  000004             2$:             ADD     #4,SP                   ;CLEAN UP THE STACK AFTER INTERRUPT
 017432  013777  002534  163070     3$:             MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 017440  013777  002536  163064                     MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 017446  004737  003546                             JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 017452  104051                                     ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORRECT
 017454  005037  002716                             CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
 017460  004737  003716                             JSR     PC,DATCHK               ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
 017464  104201                                     ERROR   +201                    ;BUFFER DATA NOT CORRECT
 017466  004737  004014                             JSR     PC,DATCH2               ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
```

```
                                            .SBTTL  TEST #25 - DOING DATO TO DIODE MEMORY CAUSES NEX
                                            ;*********************************************************************
                                            ;*TEST 25        DOING DATO TO DIODE MEMORY CAUSES NEX
                                            ;*
                                            ;*       THIS TEST INSURES THAT DOING A DATO TO DIODE MEMORY CAUSES THE NEX BIT
                                            ;*       (BIT 14) TO SET.
                                            ;*
                                            ;*********************************************************************
     017472                                 TST25:
     017472  000004                                 SCOPE                      ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     017474  012737  017502  001310                 MOV     #999$,$LPERR       ;SET LOOP ON ERROR TO 999$
     017502  004737  004036                 ç99$:   JSR     PC,CLENUP          ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
     017506  005077  163012                         CLR     @CSR               ;FORCE ACCESS TO CSR
     017512  012777  177776  163000                 MOV     #-2,@WCR           ;SET UP WCR
     017520  013777  002616  162774                 MOV     DIOMEM,@BAR        ;SET UP BAR
     017526  017737  162776  002534                 MOV     @DRINV,SDRINV      ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     017534  017737  162772  002536                 MOV     @DRVS,SDRVS        ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
     017542  012777  017652  162760                 MOV     #2$,@DRINV         ;INTERRUPT VECTOR TO 3$
     017550  013777  002542  162754                 MOV     LEVEL,@DRVS        ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
     017556  005037  177776                         CLR     PSW                ;LET THE DR11 INTERRUPT
     017562  012777  010000  162734                 MOV     #MA,@CSR           ;MAINT MODE
     017570  052777  000062  162726                 BIS     #F1+X6+X7,@CSR     ;SET FNCT1, XBA16, AND XBA17
     017576  052777  000501  162720                 BIS     #IE+CY+GO,@CSR     ;SET IE, CYCLE, AND GO
     017604  012737  001000  002662                 MOV     #1000,TIME         ;SET DELAY COUNTER
     017612  005337  002662                 1$:     DEC     TIME               ;DECREMENT UNTIL ZERO
     017616  001375                                 BNE     1$                 ;BRANCH BACK IF NOT
     017620  013777  002534  162702                 MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     017626  013777  002536  162676                 MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
     017634  017737  162664  002562                 MOV     @CSR,RCSR          ;MOVE RECEIVED DATA TO RCSR
     017642  104035                                 ERROR   +35                ;DR11 FAILED TO INTERRUPT
     017644  005077  162654                         CLR     @CSR               ;CLEAR THE CSR TO DO AN INIT
     017650  000431                                 BR      TST26              ;BRANCH TO THE NEXT TEST
     017652  062706  000004                 2$:     ADD     #4,SP              ;RESTORE THE STACK
     017656  013777  002534  162644                 MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     017664  013777  002536  162640                 MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
     017672  017737  162626  002562                 MOV     @CSR,RCSR          ;MOVE CSR DATA TO RCSR
     017700  013701  002562                         MOV     RCSR,R1            ;MOVE DATA TO R1 FOR CHECKING
     017704  042701  037577                         BIC     #37577,R1          ;CLEAR ALL BUT ERROR, NEX AND READY BITS
     017710  022701  140200                         CMP     #ER+NX+RY,R1       ;SEE IF ALL THESE BITS ARE SET
     017714  001407                                 BEQ     TST26              ;BRANCH TO THE NEXT TEST IF THEY ARE ALL SET
     017716  013737  002562  002574                 MOV     RCSR,ECSR          ;MOVE EXPECTED DATA TO ECSR
     017724  052737  140200  002574                 BIS     #ER+NX+RY,ECSR     ;SET THE BIT THAT SHOULD HAVE BEEN SET
     017732  104040                                 ERROR   +40                ;CSR IS WRONG
```

```
  2357                                          .SBTTL  TEST #26 - CROSSING 32K DOESN'T CAUSE BAOF OR FORCE ERROR
                                                ;*****************************************************************
                                                ;*TEST 26         CROSSING 32K DOESN'T CAUSE BAOF OR FORCE ERROR
                                                ;*
                                                ;*       THIS TEST INSURES THAT CROSSING THE 32K BOUNDARY DOES NOT CAUSE A BAOF
                                                ;*       OR FORCE ERROR.
                                                ;*
                                                ;*****************************************************************
       017734                                   TST26:
       017734  000004                                   SCOPE                      ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       017736  012737  017744  001310                   MOV     #999$,$LPERR       ;SET LOOP ON ERROR TO 999$
  2358 017744  004737  004036           999$:   JSR     PC,CLENUP          ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  2359 017750  012777  177760  162542           MOV     #-20,@WCR          ;SET UP WCR
  2360 017756  012777  177776  162536           MOV     #-2,@BAR           ;SET UP BAR FOR PROC STATUS ADDRESS
  2361 017764  017737  162540  002534           MOV     @DRINV,SDRINV      ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  2362 017772  017737  162534  002536           MOV     @DRVS,SDRVS        ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  2363 020000  012777  020076  162522           MOV     #2$,@DRINV         ;INTERRUPT VECTOR TO 3$
  2364 020006  013777  002542  162516           MOV     LEVEL,@DRVS        ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
  2365 020014  012737  001000  002662           MOV     #1000,TIME         ;SET WAIT LOOP COUNTER
  2366 020022  005037  177776                   CLR     PSW                ;LET THE DR11 INTERRUPT
  2367 020026  012777  010000  162470           MOV     #MA,@CSR           ;MAINT MODE
  2368 020034  052777  000563  162462           BIS     #563,@CSR          ;CYCLE, IE, FNCT1, XBA17, XBA16, AND GO TO CSR
  2369 020042  005337  002662           1$:     DEC     TIME               ;DECREMENT UNTIL WE GET TO ZERO
  2370 020046  001375                           BNE     1$                 ;BRANCH BACK IF NOT ZERO
  2371 020050  013777  002534  162452           MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2372 020056  013777  002536  162446           MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2373 020064  017737  162434  002562           MOV     @CSR,RCSR          ;MOVE CSR CONTENTS TO RCSR
  2374 020072  104035                           ERROR   +35                ;DR11 FAILED TO INTERRUPT
  2375 020074  000433                           BR      TST27              ;BRANCH TO NEXT TEST
  2376 020076  062706  000004           2$:     ADD     #4,SP              ;CLEAN UP STACK AFTER INTERRUPT
  2377 020102  013777  002534  162420           MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2378 020110  013777  002536  162414           MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2379 020116  017737  162402  002562           MOV     @CSR,RCSR          ;MOVE CSR CONTENTS TO RCSR
  2380 020124  013701  002562                   MOV     RCSR,R1            ;MOVE CONTENTS TO R1 FOR TESTING
  2381 020130  042701  037577                   BIC     #37577,R1          ;CLEAR ALL BUT THE ERROR AND READY BITS
  2382 020134  022701  140200                   CMP     #ER+RY+NX,R1       ;SEE IF ERROR, READY AND NEX ARE SET
  2383 020140  001411                           BEQ     TST27              ;BRANCH TO NEXT TEST IF THEY ARE
  2384 020142  013737  002562  002574           MOV     RCSR,ECSR          ;MOVE EXPECTED DATA TO ECSR
  2385 020150  052737  140200  002574           BIS     #ER+RY+NX,ECSR     ;SET THE BITS THAT SHOULD HAVE BEEN SET
  2386 020156  104040                           ERROR   +40                ;CSR IS WRONG
  2387 020160  005077  162340                   CLR     @CSR               ;CLEAR THE CSR TO DO AN INIT
```

```
 2394                                     .SBTTL  TEST #27 - CHECK ACTUAL POSITION OF 2-N BURST SWITCH
                                          ;*****************************************************************
                                          ;*TEST 27       CHECK ACTUAL POSITION OF 2-N BURST SWITCH
                                          ;*
                                          ;*       THIS TEST INSURES THAT THE 2-N BURST SWITCH IS IN THE POSITION THAT
                                          ;*       THE DEVICE DESCRIPTOR WORD SAYS IT SHOULD BE.
                                          ;*
                                          ;*****************************************************************
      020164                              TST27:
      020164  000004                              SCOPE                        ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      020166  012737  020204  001310              MOV     #999$,$LPERR         ;SET LOOP ON ERROR TO 999$
 2395 020174  032737  000001  002612              BIT     #BIT0,BORW           ;TESTING A 'B'' OR A 'W''?
 2396 020202  001456                              BEQ     INOOUT               ;BRANCH TO INOOUT IF DR11-B
 2397 020204  004737  004036          999$:       JSR     PC,CLENUP            ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 2398 020210  012777  100000  162306              MOV     #EIR,@CSR            ;GO TO EIR MODE
 2399 020216  017737  162302  002564              MOV     @CSR,REIR            ;MOVE EIR DATA TO REIR
 2400 020224  005077  162274                      CLR     @CSR                 ;GO BACK TO CSR
 2401 020230  013701  002564                      MOV     REIR,R1              ;MOVE DATA TO R1 ALSO
 2402 020234  000301                              SWAB    R1                   ;GET BIT 8 INTO BIT 0 BY SWAPPING BYTES
 2403 020236  006301                              ASL     R1                   ;MOVE BIT 0 INTO BIT 1
 2404 020240  042701  177775                      BIC     #CBIT1,R1            ;CLEAR ALL BUT BIT 1
 2405 020244  013702  002720                      MOV     DDW,R2               ;PUT DEVICE DESCRIPTOR WORD IN R2
 2406 020250  042702  177775                      BIC     #CBIT1,R2            ;CLEAR ALL BUT BIT 1
 2407 020254  001402                              BEQ     1$                   ;BRANCH IF IT IS CLEAR
 2408 020256  005002                              CLR     R2                   ;CLEAR THE BIT
 2409 020260  000402                              BR      2$                   ;GO TEST THE BIT
 2410 020262  012702  000002          1$:         MOV     #BIT1,R2             ;SET THE BIT
 2411 020266  020102                  2$:         CMP     R1,R2                ;SEE IF RECEIVED MATCHES EXPECTED
 2412 020270  001017                              BNE     5$                   ;BRANCH TO CHECK FOR LOOP ON TEST
 2413 020272  013737  002564  002576              MOV     REIR,EEIR            ;MOVE EXPECTED DATA TO EEIR
 2414 020300  032737  000400  002576              BIT     #BIT8,EEIR           ;TEST STATE OF BIT 8
 2415 020306  001404                              BEQ     3$                   ;BRANCH IF IT IS CLEAR
 2416 020310  042737  000400  002576              BIC     #BIT8,EEIR           ;REVERSE STATE - EXPECTED CLEAR
 2417 020316  000403                              BR      4$                   ;GO CALL ERROR
 2418 020320  052737  000400  002576  3$:         BIS     #BIT8,EEIR           ;REVERSE STATE - EXPECTED SET
 2419 020326  104054                  4$:         ERROR   +54                  ;2-N CYCLE BURST SWITCH IN WRONG POSITION
 2420 020330  032777  040400  161002  5$:         BIT     #BIT14+BIT8,@SWR;SEE IF WE SHOULD LOOP ON THIS TEST
 2421 020336  001322                              BNE     999$                 ;BRANCH BACK IF SO
```

```
                                                .SBTTL  CODE TO CHECK CABLE STATUS FOR EXECUTION OF CABLE TESTS
                                        ;               CABLE MODE TESTING (WRAP-AROUND CABLE IN USER SLOTS)

                                        ;       TESTS 30 THRU 37 ARE PERFORMED IF BIT 2 OF DEVICE DESCRIPTOR WORD IS
                                        ;       SET, INDICATING CABLE IS IN.

020340  032737  000004  002720  INOOUT: BIT     #BIT2,DDW               ;SEE IF CABLE IS IN
020346  001002                          BNE     TST30                   ;BRANCH TO NEXT TEST IF CABLE IS IN
020350  000137  023074                  JMP     ENDEV                   ;JUMP TO ENDEV - TESTS ARE NOT TO BE DONE
```

```
                                            .SBTTL  TEST #30 - CHECK CSR BIT PATTERNS WITH MAINT BIT CLEAR
                                            ;*******************************************************************
                                            ;*TEST 30        CHECK CSR BIT PATTERNS WITH MAINT BIT CLEAR
                                            ;*
                                            ;*       THIS TEST SETS ALL POSSIBLE COMBINATIONS OF SET BITS IN THE CSR WITH
                                            ;*       THE MAINTENANCE BIT CLEAR, AND COMPARES THE RECEIVED CSR CONTENTS WITH
                                            ;*       THAT OF THE EXPECTED PATTERNS IN 'MAICLR'.
                                            ;*
                                            ;*******************************************************************
020354                                      TST30:
020354  000004                                      SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
020356  012737  020412  001310                      MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
020364  004737  004036                              JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
020370  005037  002716                              CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +202
020374  012700  000002                              MOV     #2,R0                   ;DO 2 SETS OF 200 PATTERNS
020400  012701  006266                              MOV     #MAICLR,R1              ;MOVE ADDRESS OF EXPECTED PATTERNS TO R1
020404  005002                                      CLR     R2                      ;START WITH PATTERN ZERO
020406  012703  000200                      1$:     MOV     #200,R3                 ;MOVE 200 TO THE LOOP COUNTER
020412  052777  010000  162104              999$:   BIS     #MA,@CSR                ;SET MAINTENANCE AND
020420  005077  162100                              CLR     @CSR                    ;CLEAR TO DO AN INIT
020424  017737  162074  002562                      MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
020432  022737  000200  002562                      CMP     #RY,RCSR                ;MAKE SURE READY BIT IS THE ONLY BIT SET
020440  001404                                      BEQ     2$                      ;BRANCH IF SO
020442  012737  000200  002574                      MOV     #RY,ECSR                ;MOVE EXPECTED DATA TO ECSR
020450  104032                                      ERROR   +32                     ;READY IS NOT THE ONLY BIT SET
020452  012777  177777  162040              2$:     MOV     #-1,@WCR                ;MOVE 1 WORD COUNT TO WCR IN CASE OF IE ENABLED
020460  012777  052414  162034                      MOV     #NOCARE,@BAR            ;MOVE A NOT-CARE ADDRESS TO BAR FOR SAME REASON
020466  010277  162032                              MOV     R2,@CSR                 ;SET THE PARTICULAR FUNCTION BITS IN CSR
020472  017737  162026  002562                      MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
020500  011137  002574                              MOV     (R1),ECSR               ;MOVE EXPECTED DATA TO ECSR
020504  023737  002574  002562                      CMP     ECSR,RCSR               ;COMPARE EXPECTED WITH RECEIVED
020512  001427                                      BEQ     6$                      ;BRANCH IF OK
020514  012737  000401  020524                      MOV     #CY+GO,3$               ;REESTABLISH BIT PATTERN
020522  040227                                      BIC     R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
020524  000401                              3$:     .WORD   CY+GO                   ;LOCATION TO HOLD BOTH CYCLE AND GO BITS
020526  001016                                      BNE     5$                      ;BRANCH TO ERROR ONLY IF EITHER OR BOTH BITS WERE CLEAR
020530  005737  002714                              TST     MEMGMT                  ;SEE IF MEMORY MANAGEMENT IS OUT THERE
020534  001404                                      BEQ     4$                      ;BRANCH IF NOT
020536  032737  000060  002574                      BIT     #X6+X7,ECSR             ;SEE IF EITHER XBA16 OR XBA17 ARE SET
020544  001407                                      BEQ     5$                      ;BRANCH TO ERROR IF BOTH ARE CLEAR
020546  052737  140000  002574              4$:     BIS     #ER+NX,ECSR             ;SET THE ERROR AND NEX BITS - EXPECT THEM TO SET
020554  023737  002574  002562                      CMP     ECSR,RCSR               ;NOW SEE IF DATA MATCHES
020562  001403                                      BEQ     6$                      ;BRANCH AROUND ERROR IF IT DOES
020564  010237  002540                      5$:     MOV     R2,BUT                  ;MOVE THE BITS SET INTO CSR TO THE BUT LOCATION
020570  104202                                      ERROR   +202                    ;CSR PATTERN NOT CORRECT
020572  062701  000002                      6$:     ADD     #2,R1                   ;INCREMENT R1 TO NEXT EXPECTED PATTERN
020576  005202                                      INC     R2                      ;INCREMENT THE PATTERN
020600  005303                                      DEC     R3                      ;DECREMENT THE LOOP COUNTER
020602  001303                                      BNE     999$                    ;BRANCH BACK IF NOT DONE
020604  062702  000200                              ADD     #200,R2                 ;ADD 200 TO PATTERN LOCATION
020610  005300                                      DEC     R0                      ;DECREMENT THE LOOP COUNTER AND
020612  001275                                      BNE     1$                      ;BRANCH BACK IF 2ND OCTAL GROUP NOT DONE
```

```
 2484                                      .SBTTL  TEST #31 - CHECK BAR WITH CSR CLEAR
                                           ;*********************************************************************
                                           ;*TEST 31        CHECK BAR WITH CSR CLEAR
                                           ;*
                                           ;*      THIS TEST CHECKS THAT BAR BIT 0 IS CLEAR WITH CSR CLEAR (CSR=0).
                                           ;*
                                           ;*********************************************************************
      020614                               TST31:
      020614  000004                               SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      020616  012737  020624  001310               MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 2485 020624  004737  004036               999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 2486 020630  012777  001360  161664               MOV     #$TMP0,@BAR             ;PUT AN ADDRESS IN THE BAR
 2487 020636  012777  000001  161660               MOV     #GO,@CSR                ;SET JUST THE GO BIT TO CLEAR THE READY BIT
 2488 020644  017737  161654  002562               MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 2489 020652  001403                               BEQ     1$                      ;BRANCH AROUND ERROR IF EQUAL TO ZERO
 2490 020654  005037  002574                       CLR     ECSR                    ;MOVE EXPECTED DATA TO ECSR
 2491 020660  104040                               ERROR   +40                     ;CSR IS WRONG
 2492 020662  017737  161634  002570       1$:     MOV     @BAR,RBAR               ;MOVE RECEIVED DATA TO RBAR
 2493 020670  032737  000001  002570               BIT     #BIT0,RBAR              ;SEE IF THIS BIT IS CLEAR
 2494 020676  001407                               BEQ     TST32                   ;BRANCH TO NEXT TEST IF IT WAS
 2495 020700  013737  002570  002602               MOV     RBAR,EBAR               ;MOVE EXPECTED DATA TO EBAR
 2496 020706  042737  000001  002602               BIC     #BIT0,EBAR              ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
 2497 020714  104044                               ERROR   +44                     ;BAR IS WRONG
```

```
                                        .SBTTL  TEST #32 - TEST 7 SINGLE DATI NON BURST MODE TRANSFERS
                                        ;*****************************************************************
                                        ;*TEST 32       TEST 7 SINGLE DATI NON BURST MODE TRANSFERS
                                        ;*
                                        ;*      THIS TEST DOES 7 BIT PATTERNS OF SINGLE DATI NON BURST MODE TRANSFERS,
                                        ;*      AND THAT THEY ARE DONE PROPERLY.
                                        ;*
                                        ;*****************************************************************
     020716                             TST32:
     020716  000004                             SCOPE                   ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     020720  012737  020742  001310             MOV     #999$,$LPERR    ;SET LOOP ON ERROR TO 999$
     020726  012702  000007          1$:        MOV     #7,R2           ;SET UP LOOP COUNTER - DO 7 BIT PATTERNS
     020732  005037  002716                     CLR     ERRCNT          ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
     020736  012703  006250                     MOV     #PATRNS,R3      ;MOVE ADDRESS OF PATTERNS TO R3
     020742  017737  161562  002534  999$:      MOV     @DRINV,SDRINV   ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     020750  017737  161556  002536             MOV     @DRVS,SDRVS     ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
     020756  012777  021120  161544             MOV     #3$,@DRINV      ;INTERRUPT VECTOR TO 4$
     020764  013777  002542  161540             MOV     LEVEL,@DRVS     ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
     020772  005037  177776                     CLR     PSW             ;LET THE DR11 INTERRUPT
     020776  012777  010000  161520             MOV     #MA,@CSR        ;DO AN INIT BY SETTING AND
     021004  005077  161514                     CLR     @CSR            ;CLEARING THE CSR MAINTENANCE BIT
     021010  012777  177777  161502             MOV     #-1,@WCR        ;SET UP FOR 1 TRANSFER
     021016  012777  002614  161476             MOV     #NPR1,@BAR      ;TRANSFER FROM BUS ADDRESS IN NPR1
     021024  005077  161476                     CLR     @BDR            ;GET READY TO RECEIVE DATA
     021030  011337  002614                     MOV     (R3),NPR1       ;SET UP TRANSFER DATA
     021034  012777  000110  161462             MOV     #F3+IE,@CSR     ;SET THE NON BURST (FNCT3) AND IE
     021042  052777  000401  161454             BIS     #CY+GO,@CSR     ;SET THE CYCLE AND GO BITS
     021050  005037  002662                     CLR     TIME            ;CLEAR THE TIME LOCATION FOR WAIT LOOP
     021054  005237  002662          2$:        INC     TIME            ;INCREMENT UNTIL WE GET TO ZERO AGAIN
     021060  001375                             BNE     2$              ;BRANCH BACK IF WE AREN'T THERE YET
     021062  013777  002534  161440             MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     021070  013777  002536  161434             MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
     021076  017737  161422  002562             MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
     021104  011337  002606                     MOV     (R3),ENPR1      ;MOVE PATTERN TO ENPR1
     021110  104035                             ERROR   +35             ;DR11 FAILED TO INTERRUPT
     021112  005077  161406                     CLR     @CSR            ;CLEAR THE CSR TO DO AN INIT
     021116  000450                             BR      5$              ;BRANCH TO SEE IF THERE ARE ANY MORE PATTERNS TO CHECK
     021120  062706  000004          3$:        ADD     #4,SP           ;CLEAN STACK AFTER INTERRUPT
     021124  013777  002534  161376             MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     021132  013777  002536  161372             MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
     021140  004737  004254                     JSR     PC,ERRCHK       ;CLEAR IE, CHECK FOR ERROR
     021144  104021                             ERROR   +21             ;ERROR BIT SHOULD HAVE BEEN CLEAR
     021146  017737  161350  002570             MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
     021154  012737  002617  002602             MOV     #NPR1+3,EBAR    ;MOVE EXPECTED DATA TO EBAR
     021162  017737  161340  002566             MOV     @BDR,RBDR       ;MOVE RECEIVED DATA TO RBDR
     021170  011337  002600                     MOV     (R3),EBDR       ;MOVE EXPECTED DATA TO EBDR
     021174  017737  161320  002572             MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
     021202  005037  002604                     CLR     EWCR            ;MOVE EXPECTED DATA TO EWCR
     021206  023737  002570  002602             CMP     RBAR,EBAR       ;COMPARE RECEIVED WITH EXPECTED
     021214  001010                             BNE     4$              ;BRANCH IF WRONG
     021216  023737  002566  002600             CMP     RBDR,EBDR       ;COMPARE RECEIVED WITH EXPECTED
     021224  001004                             BNE     4$              ;BRANCH IF WRONG
     021226  023737  002572  002604             CMP     RWCR,EWCR       ;COMPARE RECEIVED WITH EXPECTED
     021234  001401                             BEQ     5$              ;BRANCH IF OK
     021236  104211                  4$:        ERROR   +211            ;CSR AND-OR WCR AND-OR BAR ARE INCORRECT
     021240  062703  000002          5$:        ADD     #2,R3           ;INCREMENT TO NEXT PATTERN
     021244  005302                             DEC     R2              ;DECREMENT THE LOOP COUNTER
```

```
   2551 021246  001235                    BNE     999$            ;BRANCH BACK IF NOT ZERO YET
```

```
 2557                                  .SBTTL  TEST #33 - TEST STRING OF 200 DATIS BURST MODE XFERS
                                       ;*************************************************************************
                                       ;*TEST 33         TEST STRING OF 200 DATIS BURST MODE XFERS
                                       ;*
                                       ;*       THIS TEST DOES 200 DATI TRANSFERS IN BURST MODE.
                                       ;*
                                       ;*************************************************************************
      021250                           TST33:
      021250  000004                           SCOPE                          ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      021252  012737  021260  001310           MOV     #999$,$LPERR           ;SET LOOP ON ERROR TO 999$
 2558 021260  004737  004036           999$:   JSR     PC,CLENUP              ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 2559 021264  012737  000200  002624           MOV     #200,BUFLEN            ;LENGTH OF BUFFER=200
 2560 021272  004737  003472                   JSR     PC,LODBUF              ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 2561 021276  012737  177600  002632           MOV     #-200,WCLEN            ;PREPARE NUMBER FOR WCR
 2562 021304  013777  002632  161206           MOV     WCLEN,@WCR             ;SET UP WCR
 2563 021312  013777  002620  161202           MOV     INBUF,@BAR             ;SET UP BAR
 2564 021320  012777  177777  161200           MOV     #-1,@BDR               ;MAINT AIDE
 2565 021326  017737  161176  002534           MOV     @DRINV,SDRINV          ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 2566 021334  017737  161172  002536           MOV     @DRVS,SDRVS            ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 2567 021342  012777  021452  161160           MOV     #2$,@DRINV             ;INT VECTOR
 2568 021350  013777  002542  161154           MOV     LEVEL,@DRVS            ;INTERRUPT STATUS TO LEVEL OF DEVICE
 2569 021356  005037  177776                   CLR     PSW                    ;LET THE DR11 INTERRUPT
 2570 021362  012777  000100  161134           MOV     #IE,@CSR               ;SET INTERRUPT ENABLE
 2571 021370  052777  000401  161126           BIS     #CY+GO,@CSR            ;CYCLE, GO
 2572 021376  012737  001000  002662           MOV     #1000,TIME             ;WAIT FOR INTERRUPT
 2573 021404  005337  002662           1$:     DEC     TIME                   ;DECREMENT UNTIL WE REACH ZERO
 2574 021410  001375                           BNE     1$                     ;BRANCH BACK IF NOT ZERO
 2575 021412  013777  002534  161110           MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2576 021420  013777  002536  161104           MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2577 021426  017737  161072  002562           MOV     @CSR,RCSR              ;MOVE RECEIVED DATA TO RCSR
 2578 021434  104035                           ERROR   +35                    ;DR11 FAILED TO INTERRUPT
 2579 021436  012777  010000  161060           MOV     #MA,@CSR               ;SET THE MAINTENANCE BIT AND
 2580 021444  005077  161054                   CLR     @CSR                   ;CLEAR THE CSR TO DO AN INIT
 2581 021450  000426                           BR      TST34                  ;BRANCH TO NEXT TEST
 2582 021452  062706  000004           2$:     ADD     #4,SP                  ;CLEAN UP STACK AFTER INTERRUPT
 2583 021456  013777  002534  161044           MOV     SDRINV,@DRINV          ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2584 021464  013777  002536  161040           MOV     SDRVS,@DRVS            ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2585 021472  004737  003546                   JSR     PC,INTA                ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 2586 021476  104051                           ERROR   +51                    ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 2587 021500  017737  161022  002566           MOV     @BDR,RBDR              ;MOVE RECEIVED DATA TO RBDR
 2588 021506  022737  000177  002566           CMP     #177,RBDR              ;CHECK THAT WORD #200 OF INBUF IS IN BDR
 2589 021514  001404                           BEQ     TST34                  ;BRANCH TO NEXT TEST IF IT IS
 2590 021516  012737  000177  002600           MOV     #177,EBDR              ;MOVE EXPECTED DATA TO EBDR
 2591 021524  104045                           ERROR   +45                    ;BAD DATA IN BDR
```

```
  2598                                        .SBTTL  TEST #34 - TEST 7 SINGLE DATO NON BURST MODE TRANSFERS
                                              ;*****************************************************************
                                              ;*TEST 34         TEST 7 SINGLE DATO NON BURST MODE TRANSFERS
                                              ;*
                                              ;*        THIS TEST DOES 7 PATTERNS OF SINGLE DATO NON BURST MODE TRANSFERS, AND
                                              ;*        THAT THEY ARE DONE PROPERLY.
                                              ;*
                                              ;*****************************************************************
       021526                                 TST34:
       021526  000004                                 SCOPE                   ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       021530  012737  021552  001310                 MOV     #999$,$LPERR    ;SET LOOP ON ERROR TO 999$
  2599 021536  012702  000007         1$:             MOV     #7,R2           ;DO 7 BIT PATTERNS
  2600 021542  005037  002716                         CLR     ERRCNT          ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
  2601 021546  012703  006250                         MOV     #PATRNS,R3      ;MOVE ADDRESS OF PATTERNS TO R3
  2602 021552  017737  160752  002534 999$:           MOV     @DRINV,SDRINV   ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  2603 021560  017737  160746  002536                 MOV     @DRVS,SDRVS     ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  2604 021566  012777  021740  160734                 MOV     #3$,@DRINV      ;INTERRUPT VECTOR TO 3$
  2605 021574  013777  002542  160730                 MOV     LEVEL,@DRVS     ;INTERRUPT STATUS TO LEVEL OF DEVICE
  2606 021602  005037  177776                         CLR     PSW             ;LET DR11 INTERRUPT
  2607 021606  012777  010000  160710                 MOV     #MA,@CSR        ;DO AN INIT
  2608 021614  005077  160704                         CLR     @CSR            ;FORCE ACCESS TO CSR
  2609 021620  012777  177777  160672                 MOV     #-1,@WCR        ;SET UP FOR 1 TRANSFER
  2610 021626  012777  002614  160666                 MOV     #NPR1,@BAR      ;TRANSFER TO BUS ADDRESS IN NPR1
  2611 021634  005037  002614                         CLR     NPR1            ;GET READY TO RECEIVE DATA
  2612 021640  011377  160662                         MOV     (R3),@BDR       ;SET UP TO TRANSFER DATA
  2613 021644  012777  000112  160652                 MOV     #F1+F3+IE,@CSR  ;DATO (FNCT1), FNCT3, IE
  2614 021652  052777  000401  160644                 BIS     #CY+GO,@CSR     ;CYCLE, GO
  2615 021660  012737  001000  002662                 MOV     #1000,TIME      ;CLEAR THE TIME LOCATION FOR WAIT LOOP
  2616 021666  005337  002662         2$:             DEC     TIME            ;DECREMENT UNTIL WE GET BACK TO ZERO
  2617 021672  001375                                 BNE     2$              ;BRANCH BACK IF NOT ZERO
  2618 021674  013777  002534  160626                 MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2619 021702  013777  002536  160622                 MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2620 021710  017737  160610  002562                 MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
  2621 021716  011337  001360                         MOV     (R3),$TMP0      ;MOVE PATTERN TO $TMP0
  2622 021722  104035                                 ERROR   +35             ;DR11 FAILED TO INTERRUPT
  2623 021724  012777  010000  160572                 MOV     #MA,@CSR        ;SET THE MAINTENANCE BIT AND
  2624 021732  005077  160566                         CLR     @CSR            ;CLEAR THE CSR TO DO AN INIT
  2625 021736  000445                                 BR      6$              ;BRANCH TO DO NEXT PATTERN
  2626 021740  062706  000004         3$:             ADD     #4,SP           ;CLEAN UP STACK FROM INTERRUPT
  2627 021744  013777  002534  160556                 MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2628 021752  013777  002536  160552                 MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2629 021760  004737  004254                         JSR     PC,ERRCHK       ;CLEAR IE, CHECK FOR ERROR
  2630 021764  104021                                 ERROR   +21             ;ERROR BIT SHOULD HAVE BEEN CLEAR
  2631 021766  017737  160526  002572                 MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
  2632 021774  001403                                 BEQ     4$              ;BRANCH IF IT IS EQUAL TO ZERO
  2633 021776  011337  001362                         MOV     (R3),$TMP1      ;MOVE PATTERN TO $TMP0
  2634 022002  104206                                 ERROR   +206            ;WCR NOT EQUAL TO ZERO
  2635 022004  017737  160512  002570 4$:             MOV     @BAR,RBAR       ;MOVE RECEIVED ADDRESS TO RBAR
  2636 022012  022737  002617  002570                 CMP     #NPR1+3,RBAR    ;COMPARE CORRECT BAR WITH BAR CABLE MODE TESTING LEAVES
  2637                                                                        ;BIT 0 OF BAR SET. THEREFORE MUST CHECK FOR ODD ADDRESS
  2638 022020  001406                                 BEQ     5$              ;BRANCH IF IT IS OK
  2639 022022  012737  002617  002602                 MOV     #NPR1+3,EBAR    ;MOVE EXPECTED DATA TO EBAR
  2640 022030  011337  001362                         MOV     (R3),$TMP1      ;MOVE PATTERN TO $TMP0
  2641 022034  104207                                 ERROR   +207            ;BAR IS WRONG
  2642 022036  021337  002614         5$:             CMP     (R3),NPR1       ;CHECK FOR CORRECT DATA
  2643 022042  001403                                 BEQ     6$              ;BRANCH IF CORRECT DATA WAS TRANSFERRED
  2644 022044  011337  002606                         MOV     (R3),ENPR1      ;MOVE EXPECTED DATA TO ENPR1
  2645 022050  104210                             ERROR   +210             ;DATA NOT TRANSFERED CORRECTLY
  2646 022052  062703  000002          6$:        ADD     #2,R3            ;POINT TO NEXT BIT PATTERN
  2647 022056  005302                             DEC     R2               ;COUNT 1 PATTERN DONE
  2648 022060  001234                             BNE     999$             ;BRANCH BACK IF NOT DONE
```

```
                                        .SBTTL  TEST #35 - TEST STRING OR 200 DATOS BURST MODE XFERS
                                        ;*********************************************************************
                                        ;*TEST 35        TEST STRING OR 200 DATOS BURST MODE XFERS
                                        ;*
                                        ;*       THIS TEST CHECKS 200 DATO TRANSFERS IN BURST MODE.
                                        ;*
                                        ;*********************************************************************
     022062                             TST35:
     022062  000004                             SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     022064  012737  022072  001310             MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
     022072  005077  160426             999$:   CLR     @CSR                    ;FORCE ACCESS TO CSR
     022076  012737  000200  002624             MOV     #200,BUFLEN             ;LENGTH OF BUFFER=200
     022104  004737  003472                     JSR     PC,LODBUF               ;LOAD THE BUFFER WITH INCREMENTING PATTERN
     022110  013737  002624  002632             MOV     BUFLEN,WCLEN            ;PREPARE NUMBER FOR WCR
     022116  005437  002632                     NEG     WCLEN                   ;2'S COMPLEMENT OF BUFLEN
     022122  013777  002632  160370             MOV     WCLEN,@WCR              ;SET UP WCR
     022130  013777  002620  160364             MOV     INBUF,@BAR              ;SET UP BAR
     022136  012777  052525  160362             MOV     #52525,@BDR             ;SET UP BDR
     022144  017737  160360  002534             MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     022152  017737  160354  002536             MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
     022160  012777  022270  160342             MOV     #2$,@DRINV              ;INTERRUPT VECTOR
     022166  013777  002542  160336             MOV     LEVEL,@DRVS             ;INTERRUPT STATUS TO LEVEL OF DEVICE
     022174  005037  177776                     CLR     PSW                     ;LET THE DR11 INTERRUPT
     022200  012777  000102  160316             MOV     #IE+F1,@CSR             ;IE, FNCT1
     022206  052777  000401  160310             BIS     #CY+GO,@CSR             ;CYCLE, GO
     022214  012737  001000  002662             MOV     #1000,TIME              ;MOVE WAIT LOOP VALUE TO TIME LOCATION
     022222  005337  002662             1$:     DEC     TIME                    ;DECREMENT UNTIL WE REACH ZERO
     022226  001375                             BNE     1$                      ;BRANCH BACK IF NOT ZERO
     022230  013777  002534  160272             MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     022236  013777  002536  160266             MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
     022244  017737  160254  002562             MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
     022252  104035                             ERROR   +35                     ;DR11 FAILED TO INTERRUPT
     022254  012777  010000  160242             MOV     #MA,@CSR                ;SET THE MAINTENANCE BIT AND
     022262  005077  160236                     CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
     022266  000421                             BR      TST36                   ;BRANCH TO NEXT TEST
     022270  062706  000004             2$:     ADD     #4,SP                   ;CLEAN STACK AFTER INTERRUPT
     022274  013777  002534  160226             MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     022302  013777  002536  160222             MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
     022310  004737  003546                     JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
     022314  104051                             ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
     022316  004737  004106                     JSR     PC,DATOCK               ;CHECK INBUF
     022322  104046                             ERROR   +46                     ;BUFFER DATA NOT CORRECT
     022324  004737  004170                     JSR     PC,DATOC2               ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATOCK
     022330  104047                             ERROR   +47                     ;TOO MANY WORDS WERE TRANSFERED
```

```
 2694                                           .SBTTL  TEST #36 - TEST STRING OF 200 DATIS NON-BURST MODE
                                                ;*********************************************************************
                                                ;*TEST 36       TEST STRING OF 200 DATIS NON-BURST MODE
                                                ;*
                                                ;*      THIS TEST DOES 200 DATI TRANSFERS IN NON BURST MODE.
                                                ;*
                                                ;*********************************************************************
      022332                                    TST36:
      022332  000004                                    SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      022334  012737  022342  001310                    MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 2695 022342  004737  004036                    999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 2696 022346  005077  160152                            CLR     @CSR                    ;FORCE ACCESS TO CSR
 2697 022352  012737  000200  002624                    MOV     #200,BUFLEN             ;LENGTH OF BUFFER=200
 2698 022360  004737  003472                            JSR     PC,LODBUF               ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 2699 022364  013737  002624  002632                    MOV     BUFLEN,WCLEN            ;PREPARE NUMBER FOR WCR
 2700 022372  005437  002632                            NEG     WCLEN                   ;2'S COMPLEMENT OF BUFLEN
 2701 022376  013777  002632  160114                    MOV     WCLEN,@WCR              ;SET-UP WCR
 2702 022404  013777  002620  160110                    MOV     INBUF,@BAR              ;SET-UP BAR
 2703 022412  012777  177777  160106                    MOV     #-1,@BDR                ;MAINT AIDE
 2704 022420  017737  160104  002534                    MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 2705 022426  017737  160100  002536                    MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 2706 022434  012777  022544  160066                    MOV     #2$,@DRINV              ;INT VECTOR
 2707 022442  013777  002542  160062                    MOV     LEVEL,@DRVS             ;INTERRUPT STATUS TO LEVEL OF DEVICE
 2708 022450  005037  177776                            CLR     PSW                     ;LET THE DR11 INTERRUPT
 2709 022454  012777  000110  160042                    MOV     #F3+IE,@CSR             ;FNCT3, IE
 2710 022462  052777  000401  160034                    BIS     #CY+GO,@CSR             ;CYCLE, GO
 2711 022470  012737  001000  002662                    MOV     #1000,TIME              ;SET WAIT LOOP COUNTER
 2712 022476  005337  002662                    1$:     DEC     TIME                    ;DECREMENT UNTIL WE REACH ZERO
 2713 022502  001375                                    BNE     1$                      ;BRANCH BACK IF NOT ZERO
 2714 022504  013777  002534  160016                    MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2715 022512  013777  002536  160012                    MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2716 022520  017737  160000  002562                    MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 2717 022526  104035                                    ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 2718 022530  012777  010000  157766                    MOV     #MA,@CSR                ;SET THE MAINTENANCE BIT AND
 2719 022536  005077  157762                            CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 2720 022542  000426                                    BR      TST37                   ;BRANCH TO NEXT TEST
 2721 022544  062706  000004                    2$:     ADD     #4,SP                   ;CLEAN UP STACK AFTER INTERRUPT
 2722 022550  013777  002534  157752                    MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 2723 022556  013777  002536  157746                    MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 2724 022564  004737  003546                            JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 2725 022570  104051                                    ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 2726 022572  017737  157730  002566                    MOV     @BDR,RBDR               ;MOVE RECEIVED DATA TO RBDR
 2727 022600  022737  000177  002566                    CMP     #177,RBDR               ;CHECK THAT WORD #200 OF INBUF IS IN BDR
 2728 022606  001404                                    BEQ     TST37                   ;BRANCH TO NEXT TEST IF OK
 2729 022610  012737  000177  002600                    MOV     #177,EBDR               ;MOVE EXPECTED DATA TO EBDR
 2730 022616  104045                                    ERROR   +45                     ;BAD DATA IN BDR
```

```
  2736                                              .SBTTL  TEST #37 - TEST STRING OF 200 DATOS NON-BURST MODE
                                                    ;*****************************************************************
                                                    ;*TEST 37        TEST STRING OF 200 DATOS NON-BURST MODE
                                                    ;*
                                                    ;*       THIS TEST DOES 200 DATOS IN NON BURST MODE.
                                                    ;*
                                                    ;*****************************************************************
       022620                                       TST37:
       022620  000004                                        SCOPE                         ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       022622  012737  022630  001310                        MOV     #999$,$LPERR          ;SET LOOP ON ERROR TO 999$
  2737 022630  004737  004036                       999$:    JSR     PC,CLENUP             ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  2738 022634  005077  157664                                CLR     @CSR                  ;FORCE ACCESS TO CSR
  2739 022640  012737  000200  002624                        MOV     #200,BUFLEN           ;LENGTH OF BUFFER=200
  2740 022646  004737  003472                                JSR     PC,LODBUF             ;LOAD THE BUFFER WITH INCREMENTING PATTERN
  2741 022652  013737  002624  002632                        MOV     BUFLEN,WCLEN          ;PREPARE NUMBER FOR WCR
  2742 022660  005437  002632                                NEG     WCLEN                 ;2'S COMPLEMENT OF BUFLEN
  2743 022664  013777  002632  157626                        MOV     WCLEN,@WCR            ;SET UP WCR
  2744 022672  013777  002620  157622                        MOV     INBUF,@BAR            ;SET UP BAR
  2745 022700  012777  052525  157620                        MOV     #52525,@BDR           ;SET UP BDR
  2746 022706  017737  157616  002534                        MOV     @DRINV,SDRINV         ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  2747 022714  017737  157612  002536                        MOV     @DRVS,SDRVS           ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  2748 022722  012777  023032  157600                        MOV     #2$,@DRINV            ;INTERRUPT VECTOR
  2749 022730  013777  002542  157574                        MOV     LEVEL,@DRVS           ;INTERRUPT STATUS TO LEVEL OF DEVICE
  2750 022736  005037  177776                                CLR     PSW                   ;LET THE DR11 INTERRUPT
  2751 022742  012777  000112  157554                        MOV     #F1+F3+IE,@CSR        ;FNCT1, FNCT3, IE
  2752 022750  052777  000401  157546                        BIS     #CY+GO,@CSR           ;CYCLE, GO
  2753 022756  012737  001000  002662                        MOV     #1000,TIME            ;SET WAIT LOOP COUNTER
  2754 022764  005337  002662                       1$:      DEC     TIME                  ;DECREMENT UNTIL WE GET TO ZERO
  2755 022770  001375                                        BNE     1$                    ;BRANCH BACK IF NOT ZERO
  2756 022772  013777  002534  157530                        MOV     SDRINV,@DRINV         ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2757 023000  013777  002536  157524                        MOV     SDRVS,@DRVS           ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2758 023006  017737  157512  002562                        MOV     @CSR,RCSR             ;MOVE RECEIVED DATA TO RCSR
  2759 023014  104035                                        ERROR   +35                   ;DR11 FAILED TO INTERRUPT
  2760 023016  012777  010000  157500                        MOV     #MA,@CSR              ;SET THE MAINTENANCE BIT AND
  2761 023024  005077  157474                                CLR     @CSR                  ;CLEAR THE CSR TO DO AN INIT
  2762 023030  000421                                        BR      TST40                 ;BRANCH TO NEXT TEST
  2763 023032  062706  000004                       2$:      ADD     #4,SP                 ;CLEAN UP STACK AFTER INTERRUPT
  2764 023036  013777  002534  157464                        MOV     SDRINV,@DRINV         ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  2765 023044  013777  002536  157460                        MOV     SDRVS,@DRVS           ;RESTORE LOCATION USED AS THE INTERRUPT PS
  2766 023052  004737  003546                                JSR     PC,INTA               ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
  2767 023056  104051                                        ERROR   +51                   ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
  2768 023060  004737  004106                                JSR     PC,DATOCK             ;CHECK INBUF
  2769 023064  104046                                        ERROR   +46                   ;BUFFER DATA NOT CORRECT
  2770 023066  004737  004170                                JSR     PC,DATOC2             ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATOCK
  2771 023072  104047                                        ERROR   +47                   ;TOO MANY WORDS WERE TRANSFERED
```

```
                                           .SBTTL  END OF DEVICE PASS ROUTINE
                                           ;*****************************************************************
023074  000004                             ENDEV:  SCOPE                       ;FOR POSSIBLE LOOP ON TEST
023076  005037  001302                             CLR     $TSTNM              ;CLEAR TEST NO. COUNT FOR SCOPE ROUTINE
023102  022737  000001  002416                     CMP     #1,QTYBRD           ;IS THERE MORE THAN 1 BOARD UNDER TEST?
023110  001444                                     BEQ     5$                  ;BRANCH IF NO
023112  005737  001312                             TST     $ERTTL              ;SEE IF THERE WERE ANY ERRORS
023116  001014                                     BNE     2$                  ;BRANCH AROUND EOP TEST IF SO
023120  105737  002710                             TSTB    EOPLOC              ;SEE IF EOP MESSAGES ARE TO PRINT
023124  001413                                     BEQ     3$                  ;BRANCH IF SO
023126  105737  002711                             TSTB    EOPLOC+1            ;SEE IF EOP WAS REQUESTED BEFORE
023132  001003                                     BNE     1$                  ;BRANCH TO PRINT MESSAGE IF SO
023134  105737  027423                             TSTB    CHARCT              ;SEE IF EOD REQUESTED
023140  001430                                     BEQ     5$                  ;BRANCH AROUND MESSAGE PRINT IF NOT
023142  105237  002711                     1$:     INCB    EOPLOC+1            ;INCREMENT UPPER BYTE OF EOPLOC TO CALL EOP MESSAGE
023146  000402                                     BR      3$                  ;BRANCH IF NOT - NO ERRORS TO SPACE FROM
023150  104401  001405                     2$:     TYPE    ,$CRLF              ;TYPE A <CRLF>
023154  104401  034036                     3$:     TYPE    ,BOARD              ;TYPE:  'BOARD # '
023160  013746  001424                             MOV     $UNIT,-(SP)         ;;SAVE $UNIT FOR TYPEOUT
023164  104405                                     TYPDS                       ;;GO TYPE--DECIMAL ASCII WITH SIGN
023166  104401  034753                             TYPE    ,TSTCOM             ;TYPE:  ' TESTING COMPLETE'
023172  005737  001312                             TST     $ERTTL              ;SEE IF ANY ERRORS THIS DEVICE
023176  001407                                     BEQ     4$                  ;BRANCH AROUND TOTAL ERRORS MESSAGE IF NONE
023200  104401  032764                             TYPE    ,ETDEV              ;TYPE:  ' - TOTAL ERRORS THIS DEVICE = '
023204  013746  001312                             MOV     $ERTTL,-(SP)        ;MOVE NUMBER OF ERRORS TO THE STACK
023210  104405                                     TYPDS                       ;GO TYPE THE NUMBER
023212  004737  003126                             JSR     PC,ERCAPT           ;GO LOG THE UNIT #, PASS # & # OF ERRORS THIS DEVICE
023216  104401  001405                     4$:     TYPE    ,$CRLF              ;TYPE A <CRLF>
023222  005237  001422                     5$:     INC     $DEVCT              ;INCREMENT DEVICE COUNTER
023226  023737  002416  001422                     CMP     QTYBRD,$DEVCT       ;ALL DEVICES TESTED?
023234  001404                                     BEQ     $EOP                ;GO TO END OF PASS ROUTINE IF SO
023236  005237  001424                             INC     $UNIT               ;INCREMENT THE UNIT NUMBER
023242  000137  011020                             JMP     TSTDEV              ;GO TEST NEXT DEVICE
```

```
                                .SBTTL  END OF PASS ROUTINE
                                ;*******************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO GOAGIN
023246                          $EOP:
023246  000004                            SCOPE
023250  005037  001302                    CLR     $TSTNM            ;;ZERO THE TEST NUMBER
023254  005237  001416                    INC     $PASS             ;;INCREMENT THE PASS NUMBER
023260  100004                            BPL     10$               ;&& BRANCH IF STILL POSITIVE
023262  005037  001416                    CLR     $PASS             ;&& CLEAR THE PASS LOCATION AND
023266  005237  001420                    INC     $PASS+2           ;&& INCREMENT $PASS+2 TO SHOW 1 OVERFLOW
023272  005327                  10$:      DEC     (PC)+             ;;LOOP?
023274  000001                  $EOPCT:   .WORD   1
023276  003076                            BGT     $DOAGN            ;;YES
023300  012737                            MOV     (PC)+,@(PC)+      ;;RESTORE COUNTER
023302  000001                  $ENDCT:   .WORD   1
023304  023274                            $EOPCT
023306  105737  002710                    TSTB    EOPLOC            ;&& SEE IF EOP MESSAGES ARE TO PRINT
023312  001420                            BEQ     1$                ;&& BRANCH IF THEY ARE
023314  005737  001312                    TST     $ERTTL            ;&& SEE IF ANY ERRORS THIS PASS
023320  001020                            BNE     2$                ;&& BRANCH IF THERE ARE TO PRINT EOP
023322  105737  002711                    TSTB    EOPLOC+1          ;&& SEE IF ERROR OCCURED IN ANOTHER DEVICE
023326  001012                            BNE     1$                ;&& BRANCH IF ANY TO PRINT EOP
023330  105737  027423                    TSTB    CHARCT            ;&& SEE IF ANY CHARACTER WAS INPUTED
023334  001447                            BEQ     $GET42            ;&& BRANCH IF NOT
023336  122737  000007  027423            CMPB    #7,CHARCT         ;&& SEE IF OTHER THAT (^G) TYPED, REQUESTING EOP
023344  001443                            BEQ     $GET42            ;&& BRANCH IF A (^G) - THIS NOT MEANT FOR EOP ROUTINE
023346  105037  027423                    CLRB    CHARCT            ;&& CLEAR THE LOCATION
023352  000405                            BR      3$                ;&& GET OVER $ERTTL TEST AND <CRLF> PRINT
023354  005737  001312          1$:       TST     $ERTTL            ;&& SEE IF AN EXTRA <CRLF> NEEDS PRINTING
023360  001402                            BEQ     3$                ;&& BRANCH IF NOT
023362  104401  001405          2$:       TYPE    ,$CRLF            ;&& TYPE A <CRLF> TO SPACE EOP FROM ERROR
023366  105037  002711          3$:       CLRB    EOPLOC+1          ;&& CLEAR THE UPPER BYTE OF EOPLOC
023372  104401  023503                    TYPE    ,$ENDMG           ;;TYPE "END PASS #"
023376  013746  001420                    MOV     $PASS+2,-(SP)     ;&& MOVE OVERFLOW TO STACK FOR PRINTING
023402  013746  001416                    MOV     $PASS,-(SP)       ;;MOVE $PASS TO THE STACK FOR PRINTING
023406  104406                            TYPDE                     ;&& TYPE THE NUMBER IN EXTENDED DECIMAL
023410  104401  023500                    TYPE    ,$ENULL           ;;TYPE A NULL CHARACTER
023414  005737  001312                    TST     $ERTTL            ;&& SEE IF ANY ERRORS THIS PASS
023420  001413                            BEQ     4$                ;&& BRANCH AROUND NUMBER OF ERRORS MESSAGE IF NONE
023422  022737  000001  002416            CMP     #1,QTYBRD         ;&& SEE IF ONLY 1 BOARD IS BEING TESTED
023430  001007                            BNE     4$                ;&& BRANCH IF NOT - 'TOTAL ERRORS' IS MEANINGLESS
023432  104401  027424                    TYPE    ,TESLR            ;&& TYPE:  '  TOTAL ERRORS SINCE LAST REPORT '
023436  013746  001312                    MOV     $ERTTL,-(SP)      ;&& PUT $ERTTL ON STACK FOR PRINTING
023442  104405                            TYPDS                     ;&& TYPE THE NUMBER OF ERRORS IN DECIMAL
023444  004737  003126                    JSR     PC,ERCAPT         ;&& GO CAPTURE THE DEVICE, PASS & # OF ERRORS
023450  104401  001405          4$:       TYPE    ,$CRLF            ;&& TYPE A <CRLF>
023454  013700  000042          $GET42:   MOV     @#42,R0           ;;GET MONITOR ADDRESS
023460  001405                            BEQ     $DOAGN            ;;BRANCH IF NO MONITOR
023462  000005                            RESET                     ;;CLEAR THE WORLD
023464  004710                  $ENDAD:   JSR     PC,(R0)           ;;GO TO MONITOR
023466  000240                            NOP                       ;;SAVE ROOM
023470  000240                            NOP                       ;;FOR
023472  000240                            NOP                       ;;ACT11
023474                          $DOAGN:
     023474  000137                            JMP     @(PC)+              ;;RETURN
     023476  023516                   $RTNAD:  .WORD   GOAGIN
     023500     377     377      000  $ENULL:  .BYTE   -1,-1,0             ;;NULL CHARACTER STRING
     023503     105     116      104  $ENDMG:  .ASCIZ  /END PASS #/
2805 023516  005037  001422           GOAGIN:  CLR     $DEVCT              ;CLEAR DEVICE COUNT
2806 023522  022737  000001   002416           CMP     #1,QTYBRD           ;IS THERE ONLY ONE DEVICE UNDER TEST?
2807 023530  001002                            BNE     RSTRT               ;BR, IF NOT
2808 023532  000137  011206                    JMP     REINIT              ;GO DO ANOTHER PASS
2809 023536  005037  001424           RSTRT:   CLR     $UNIT               ;CLEAR UNIT NUMBER
2810 023542  000137  011006                    JMP     BEGIN1              ;GO BEGIN TEST OF NEXT DEVICE
```

```
                                        .SBTTL  TYPE ROUTINE
                                        ;*******************************************************************
                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                        ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                        ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                        ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                        ;*
                                        ;*CALL:
                                        ;*1) USING A TRAP INSTRUCTION
                                        ;*       TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*       TYPE
                                        ;*       MESADR
                                        ;*
023546  105737  001357                  $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
023552  100002                                  BPL     1$              ;;BR IF YES
023554  000000                                  HALT                    ;;HALT HERE IF NO TERMINAL
023556  000430                                  BR      3$              ;;LEAVE
023560  010046                          1$:     MOV     R0,-(SP)        ;;SAVE R0
023562  017600  000002                          MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
023566  122737  000001  001432                  CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
023574  001011                                  BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
023576  132737  000100  001433                  BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
023604  001405                                  BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
023606  010037  023616                          MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
023612  004737  030250                          JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
023616  000000                          61$:    .WORD   0               ;;MESSAGE ADDRESS
023620  132737  000040  001433          62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
023626  001003                                  BNE     60$             ;;YES,SKIP TYPE OUT
023630  112046                          2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
023632  001005                                  BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
023634  005726                                  TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
023636  012600                          60$:    MOV     (SP)+,R0        ;;RESTORE R0
023640  062716  000002                  3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
023644  000002                                  RTI                     ;;RETURN
023646  122716  000011                  4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
023652  001430                                  BEQ     8$
023654  122716  000200                          CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
023660  001006                                  BNE     5$
023662  005726                                  TST     (SP)+           ;;POP  <CR><LF> EQUIV
023664  104401                                  TYPE                    ;;TYPE A CR AND LF
023666  001405                                  $CRLF
023670  105037  024110                          CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
023674  000755                                  BR      2$              ;;GET NEXT CHARACTER
023676  004737  023760                  5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
023702  123726  001356                  6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
023706  001350                                  BNE     2$              ;;IF NO GO GET NEXT CHAR.
023710  013746  001354                          MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                        ;;AND THE NULL CHAR.
023714  105366  000001                  7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
023720  002770                                  BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
023722  004737  023760                          JSR     PC,$TYPEC       ;;GO TYPE A NULL
023726  105337  024110                          DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
023732  000770                                  BR      7$              ;;LOOP
                                        ;HORIZONTAL TAB PROCESSOR
023734  112716  000040                  8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
```

```
        023740  004737  023760           9$:       JSR     PC,$TYPEC              ;;TYPE A SPACE
        023744  132737  000007  024110             BITB    #7,$CHARCNT            ;;BRANCH IF NOT AT
        023752  001372                             BNE     9$                     ;;TAB STOP
        023754  005726                             TST     (SP)+                  ;;POP SPACE OFF STACK
        023756  000724                             BR      2$                     ;;GET NEXT CHARACTER
        023760  105777  155364           $TYPEC:   TSTB    @$TPS                  ;;WAIT UNTIL PRINTER IS READY
        023764  100375                             BPL     $TYPEC
        023766  116677  000002  155356             MOVB    2(SP),@$TPB            ;;LOAD CHAR TO BE TYPED INTO DATA REG.
        023774  105777  155344                     TSTB    @$TKS                  ;;SEE IF KEYBOARD IS TALKING.
        024000  100027                             BPL     2$                     ;;BRANCH IF IT ISN'T.
        024002  117737  155340  027423             MOVB    @$TKB,CHARCT           ;&& PUT CHARACTER IN CHARCT
        024010  142737  000200  027423             BICB    #200,CHARCT            ;&& BIT CLEAR PARITY BIT.
        024016  122737  000023  027423             CMPB    #23,CHARCT             ;&& SEE IF THIS IS A ^S.
        024024  001015                             BNE     2$                     ;;BRANCH TO CONTINUE IF IT ISN'T.
        024026  105777  155312           3$:       TSTB    @$TKS                  ;;WAIT FOR ANOTHER INPUT.
        024032  100375                             BPL     3$                     ;;BRANCH BACK IF NOT READY.
        024034  117737  155306  027423             MOVB    @$TKB,CHARCT           ;&& PUT CHARACTER IN CHARCT
        024042  142737  000200  027423             BICB    #200,CHARCT            ;&& BIT CLEAR PARITY BIT.
        024050  122737  000021  027423             CMPB    #21,CHARCT             ;&& SEE IF THIS IS A ^Q.
        024056  001363                             BNE     3$                     ;;BRANCH BACK FOR MORE WAIT IF NOT.
        024060  122766  000015  000002   2$:       CMPB    #CR,2(SP)              ;;IS CHARACTER A CARRIAGE RETURN?
        024066  001003                             BNE     1$                     ;;BRANCH IF NO
        024070  105037  024110                     CLRB    $CHARCNT               ;;YES--CLEAR CHARACTER COUNT
        024074  000406                             BR      $TYPEX                 ;;EXIT
        024076  122766  000012  000002   1$:       CMPB    #LF,2(SP)              ;;IS CHARACTER A LINE FEED?
        024104  001402                             BEQ     $TYPEX                 ;;BRANCH IF YES
        024106  105227                             INCB    (PC)+                  ;;COUNT THE CHARACTER
        024110  000000                   $CHARCNT:.WORD    0                      ;;CHARACTER COUNT STORAGE
        024112  000207                   $TYPEX:   RTS     PC
```

```
                                      .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
                                      ;*********************************************************************
                                      ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                      ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                      ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                      ;*CALL:
                                      ;*       MOV     NUM,-(SP)          ;;NUMBER TO BE TYPED
                                      ;*       TYPOS                      ;;CALL FOR TYPEOUT
                                      ;*       .BYTE   N                  ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                      ;*       .BYTE   M                  ;;M=1 OR 0
                                      ;*                                          ;;1=TYPE LEADING ZEROS
                                      ;*                                          ;;0=SUPPRESS LEADING ZEROS
                                      ;*
                                      ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                      ;*$TYPOS OR $TYPOC
                                      ;*CALL:
                                      ;*       MOV     NUM,-(SP)          ;;NUMBER TO BE TYPED
                                      ;*       TYPON                      ;;CALL FOR TYPEOUT
                                      ;*
                                      ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                      ;*CALL:
                                      ;*       MOV     NUM,-(SP)          ;;NUMBER TO BE TYPED
                                      ;*       TYPOC                      ;;CALL FOR TYPEOUT
024114  017646  000000                $TYPOS: MOV     @(SP),-(SP)        ;;PICKUP THE MODE
024120  116637  000001  024337                MOVB    1(SP),$0FILL       ;;LOAD ZERO FILL SWITCH
024126  112637  024341                        MOVB    (SP)+,$0MODE+1     ;;NUMBER OF DIGITS TO TYPE
024132  062716  000002                        ADD     #2,(SP)            ;;ADJUST RETURN ADDRESS
024136  000406                                BR      $TYPON
024140  112737  000001  024337        $TYPOC: MOVB    #1,$0FILL          ;;SET THE ZERO FILL SWITCH
024146  112737  000006  024341                MOVB    #6,$0MODE+1        ;;SET FOR SIX(6) DIGITS
024154  112737  000005  024336        $TYPON: MOVB    #5,$0CNT           ;;SET THE ITERATION COUNT
024162  010346                                MOV     R3,-(SP)           ;;SAVE R3
024164  010446                                MOV     R4,-(SP)           ;;SAVE R4
024166  010546                                MOV     R5,-(SP)           ;;SAVE R5
024170  113704  024341                        MOVB    $0MODE+1,R4        ;;GET THE NUMBER OF DIGITS TO TYPE
024174  005404                                NEG     R4
024176  062704  000006                        ADD     #6,R4              ;;SUBTRACT IT FOR MAX. ALLOWED
024202  110437  024340                        MOVB    R4,$0MODE          ;;SAVE IT FOR USE
024206  113704  024337                        MOVB    $0FILL,R4          ;;GET THE ZERO FILL SWITCH
024212  016605  000012                        MOV     12(SP),R5          ;;PICKUP THE INPUT NUMBER
024216  005003                                CLR     R3                 ;;CLEAR THE OUTPUT WORD
024220  006105                        1$:     ROL     R5                 ;;ROTATE MSB INTO "C"
024222  000404                                BR      3$                 ;;GO DO MSB
024224  006105                        2$:     ROL     R5                 ;;FORM THIS DIGIT
024226  006105                                ROL     R5
024230  006105                                ROL     R5
024232  010503                                MOV     R5,R3
024234  006103                        3$:     ROL     R3                 ;;GET LSB OF THIS DIGIT
024236  105337  024340                        DECB    $0MODE             ;;TYPE THIS DIGIT?
024242  100016                                BPL     7$                 ;;BR IF NO
024244  042703  177770                        BIC     #177770,R3         ;;GET RID OF JUNK
024250  001002                                BNE     4$                 ;;TEST FOR 0
024252  005704                                TST     R4                 ;;SUPPRESS THIS 0?
024254  001403                                BEQ     5$                 ;;BR IF YES
024256  005204                        4$:     INC     R4                 ;;DON'T SUPPRESS ANYMORE 0'S
024260  052703  000060                        BIS     #'0,R3             ;;MAKE THIS DIGIT ASCII
024264  052703  000040                5$:     BIS     #' ,R3             ;;MAKE ASCII IF NOT ALREADY
```

```
024270  110337  024334                    MOVB    R3,8$             ;;SAVE FOR TYPING
024274  104401  024334                    TYPE    ,8$               ;;GO TYPE THIS DIGIT
024300  105337  024336          7$:       DECB    $OCNT             ;;COUNT BY 1
024304  003347                            BGT     2$                ;;BR IF MORE TO DO
024306  002402                            BLT     6$                ;;BR IF DONE
024310  005204                            INC     R4                ;;INSURE LAST DIGIT ISN'T A BLANK
024312  000744                            BR      2$                ;;GO DO THE LAST DIGIT
024314  012605                  6$:       MOV     (SP)+,R5          ;;RESTORE R5
024316  012604                            MOV     (SP)+,R4          ;;RESTORE R4
024320  012603                            MOV     (SP)+,R3          ;;RESTORE R3
024322  016666  000002  000004            MOV     2(SP),4(SP)       ;;SET THE STACK FOR RETURNING
024330  012616                            MOV     (SP)+,(SP)
024332  000002                            RTI                       ;;RETURN
024334     000                  8$:       .BYTE   0                 ;;STORAGE FOR ASCII DIGIT
024335     000                            .BYTE   0                 ;;TERMINATOR FOR TYPE ROUTINE
024336     000                  $OCNT:    .BYTE   0                 ;;OCTAL DIGIT COUNTER
024337     000                  $OFILL:   .BYTE   0                 ;;ZERO FILL SWITCH
024340  000000                  $OMODE:   .WORD   0                 ;;NUMBER OF DIGITS TO TYPE
```

```
                                        .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
                                        ;*****************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                        ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                        ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                        ;*BEFORE THE FIRST DIGIT OF THE NUMBEP. LEADING ZEROS WILL ALWAYS BE
                                        ;*REPLACED WITH SPACES.
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;PUT THE BINAPY NUMBER ON THE STACK
                                        ;*      TYPDS                   ;;GO TO THE ROUTINE
                                        ;*
                                        ;&& IF YOU SHOULD HAVE A NUMBER GREATER THAN 32767 TO PRINT, LOAD THE
                                        ;&& MULTIPLE OF 32768 ON THE STACK, THEN THE REMAINDER AS YOU WOULD
                                        ;&& ABOVE.  FOR INSTANCE, WHEN INCREMENTING A COUNTER TO BE PRINTED,
                                        ;&& TEST FOR NEGATIVE.  IF NEGATIVE, CLEAR THE LOCATION AND INCREMENT
                                        ;&& A SPECIAL OVERFLOW LOCATION.
                                        ;&& CALL:
                                        ;&&     MOV     OVFNUM,-(SP)    ;&& PUT OVERFLOW NUMBER ON STACK
                                        ;&&     MOV     NUM,-(SP)       ;&& PUT REMAINING NUMBER ON STACK
                                        ;&&     TYPDE                   ;&& GO TO THE ROUTINE
  024342  012737  000001  001364        $TYPDE: MOV     #1,$TMP2        ;&& SHOW ENTRY AT $TYPDE
  024350  000402                                BR      $TYPD           ;&& GO TO ROUTINE
  024352  005037  001364                $TYPDS: CLR     $TMP2           ;&& SHOW ENTRY AT $TYPDS
  024356                                $TYPD:
  024356  010046                                MOV     R0,-(SP)        ;;PUSH R0 ON STACK
  024360  010146                                MOV     R1,-(SP)        ;;PUSH R1 ON STACK
  024362  010246                                MOV     R2,-(SP)        ;;PUSH R2 ON STACK
  024364  010346                                MOV     R3,-(SP)        ;;PUSH R3 ON STACK
  024366  010546                                MOV     R5,-(SP)        ;;PUSH R5 ON STACK
  024370  012746  020200                        MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
  024374  016605  000020                        MOV     20(SP),R5       ;;GET THE INPUT NUMBER
  024400  100004                                BPL     1$              ;;BR IF INPUT IS POS.
  024402  005405                                NEG     R5              ;;MAKE THE BINARY NUMBER POS.
  024404  112766  000055  000001                MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
  024412  005000                        1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
  024414  012703  024656                        MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
  024420  112723  000040                        MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
  024424  005002                        2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
  024426  016001  024646                        MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
  024432  160105                        3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
  024434  002402                                BLT     4$              ;;BR IF DONE
  024436  005202                                INC     R2              ;;INCREASE THE BCD DIGIT BY 1
  024440  000774                                BR      3$
  024442  060105                        4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
  024444  005702                                TST     R2              ;;CHECK IF BCD DIGIT=0
  024446  001002                                BNE     5$              ;;FALL THROUGH IF 0
  024450  105716                                TSTB    (SP)            ;;STILL DOING LEADING 0'S?
  024452  100407                                BMI     7$              ;;BR IF YES
  024454  106316                        5$:     ASLB    (SP)            ;;MSD?
  024456  103003                                BCC     6$              ;;BR IF NO
  024460  116663  000001  177777                MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
  024466  052702  000060                6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
  024472  052702  000040                7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
  024476  110223                                MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
  024500  005720                                TST     (R0)+           ;;JUST INCREMENTING
  024502  020027  000010                        CMP     R0,#10          ;;CHECK THE TABLE INDEX
  024506  002746                                BLT     2$              ;;GO DO THE NEXT DIGIT
```

```
    024510  003002                          BGT     8$                  ;;GO TO EXIT
    024512  010502                          MOV     R5,R2               ;;GET THE LSD
    024514  000764                          BR      6$                  ;;GO CHANGE TO ASCII
    024516  105726                  8$:     TSTB    (SP)+               ;;WAS THE LSD THE FIRST NON-ZERO?
    024520  100003                          BPL     9$                  ;;BR IF NO
    024522  116663  177777  177776          MOVB    -1(SP),-2(R3)       ;;YES--SET THE SIGN FOR TYPING
    024530  105013                  9$:     CLRB    (R3)                ;;SET THE TERMINATOR
    024532  005737  001364                  TST     $TMP2               ;&& WAS ENTRY AT $TYPDS?
    024536  001405                          BEQ     10$                 ;&& BRANCH IF SO
    024540  005766  000020                  TST     20(SP)              ;&& TEST THE OVERFLOW LOCATION
    024544  001402                          BEQ     10$                 ;&& BRANCH IF NON-ZERO
    024546  004737  024670                  JSR     PC,EXPAND           ;&& GO EXPAND THE DECIMAL NUMBER
    024552                          10$:
    024552  012605                          MOV     (SP)+,R5            ;;POP STACK INTO R5
    024554  012603                          MOV     (SP)+,R3            ;;POP STACK INTO R3
    024556  012602                          MOV     (SP)+,R2            ;;POP STACK INTO R2
    024560  012601                          MOV     (SP)+,R1            ;;POP STACK INTO R1
    024562  012600                          MOV     (SP)+,R0            ;;POP STACK INTO R0
    024564  104401  024656                  TYPE    ,$DBLK              ;;NOW TYPE THE NUMBER
    024570  005737  001364                  TST     $TMP2               ;&& SEE IF ENTRY WAS AT $TYPDS
    024574  001417                          BEQ     15$                 ;&& BRANCH IF SO
    024576  016666  000002  000006          MOV     2(SP),6(SP)         ;&& ADJUST THE STACK
    024604  012666  000002                  MOV     (SP)+,2(SP)
    024610  005726                          TST     (SP)+
    024612  105037  024665                  CLRB    $DBLK+7             ;&& REPLACE ORIGINAL TERMINATOR
    024616  112737  000040  024664          MOVB    #' ,$DBLK+6         ;&& REPLACE ORIGINAL SPACE CHARACTER
    024624  112737  000040  024656          MOVB    #' ,$DBLK           ;&& REPLACE ORIGINAL SPACE CHARACTER
    024632  000002                          RTI                         ;&& RETURN TO USER
    024634  016666  000002  000004  15$:    MOV     2(SP),4(SP)         ;;ADJUST THE STACK
    024642  012616                          MOV     (SP)+,(SP)
    024644  000002                          RTI                         ;;RETURN TO USER
    024646  023420  001750  000144  $DTBL:  .WORD   10000.,1000.,100.,10.
    024656                          $DBLK:  .BLKW   5
```

```
                                              .SBTTL  SUBROUTINE TO EXPAND DECIMAL TO LARGER THAN 32767
                                      ;*****************************************************************
  024670  012702  024664              EXPAND: MOV     #$DBLK+6,R2       ;&& MOVE LOCATION OF LCD+1 TO R2
  024674  012703  024670                      MOV     #$DBLK+12,R3      ;&& MOVE NEW LOCATION OF LCD+2 TO R3
  024700  105043                              CLRB    -(R3)             ;&& MAKE SURE TERMINATOR IS THERE
  024702  114243                              MOVB    -(R2),-(R3)       ;&& MOVE THE 5 ASCII'S TO THEIR NEW LOCATIONS
  024704  114243                              MOVB    -(R2),-(R3)       ;&&
  024706  114243                              MOVB    -(R2),-(R3)       ;&&
  024710  114243                              MOVB    -(R2),-(R3)       ;&&
  024712  114243                              MOVB    -(R2),-(R3)       ;&&
  024714  112743  000040                      MOVB    #' ,-(R3)         ;&& MOVE 4 SPACE CHARACTERS TO THE 4 NEW LOCATIONS
  024720  112743  000040                      MOVB    #' ,-(R3)         ;&&
  024724  112743  000040                      MOVB    #' ,-(R3)         ;&&
  024730  112743  000040                      MOVB    #' ,-(R3)         ;&&
  024734  013746  001360                      MOV     $TMP0,-(SP)       ;&& SAVE $TMP0
  024740  005037  001360                      CLR     $TMP0             ;&& CLEAR LOCATION TO USE AS ACCUMULATOR
  024744  013746  001362                      MOV     $TMP1,-(SP)       ;&& SAVE $TMP1
  024750  005037  001362                      CLR     $TMP1             ;&& CLEAR LOCATION TO USE AS 2ND ACCUMULATOR
  024754  012701  024665                      MOV     #$DBLK+7,R1       ;&& MOVE ADDRESS OF LCD TO R2
  024760  012702  025134                      MOV     #$NUMS+10,R2      ;&& MOVE ADDRESS+10 OF WORD STREAM OF 8^6 TO R2
  024764  016600  000026              1$:     MOV     26(SP),R0         ;&& MOVE OVERFLOW LOCATION CONTENTS TO R0
  024770  111137  001360                      MOVB    (R1),$TMP0        ;&& MOVE ASCII TO THE TEMPORARY LOCATION
  024774  052737  000060  001360              BIS     #'0,$TMP0         ;&& MAKE LOCATION AN ASCII IF NOT ALREADY
  025002  061237  001360              2$:     ADD     (R2),$TMP0        ;&& ADD THE NUMBER TO THE ASCII
  025006  022737  000071  001360              CMP     #'9,$TMP0         ;&& HAVE WE SURPASSED ASCII '9'?
  025014  002025                              BGE     4$                ;&& BRANCH IF NOT
  025016  162737  000012  001360              SUB     #10.,$TMP0        ;&& SUBTRACT 10 FROM THE ASCII AND
  025024  010103                              MOV     R1,R3             ;&& MOVE PRESENT ASCII ADDRESS TO R3
  025026  005303                      3$:     DEC     R3                ;&& DECREMENT TO NEXT SIGNIFICANT ASCII DIGIT
  025030  105213                              INCB    (R3)              ;&& ADD THE CARRY TO THE ASCII
  025032  152713  000060                      BISB    #'0,(R3)          ;&& SET BITS TO MAKE IT A NUMBER ASCII
  025036  122713  000071                      CMPB    #'9,(R3)          ;&& SEE IF CARRY NEEDS TO BE TRANSFERED
  025042  002012                              BGE     4$                ;&& BRANCH IF NOT
  025044  111337  001362                      MOVB    (R3),$TMP1        ;&& MOVE BYTE TO LOCATION $TMP1
  025050  162737  000012  001362              SUB     #10.,$TMP1        ;&& SUBTRACT 10 DECIMAL AND
  025056  113713  001362                      MOVB    $TMP1,(R3)        ;&& MOVE IT BACK
  025062  022703  024656                      CMP     #$DBLK,R3         ;&& SEE IF ALL POSITIONS HAVE BEEN DONE
  025066  001357                              BNE     3$                ;&& BRANCH BACK IF NOT
  025070  005300                      4$:     DEC     R0                ;&& DECREMENT THE OVERFLOW LOCATION R0
  025072  001343                              BNE     2$                ;&& BRANCH IF NOT ALL ADDED
  025074  113711  001360                      MOVB    $TMP0,(R1)        ;&& MOVE NEW NUMBER TO LOCATION
  025100  005301                              DEC     R1                ;&& POINT R1 TO THE NEXT ASCII LOCATION
  025102  005742                              TST     -(R2)             ;&& POINT R2 TO NEXT DIGIT TO ADD
  025104  022701  024661                      CMP     #$DBLK+3,R1       ;&& SEE IF ALL DIGITS HAVE BEEN ADDED
  025110  001325                              BNE     1$                ;&& BRANCH IF NOT DONE
  025112  012637  001362                      MOV     (SP)+,$TMP1       ;&& RESTORE $TMP1
  025116  012637  001360                      MOV     (SP)+,$TMP0       ;&& RESTORE $TMP0
  025122  000207                              RTS     PC                ;&& RETURN
  025124  000003  000002  000007      $NUMS:  .WORD   3,2,7,6,8.
```

```
   2814                                     .SBTTL  TTY INPUT ROUTINE
                                            ;*************************************************************
                                            .ENABL  LSB
                                            ;*************************************************************
                                            ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                                            ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
                                            ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                                            ;*WHEN OPERATING IN TTY FLAG MODE.
      025136  022737  000176  001340  $CKSWR: CMP     #SWREG,SWR       ;;IS THE SOFT-SWR SELECTED?
      025144  001112                          BNE     15$              ;;BRANCH IF NO
      025146  105737  027423                  TSTB    CHARCT           ;&& SEE IF CHARACTER WAS INPUTED DURING PRINT
      025152  001405                          BEQ     1$               ;&& BRANCH IF NOT
      025154  113746  027423                  MOVB    CHARCT,-(SP)     ;&& MOVE CHARACTER TO THE STACK
      025160  105037  027423                  CLRB    CHARCT           ;&& CLEAR THE CHARACTER FROM CHARCT
      025164  000405                          BR      2$               ;&& GO CHECK IT OUT
      025166  105777  154152          1$:     TSTB    @$TKS            ;;CHAR THERE?
      025172  100077                          BPL     15$              ;;IF NO, DON'T WAIT AROUND
      025174  117746  154146                  MOVB    @$TKB,-(SP)      ;;SAVE THE CHAR
      025200  042716  177600          2$:     BIC     #^C177,(SP)      ;;STRIP-OFF THE ASCII
      025204  022726  000007                  CMP     #7,(SP)+         ;;IS IT A CONTROL G?
      025210  001404                          BEQ     3$               ;&& YES, BRANCH AROUND RETURN TO USER SETUP
      025212  116637  177776  027423          MOVB    -2(SP),CHARCT    ;&& MOVE CHARACTER BACK TO CHARCT
      025220  000464                          BR      15$              ;&& RETURN TO USER
      025222  123727  001334  000001  3$:     CMPB    $AUTOB,#1        ;;ARE WE RUNNING IN AUTO-MODE?
      025230  001460                          BEQ     15$              ;;BRANCH IF YES
      025232  104401  025716                  TYPE    ,$CNTLG          ;;ECHO THE CONTROL-G (^G)
      025236  104401  025723          $GTSWR: TYPE    ,$MSWR           ;;TYPE CURRENT CONTENTS
      025242  013746  000176                  MOV     SWREG,-(SP)      ;;SAVE SWREG FOR TYPEOUT
      025246  104402                          TYPOC                    ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
      025250  104401  025734                  TYPE    ,$MNEW           ;;PROMPT FOR NEW SWR
      025254  105037  027423          19$:    CLRB    CHARCT           ;&& CLEAR ANY CHARACTER THAT WAS INPUTED DURING PRINT
      025260  005046                          CLR     -(SP)            ;;CLEAR COUNTER
      025262  005046                          CLR     -(SP)            ;;THE NEW SWR
      025264  105777  154054          7$:     TSTB    @$TKS            ;;CHAR THERE?
      025270  100375                          BPL     7$               ;;IF NOT TRY AGAIN
      025272  117746  154050                  MOVB    @$TKB,-(SP)      ;;PICK UP CHAR
      025276  042716  177600                  BIC     #^C177,(SP)      ;;MAKE IT 7-BIT ASCII
      025302  021627  000025          9$:     CMP     (SP),#25         ;;IS IT A CONTROL-U?
      025306  001005                          BNE     10$              ;;BRANCH IF NOT
      025310  104401  025711                  TYPE    ,$CNTLU          ;;YES, ECHO CONTROL-U (^U)
      025314  062706  000006          20$:    ADD     #6,SP            ;;IGNORE PREVIOUS INPUT
      025320  000746                          BR      $GTSWR           ;;LET'S TRY IT AGAIN
      025322  021627  000015          10$:    CMP     (SP),#15         ;;IS IT A <CR>?
      025326  001022                          BNE     16$              ;;BRANCH IF NO
      025330  005766  000004                  TST     4(SP)            ;;YES, IS IT THE FIRST CHAR?
      025334  001403                          BEQ     11$              ;;BRANCH IF YES
      025336  016677  000002  153774          MOV     2(SP),@SWR       ;;SAVE NEW SWR
      025344  062706  000006          11$:    ADD     #6,SP            ;;CLEAR UP STACK
      025350  104401  001405          14$:    TYPE    ,$CRLF           ;;ECHO <CR> AND <LF>
      025354  123727  001335  000001          CMPB    $INTAG,#1        ;;RE-ENABLE TTY KBD INTERRUPTS?
      025362  001003                          BNE     15$              ;;BRANCH IF NOT
      025364  012777  000100  153752          MOV     #100,@$TKS       ;;RE-ENABLE TTY KBD INTERRUPTS
      025372  000002                  15$:    RTI                      ;;RETURN
      025374  004737  023760          16$:    JSR     PC,$TYPEC        ;;ECHO CHAR
      025400  021627  000060                  CMP     (SP),#60         ;;CHAR < 0?
      025404  002420                          BLT     18$              ;;BRANCH IF YES
      025406  021627  000067                  CMP     (SP),#67         ;;CHAR > 7?
```

```
	025412	003015				BGT	18$			;;BRANCH IF YES
	025414	042726	000060			BIC	#60,(SP)+		;;STRIP-OFF ASCII
	025420	005766	000002			TST	2(SP)			;;IS THIS THE FIRST CHAR
	025424	001403				BEQ	17$			;;BRANCH IF YES
	025426	006316				ASL	(SP)			;;NO, SHIFT PRESENT
	025430	006316				ASL	(SP)			;;	CHAR OVER TO MAKE
	025432	006316				ASL	(SP)			;;	ROOM FOR NEW ONE.
	025434	005266	000002		17$:	INC	2(SP)			;;KEEP COUNT OF CHAR
	025440	056616	177776			BIS	-2(SP),(SP)		;;SET IN NEW CHAR
	025444	000707				BR	7$			;;GET THE NEXT ONE
	025446	104401	001404		18$:	TYPE	,$QUES			;;TYPE ?<CR><LF>
	025452	000720				BR	20$			;;SIMULATE CONTROL-U
						.DSABL	LSB
						;*************************************************************************
```

```
                                                 .SBTTL  ROUTINE TO INPUT A SINGLE CHARACTER FROM TTY
                                        ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*CALL:
                                        ;*       RDCHR                          ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*       RETURN HERE                    ;;CHARACTER IS ON THE STACK
                                        ;*                                      ;;WITH PARITY BIT STRIPPED OFF
                                        ;
        025454  011646                  $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC
        025456  016666  000004  000002          MOV     4(SP),2(SP)             ;;SAVE THE PS
        025464  105777  153654          1$:     TSTB    @$TKS                   ;;WAIT FOR
        025470  100375                          BPL     1$                      ;;A CHARACTER
        025472  117766  153650  000004          MOVB    @$TKB,4(SP)             ;;READ THE TTY
        025500  042766  177600  000004          BIC     #^C<177>,4(SP)          ;;GET RID OF JUNK IF ANY
        025506  026627  000004  000023          CMP     4(SP),#23               ;;IS IT A CONTROL-S?
        025514  001013                          BNE     3$                      ;;BRANCH IF NO
        025516  105777  153622          2$:     TSTB    @$TKS                   ;;WAIT FOR A CHARACTER
        025522  100375                          BPL     2$                      ;;LOOP UNTIL ITS THERE
        025524  117746  153616                  MOVB    @$TKB,-(SP)             ;;GET CHARACTER
        025530  042716  177600                  BIC     #^C177,(SP)             ;;MAKE IT 7-BIT ASCII
        025534  022627  000021                  CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
        025540  001366                          BNE     2$                      ;;IF NOT DISCARD IT
        025542  000750                          BR      1$                      ;;YES, RESUME
        025544  026627  000004  000140  3$:     CMP     4(SP),#140              ;;IS IT UPPER CASE?
        025552  002407                          BLT     4$                      ;;BRANCH IF YES
        025554  026627  000004  000175          CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
        025562  003003                          BGT     4$                      ;;BRANCH IF YES
        025564  042766  000040  000004          BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
        025572  000002                  4$:     RTI                             ;;GO BACK TO USER
```

```
                                          .SBTTL  ROUTINE TO INPUT A STRING FROM TTY
                                 ;*********************************************************************
                                 ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                 ;*CALL:
                                 ;*       RDLIN                         ;;INPUT A STRING FROM THE TTY
                                 ;*       RETURN HERE                   ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                 ;*                                     ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
025574  010346                   $RDLIN: MOV     R3,-(SP)              ;;SAVE R3
025576  012703  025702           1$:     MOV     #$TTYIN,R3            ;;GET ADDRESS
025602  022703  025711           2$:     CMP     #$TTYIN+7.,R3         ;;BUFFER FULL?
025606  101405                           BLOS    4$                    ;;BR IF YES
025610  104411                           RDCHR                         ;;GO READ ONE CHARACTER FROM THE TTY
025612  112613                           MOVB    (SP)+,(R3)            ;;GET CHARACTER
025614  122713  000177           10$:    CMPB    #177,(R3)             ;;IS IT A RUBOUT
025620  001003                           BNE     3$                    ;;SKIP IF NOT
025622  104401  001404           4$:     TYPE    ,$QUES                ;;TYPE A '?'
025626  000763                           BR      1$                    ;;CLEAR THE BUFFER AND LOOP
025630  111337  025700           3$:     MOVB    (R3),9$               ;;ECHO THE CHARACTER
025634  104401  025700                   TYPE    ,9$
025640  122723  000015                   CMPB    #15,(R3)+             ;;CHECK FOR RETURN
025644  001356                           BNE     2$                    ;;LOOP IF NOT RETURN
025646  105063  177777                   CLRB    -1(R3)                ;;CLEAR RETURN (THE 15)
025652  104401  001406                   TYPE    ,$LF                  ;;TYPE A LINE FEED
025656  012603                           MOV     (SP)+,R3              ;;RESTORE R3
025660  011646                           MOV     (SP),-(SP)            ;;ADJUST THE STACK AND PUT ADDRESS OF THE
025662  016666  000004  000002           MOV     4(SP),2(SP)           ;;        FIRST ASCII CHARACTER ON IT
025670  012766  025702  000004           MOV     #$TTYIN,4(SP)
025676  000002                           RTI                           ;;RETURN
025700     000                   9$:     .BYTE   0                     ;;STORAGE FOR ASCII CHAR. TO TYPE
025701     000                           .BYTE   0                     ;;TERMINATOR
025702                           $TTYIN: .BLKB   7.                    ;;RESERVE 7. BYTES FOR TTY INPUT
025711     136     125     015   $CNTLU: .ASCIZ  /^U/<15><12>          ;;CONTROL "U"
025716     136     107     015   $CNTLG: .ASCIZ  /^G/<15><12>          ;;CONTROL "G"
025723     015     012     123   $MSWR:  .ASCIZ  <15><12>/SWR = /
025734     040     040     116   $MNEW:  .ASCIZ  /  NEW = /
                                 .EVEN
```

```
                                        .SBTTL  READ A DECIMAL NUMBER FROM THE TTY
                                        ;*************************************************************
                                        ;*THIS ROUTINE WILL READ A DECIMAL (ASCII) NUMBER FROM THE TTY AND
                                        ;*CHANGE IT TO BINARY. IF TOO MANY CHARACTERS OR ANY ILLEGAL CHARACTERS
                                        ;*ARE READ A "?" FOLLOWED BY A CARRIAGE RETURN-LINE FEED WILL BE TYPED.
                                        ;*THE COMPLETE NUMBER MUST BE RETYPED. THE INPUT IS TERMINATED BY THE
                                        ;*USER TYPING A CARRIAGE RETURN. THE RANGE OF THE INPUT NUMBER IS
                                        ;*POSITIVE 32767 TO NEGATIVE 32768.
                                        ;*CALL:
                                        ;*      RDDEC                           ;;READ A DECIMAL NUMBER
                                        ;*      RETURN HERE                     ;;NUMBER IS ON TOP OF THE STACK
                                        ;
  025746  011646                        $RDDEC: MOV     (SP),-(SP)              ;;PROVIDE SPACE FOR
  025750  016666  000004  000002                MOV     4(SP),2(SP)             ;;THE INPUT NUMBER
  025756  010046                                MOV     R0,-(SP)                ;;PUSH R0 ON STACK
  025760  010146                                MOV     R1,-(SP)                ;;PUSH R1 ON STACK
  025762  010246                                MOV     R2,-(SP)                ;;PUSH R2 ON STACK
  025764  104412                        1$:     RDLIN                           ;;READ AN ASCIZ LINE
  025766  012600                                MOV     (SP)+,R0                ;;ADDRESS OF 1ST CHAR.
  025770  010037  026114                        MOV     R0,6$                   ;;SAVE INCASE OF BAD INPUT
  025774  005046                                CLR     -(SP)                   ;;CLEAR DATA WORD
  025776  005002                                CLR     R2                      ;;SIGN SET POSITIVE
  026000  122710  000055                        CMPB    #'-,(R0)                ;;SEE IF A MINUS SIGN WAS TYPED
  026004  001001                                BNE     2$                      ;;BR IF NO MINUS SIGN
  026006  112002                                MOVB    (R0)+,R2                ;;SAVE FOR LATER USE
  026010  112001                        2$:     MOVB    (R0)+,R1                ;;PICKUP THIS CHARACTER
  026012  001424                                BEQ     3$                      ;;GET OUT IF ZERO
  026014  122701  000060                        CMPB    #'0,R1                  ;;MAKE SURE THIS CHARACTER
  026020  003032                                BGT     5$                      ;;IS A DIGIT BETWEEN 0 & 9
  026022  122701  000071                        CMPB    #'9,R1
  026026  002427                                BLT     5$
  026030  032716  170000                        BIT     #^C7777,(SP)            ;;DON'T LET NUMBER GET TO BIG
  026034  001024                                BNE     5$                      ;;BR IF NUMBER WOULD OVERFLOW
  026036  006316                                ASL     (SP)                    ;;*2
  026040  011646                                MOV     (SP),-(SP)              ;;SAVE FOR LATER
  026042  006316                                ASL     (SP)                    ;;*4
  026044  006316                                ASL     (SP)                    ;;*8.
  026046  062616                                ADD     (SP)+,(SP)              ;;*10.
  026050  102416                                BVS     5$                      ;;OVERFLOW ISN'T ALLOWED
  026052  162701  000060                        SUB     #'0,R1                  ;;STRIP AWAY THE ASCII JUNK
  026056  060116                                ADD     R1,(SP)                 ;;ADD IN THIS DIGIT
  026060  102412                                BVS     5$                      ;;OVERFLOW ISN'T ALLOWED
  026062  000752                                BR      2$                      ;;LOOP
  026064  005702                        3$:     TST     R2                      ;;CHECK IF NUMBER IS NEG
  026066  001401                                BEQ     4$                      ;;BR IF NO
  026070  005416                                NEG     (SP)                    ;;YES--NEGATE THE NUMBER
  026072  012666  000012                4$:     MOV     (SP)+,12(SP)            ;;SAVE THE RESULT
  026076  012602                                MOV     (SP)+,R2                ;;POP STACK INTO R2
  026100  012601                                MOV     (SP)+,R1                ;;POP STACK INTO R1
  026102  012600                                MOV     (SP)+,R0                ;;POP STACK INTO R0
  026104  000002                                RTI                             ;;RETURN
  026106  005726                        5$:     TST     (SP)+                   ;;CLEAN PARTIAL NUMBER FROM STACK
  026110  105010                                CLRB    (R0)                    ;;SET A TERMINATOR
  026112  104401                                TYPE                            ;;TYPE THE INPUT UP TO BAD CHAR.
  026114  000000                        6$:     .WORD   0                       ;;POINTER GOES HERE
  026116  104401  001404                        TYPE    ,$QUES                  ;;"?" "CR" &"LF"
  026122  000720                                BR      1$                      ;;TRY AGAIN
```

```
                                        .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
                                        ;*************************************************************
                                        ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
                                        ;*CHANGE IT TO BINARY.
                                        ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
                                        ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A ''?'' WILL BE TYPED
                                        ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
                                        ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
                                        ;*CALL:
                                        ;*      RDOCT                   ;;READ AN OCTAL NUMBER
                                        ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                        ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
  026124  011646                        $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
  026126  016666  000004  000002                MOV     4(SP),2(SP)     ;;INPUT NUMBER
  026134  010046                                MOV     R0,-(SP)        ;;PUSH R0 ON STACK
  026136  010146                                MOV     R1,-(SP)        ;;PUSH R1 ON STACK
  026140  010246                                MOV     R2,-(SP)        ;;PUSH R2 ON STACK
  026142  104412                        1$:     RDLIN                   ;;READ AN ASCIZ LINE
  026144  012600                                MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
  026146  010037  026252                        MOV     R0,5$           ;;AND SAVE IT
  026152  005001                                CLR     R1              ;;CLEAR DATA WORD
  026154  005002                                CLR     R2
  026156  112046                        2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
  026160  001420                                BEQ     3$              ;;IF ZERO GET OUT
  026162  122716  000060                        CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
  026166  003026                                BGT     4$              ;;IS AN OCTAL DIGIT
  026170  122716  000067                        CMPB    #'7,(SP)
  026174  002423                                BLT     4$
  026176  006301                                ASL     R1              ;;*2
  026200  006102                                ROL     R2
  026202  006301                                ASL     R1              ;;*4
  026204  006102                                ROL     R2
  026206  006301                                ASL     R1              ;;*8
  026210  006102                                ROL     R2
  026212  042716  177770                        BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
  026216  062601                                ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
  026220  000756                                BR      2$              ;;LOOP
  026222  005726                        3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
  026224  010166  000012                        MOV     R1,12(SP)       ;;SAVE THE RESULT
  026230  010237  026262                        MOV     R2,$HIOCT
  026234  012602                                MOV     (SP)+,R2        ;;POP STACK INTO R2
  026236  012601                                MOV     (SP)+,R1        ;;POP STACK INTO R1
  026240  012600                                MOV     (SP)+,R0        ;;POP STACK INTO R0
  026242  000002                                RTI                     ;;RETURN
  026244  005726                        4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
  026246  105010                                CLRB    (R0)            ;;SET A TERMINATOR
  026250  104401                                TYPE                    ;;TYPE UP THRU THE BAD CHAR.
  026252  000000                        5$:     .WORD   0
  026254  104401  001404                        TYPE    ,$QUES          ;;''?'' ''CR'' & ''LF''
  026260  000730                                BR      1$              ;;TRY AGAIN
  026262  000000                        $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE
```

```
                                        .SBTTL  TRAP DECODER
                                        ;******************************************************************
                                        ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE ''TRAP'' INSTRUCTION
                                        ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                        ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                        ;*GO TO THAT ROUTINE.
 026264  010046                         $TRAP:  MOV     R0,-(SP)         ;;SAVE R0
 026266  016600  000002                         MOV     2(SP),R0         ;;GET TRAP ADDRESS
 026272  005740                                 TST     -(R0)            ;;BACKUP BY 2
 026274  111000                                 MOVB    (R0),R0          ;;GET RIGHT BYTE OF TRAP
 026276  006300                                 ASL     R0               ;;POSITION FOR INDEXING
 026300  016000  026320                         MOV     $TRPAD(R0),R0    ;;INDEX TO TABLE
 026304  000200                                 RTS     R0               ;;GO TO ROUTINE
                                        ;;THIS IS USE TO HANDLE THE ''GETPRI'' MACRO
 026306  011646                         $TRAP2: MOV     (SP),-(SP)       ;;MOVE THE PC DOWN
 026310  016666  000004  000002                 MOV     4(SP),2(SP)      ;;MOVE THE PSW DOWN
 026316  000002                                 RTI                      ;;RESTORE THE PSW
                                        .SBTTL  TRAP TABLE
                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE ''TRAP'' INSTRUCTION.
                                        ;       ROUTINE
                                        ;       -------
 026320  026306                         $TRPAD: .WORD   $TRAP2
 026322  023546                                 $TYPE   ;;CALL=TYPE      TRAP+1(104401)  TTY TYPEOUT ROUTINE
 026324  024140                                 $TYPOC  ;;CALL=TYPOC     TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 026326  024114                                 $TYPOS  ;;CALL=TYPOS     TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 026330  024154                                 $TYPON  ;;CALL=TYPON     TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 026332  024352                                 $TYPDS  ;;CALL=TYPDS     TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
 026334  024342                                 $TYPDE  ;;CALL=TYPDE     TRAP+6(104406)  TYPE DECIMAL NUMBER GREATER THAN 32767
 026336  025236                                 $GTSWR  ;;CALL=GTSWR     TRAP+7(104407)  GET SOFT-SWR SETTING
 026340  025136                                 $CKSWR  ;;CALL=CKSWR     TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
 026342  025454                                 $RDCHR  ;;CALL=RDCHR     TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
 026344  025574                                 $RDLIN  ;;CALL=RDLIN     TRAP+12(104412) TTY TYPEIN STRING ROUTINE
 026346  026124                                 $RDOCT  ;;CALL=RDOCT     TRAP+13(104413) READ AN OCTAL NUMBER FROM TTY
 026350  025746                                 $RDDEC  ;;CALL=RDDEC     TRAP+14(104414) READ A DECIMAL NUMBER FROM TTY
```

```
  2818                                          .SBTTL  SCOPE HANDLER ROUTINE
                                                ;*****************************************************************
                                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                                ;*SW14=1         LOOP ON TEST
                                                ;*SW09=1         LOOP ON ERROR
                                                ;*SW08=1         LOOP ON TEST IN SWR<6:0>
                                                ;*CALL
                                                ;*         SCOPE               ;;SCOPE=IOT
      026352  032777  001000  152760    $SCOPE: BIT     #BIT09,@SWR             ;;LOOP ON ERROR?
      026360  001406                            BEQ     1$                      ;;BR IF NO
      026362  005737  001312                    TST     $ERTTL                  ;;SEE IF THERE WERE ANY ERRORS YET
      026366  001403                            BEQ     1$                      ;;BR IF NOT YET
      026370  013716  001310                    MOV     $LPERR,(SP)             ;;FUDGE RETURN
      026374  000002                            RTI                             ;;RETURN
      026376  032777  040000  152734    1$:     BIT     #BIT14,@SWR             ;;LOOP ON TEST?
      026404  001403                            BEQ     2$                      ;;BR IF NO
      026406  013716  001306                    MOV     $LPADR,(SP)             ;;FUDGE RETURN
      026412  000002                            RTI                             ;;RETURN
      026414  105737  002710            2$:     TSTB    EOPLOC                  ;&& TEST TO SEE IF EOP'S ARE TO PRINT
      026420  001043                            BNE     6$                      ;&& BRANCH IF NOT
      026422  105737  027423                    TSTB    CHARCT                  ;&& SEE IF A CHARACTER WAS INPUTED IN A PRINT ROUTINE
      026426  001406                            BEQ     3$                      ;&& BRANCH TO CHECK KEYBOARD IF NOT
      026430  113737  027423  002710            MOVB    CHARCT,EOPLOC           ;&& MOVE THE CHARACTER TO EOPLOC
      026436  105037  027423                    CLRB    CHARCT                  ;&& CLEAR THE LOCATION
      026442  000411                            BR      4$                      ;&& BRANCH TO CHECK THE CHARACTER
      026444  105777  152674            3$:     TSTB    @$TKS                   ;&& SEE IF EOP REQUESTED
      026450  100055                            BPL     8$                      ;&& BRANCH IF NOT
      026452  117737  152670  002710            MOVB    @$TKB,EOPLOC            ;&& GET CHARACTER
      026460  142737  000200  002710            BICB    #200,EOPLOC             ;&& CLEAR PARITY BIT
      026466  122737  000030  002710    4$:     CMPB    #30,EOPLOC              ;&& SEE IF A (^X)
      026474  001406                            BEQ     5$                      ;&& BRANCH IF IT IS
      026476  113737  002710  027423            MOVB    EOPLOC,CHARCT           ;&& MOVE CHARACTER BACK TO CHARCT FOR POSSIBLE FUTURE USE
      026504  105037  002710                    CLRB    EOPLOC                  ;&& CLEAR THE LOCATION
      026510  000435                            BR      8$                      ;&& BRANCH TO START SCOPE ROUTINE
      026512  104401  027042            5$:     TYPE    ,HAKTPM                 ;&& TYPE: 'HIT ANY KEY TO OBTAIN A PROGRESS REPORT,'
                                                                                ;&&        'ENTER (^X) TO RESUME EOP'S AND EOD'S'
                                                                                ;&&        'ENTER THE KEY REPEATEDLY, AS RESETS DONE IN THE D
                                                                                ;&&        'MAY CLEAR THE CHARACTER BEFORE THE TESTS FOR THE
      026516  105337  002710                    DECB    EOPLOC                  ;&& MAKE ^X ANOTHER CHARACTER AND
      026522  105037  027423                    CLRB    CHARCT                  ;&& CLEAR ANY CHARACTER THAT MAY BE THERE
      026526  000426                            BR      8$                      ;&& BRANCH TO START SCOPE ROUTINE
      026530  105737  027423            6$:     TSTB    CHARCT                  ;&& SEE IF A CHARACTER WAS INPUTED IN THE TYPE ROUTINE
      026534  001011                            BNE     7$                      ;&& GO TEST THE CHARACTER IF SO
      026536  105777  152602                    TSTB    @$TKS                   ;&& SEE IF CHARACTER WAITING
      026542  100020                            BPL     8$                      ;&& BRANCH IF NOT
      026544  117737  152576  027423            MOVB    @$TKB,CHARCT            ;&& MOVE THE CHARACTER FOR TESTING
      026552  142737  000200  027423            BICB    #200,CHARCT             ;&& CLEAR THE PARITY BIT
      026560  122737  000030  027423    7$:     CMPB    #30,CHARCT              ;&& SEE IF ANOTHER (^X) WAS INPUTED
      026566  001006                            BNE     8$                      ;&& BRANCH IF NOT
      026570  105037  002710                    CLRB    EOPLOC                  ;&& CLEAR EOPLOC TO RESUME EOP MESSAGES
      026574  104401  027352                    TYPE    ,EOPRSM                 ;&& TYPE: 'EOP'S AND EOD'S WILL RESUME PRINTING'
      026600  105037  027423                    CLRB    CHARCT                  ;&& MAKE CHARACTER SOMETHING ELSE
      026604  105737  027423            8$:     TSTB    CHARCT                  ;&& SEE IF A CHARACTER IS WAITING
      026610  001410                            BEQ     9$                      ;&& BRANCH AROUND (^Y) TEST IF NOT
```

```
026612  122737  000031  027423           CMPB    #31,CHARCT         ;&& IS THIS A (^Y) (REQUEST FOR RUN SUMMARY)
026620  001004                           BNE     9$                 ;&& BRANCH IF NOT
026622  004737  003170                   JSR     PC,PTCAPT          ;&& GO TO SUBROUTINE TO PRINT SUMMARY
026626  105037  027423                   CLRB    CHARCT             ;&& CLEAR THE CHARCT LOCATION SO SUMMARY NOT REPEATED
026632  104410                   9$:     CKSWR                      ;;TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER
                                 ;#####START OF CODE FOR THE XOR TESTER#####
026634  000416                   $XTSTR: BR      6$                 ;;IF RUNNING ON THE ''XOR'' TESTER CHANGE
                                                                    ;;THIS INSTRUCTION TO A ''NOP'' (NOP=240)
026636  013746  000004                   MOV     @#ERRVEC,-(SP)     ;;SAVE THE CONTENTS OF THE ERROR VECTOR
026642  012737  026662  000004           MOV     #5$,@#ERRVEC       ;;SET FOR TIMEOUT
026650  005737  177060                   TST     @#177060           ;;TIME OUT ON XOR?
026654  012637  000004                   MOV     (SP)+,@#ERRVEC     ;;RESTORE THE ERROR VECTOR
026660  000444                           BR      $SVLAD             ;;GO TO THE NEXT TEST
026662  022626                   5$:     CMP     (SP)+,(SP)+        ;;CLEAR THE STACK AFTER A TIME OUT
026664  012637  000004                   MOV     (SP)+,@#ERRVEC     ;;RESTORE THE ERROR VECTOR
026670  000432                           BR      7$                 ;;LOOP ON THE PRESENT TEST
026672                           6$:;#####END OF CODE FOR THE XOR TESTER#####
026672  032777  000400  152440           BIT     #BIT08,@SWR        ;;LOOP ON SPEC. TEST?
026700  001432                           BEQ     4$                 ;;BR IF NO
026702  005046                           CLR     -(SP)              ;;CLEAR A TEMP. LOCATION
026704  117716  152430                   MOVB    @SWR,(SP)          ;;PICKUP THE DESIRED TEST NUMBER
026710  042716  000200                   BIC     #$SWRMK,(SP)       ;;MASK OUT UNDESIRED BITS
026714  001416                           BEQ     8$                 ;;BRANCH IF BAD TEST NUMBER IN SWR
026716  022716  000037                   CMP     #37,(SP)           ;;CHECK THE NUMBER IN THE SWR
026722  002413                           BLT     8$                 ;;BRANCH IF TEST NUMBER IS OUT OF RANGE
026724  011637  001302                   MOV     (SP),$TSTNM        ;;UPDATE THE TEST NUMBER IN $TSTNM
026730  011637  001414                   MOV     (SP),$TESTN        ;&& UPDATE THE TEST NUMBER IN $TESTN
026734  005316                           DEC     (SP)               ;;BACKUP BY ONE
026736  006316                           ASL     (SP)               ;;SCALE THE TEST NUMBER AS AN INDEX
026740  062716  027466                   ADD     #$SW08TBL,(SP)     ;;FORM THE ADDRESS OF TEST POINTER
026744  013637  001306                   MOV     @(SP)+,$LPADR      ;;SET LOOP ADDRESS TO DESIRED TEST
026750  000426                           BR      $OVER              ;;GO LOOP ON THE TEST
026752  005726                   8$:     TST     (SP)+              ;;CLEAN THE BAD TEST NUMBER OFF OF THE STACK
026754                           2$:     ;TSTB   $ERFLG             ;;HAS AN ERROR OCCURRED? ;&& ELIMINATED FOR CZDRLB
026754  001406                           BEQ     $SVLAD             ;;BR IF NO
026756  013737  001310  001306   7$:     MOV     $LPERR,$LPADR      ;;SET LOOP ADDRESS TO LAST SCOPE
026764  000420                           BR      $OVER
026766  105037  001303           4$:     CLRB    $ERFLG             ;;ZERO THE ERROR FLAG
026772  105237  001302           $SVLAD: INCB    $TSTNM             ;;COUNT TEST NUMBERS
026776  113737  001302  001414           MOVB    $TSTNM,$TESTN      ;;SET TEST NUMBER IN APT MAILBOX
027004  011637  001306                   MOV     (SP),$LPADR        ;;SAVE SCOPE LOOP ADDRESS
027010  011637  001310                   MOV     (SP),$LPERR        ;;SAVE ERROR LOOP ADDRESS
027014  005037  001376                   CLR     $ESCAPE            ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
027020  112737  000001  001315           MOVB    #1,$ERMAX          ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
027026  013777  001302  152306   $OVER:  MOV     $TSTNM,@DISPLAY    ;;DISPLAY TEST NUMBER
027034  013716  001306                   MOV     $LPADR,(SP)        ;;FUDGE RETURN ADDRESS
027040  000002                           RTI                        ;;RETURN
027042     136     130     200   HAKTPM: .ASCII  /^X/<CRLF>/HIT ANY KEY TO OBTAIN A PROGRESS REPORT,/<CRLF> ;&&
027116     105     116     124           .ASCII  /ENTER (^X) TO RESUME EOP'S AND EOD'S/<CRLF>              ;&&
027163     105     116     124           .ASCII  /ENTER THE KEY REPEATEDLY, AS RESETS DONE IN THE DIAGNOSTIC/<CRLF> ;&&
027256     115     101     131           .ASCIZ  /MAY CLEAR THE CHARACTER BEFORE THE TESTS FOR THE CHARACTER/<CRLF> ;&&
027352     136     130     200   EOPRSM: .ASCIZ  /^X/<CRLF>/EOP'S AND EOD'S WILL RESUME PRINTING/<CRLF>     ;&&
027423     000                   CHARCT: .BYTE   0                  ;&& LOCATION TO HOLD INPUTED CHARACTER
027424     040     040     124   TESLR:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /      ;&& ERROR MESSAGE FOR $EOP
                                         .EVEN
```

```
        027466                          $SW08TBL:
        027466  011246                          .WORD   TST1+2          ;STARTING ADDRESS+2 OF TEST 1
        027470  011416                          .WORD   TST2+2          ;STARTING ADDRESS+2 OF TEST 2
        027472  011520                          .WORD   TST3+2          ;STARTING ADDRESS+2 OF TEST 3
        027474  012032                          .WORD   TST4+2          ;STARTING ADDRESS+2 OF TEST 4
        027476  012574                          .WORD   TST5+2          ;STARTING ADDRESS+2 OF TEST 5
        027500  012742                          .WORD   TST6+2          ;STARTING ADDRESS+2 OF TEST 6
        027502  013256                          .WORD   TST7+2          ;STARTING ADDRESS+2 OF TEST 7
        027504  013406                          .WORD   TST10+2         ;STARTING ADDRESS+2 OF TEST 10
        027506  013614                          .WORD   TST11+2         ;STARTING ADDRESS+2 OF TEST 11
        027510  013752                          .WORD   TST12+2         ;STARTING ADDRESS+2 OF TEST 12
        027512  014110                          .WORD   TST13+2         ;STARTING ADDRESS+2 OF TEST 13
        027514  014246                          .WORD   TST14+2         ;STARTING ADDRESS+2 OF TEST 14
        027516  014410                          .WORD   TST15+2         ;STARTING ADDRESS+2 OF TEST 15
        027520  014614                          .WORD   TST16+2         ;STARTING ADDRESS+2 OF TEST 16
        027522  015024                          .WORD   TST17+2         ;STARTING ADDRESS+2 OF TEST 17
        027524  015374                          .WORD   TST20+2         ;STARTING ADDRESS+2 OF TEST 20
        027526  015752                          .WORD   TST21+2         ;STARTING ADDRESS+2 OF TEST 21
        027530  016240                          .WORD   TST22+2         ;STARTING ADDRESS+2 OF TEST 22
        027532  016510                          .WORD   TST23+2         ;STARTING ADDRESS+2 OF TEST 23
        027534  017220                          .WORD   TST24+2         ;STARTING ADDRESS+2 OF TEST 24
        027536  017474                          .WORD   TST25+2         ;STARTING ADDRESS+2 OF TEST 25
        027540  017736                          .WORD   TST26+2         ;STARTING ADDRESS+2 OF TEST 26
        027542  020166                          .WORD   TST27+2         ;STARTING ADDRESS+2 OF TEST 27
        027544  020356                          .WORD   TST30+2         ;STARTING ADDRESS+2 OF TEST 30
        027546  020616                          .WORD   TST31+2         ;STARTING ADDRESS+2 OF TEST 31
        027550  020720                          .WORD   TST32+2         ;STARTING ADDRESS+2 OF TEST 32
        027552  021252                          .WORD   TST33+2         ;STARTING ADDRESS+2 OF TEST 33
        027554  021530                          .WORD   TST34+2         ;STARTING ADDRESS+2 OF TEST 34
        027556  022064                          .WORD   TST35+2         ;STARTING ADDRESS+2 OF TEST 35
        027560  022334                          .WORD   TST36+2         ;STARTING ADDRESS+2 OF TEST 36
        027562  022622                          .WORD   TST37+2         ;STARTING ADDRESS+2 OF TEST 37
```

```
 2819                                        .SBTTL  ERROR HANDLER ROUTINE
                                             ;*******************************************************************
                                             ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                             ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                             ;*AND GO TO $ERRTYP ON ERROR
                                             ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                             ;*SW15=1         HALT ON ERROR
                                             ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                             ;*SW10=1         BELL ON ERROR
                                             ;*SW09=1         LOOP ON ERROR
                                             ;*CALL
                                             ;*        ERROR   N          ;;ERROR=EMT AND N=ERROR ITEM NUMBER
      027564                                 $ERROR:
      027564  104410                                  CKSWR                       ;;TEST FOR CHANGE IN SOFT-SWR
      027566  105237  001303                 7$:      INCB    $ERFLG              ;;SET THE ERROR FLAG
      027572  001775                                  BEQ     7$                  ;;DON'T LET THE FLAG GO TO ZERO
      027574  013777  001302  151540                  MOV     $TSTNM,@DISPLAY     ;;DISPLAY TEST NUMBER AND ERROR FLAG
      027602  032777  002000  151530                  BIT     #BIT10,@SWR         ;;BELL ON ERROR?
      027610  001402                                  BEQ     1$                  ;;NO - SKIP
      027612  104401  001400                          TYPE    ,$BELL              ;;RING BELL
      027616  005237  001312                 1$:      INC     $ERTTL              ;;COUNT THE NUMBER OF ERRORS
      027622  005237  002716                          INC     ERRCNT              ;&& INCREMENT THE ERROR COUNT
      027626  011637  001316                          MOV     (SP),$ERRPC         ;;GET ADDRESS OF ERROR INSTRUCTION
      027632  162737  000002  001316                  SUB     #2,$ERRPC
      027640  117737  151452  001314                  MOVB    @$ERRPC,$ITEMB      ;;STRIP AND SAVE THE ERROR ITEM CODE
      027646  032777  020000  151464                  BIT     #BIT13,@SWR         ;;SKIP TYPEOUT IF SET
      027654  001002                                  BNE     20$                 ;;SKIP TYPEOUTS
      027656  004737  027764                          JSR     PC,$ERRTYP          ;;GO TO USER ERROR ROUTINE
      027662                                 20$:
      027662  122737  000001  001432                  CMPB    #APTENV,$ENV        ;;RUNNING IN APT MODE
      027670  001007                                  BNE     2$                  ;;NO,SKIP APT ERROR REPORT
      027672  113737  001314  027704                  MOVB    $ITEMB,21$          ;;SET ITEM NUMBER AS ERROR NUMBER
      027700  004737  030260                          JSR     PC,$ATY4            ;;REPORT FATAL ERROR TO APT
      027704     000                         21$:     .BYTE   0
      027705     000                                  .BYTE   0
      027706  000777                         22$:     BR      22$                 ;;APT ERROR LOOP
      027710  005777  151424                 2$:      TST     @SWR                ;;HALT ON ERROR
      027714  100002                                  BPL     3$                  ;;SKIP IF CONTINUE
      027716  000000                                  HALT                        ;;HALT ON ERROR!
      027720  104410                                  CKSWR                       ;;TEST FOR CHANGE IN SOFT-SWR
      027722  005737  001376                 3$:      TST     $ESCAPE             ;;CHECK FOR AN ESCAPE ADDRESS
      027726  001402                                  BEQ     4$                  ;;BR IF NONE
      027730  013716  001376                          MOV     $ESCAPE,(SP)        ;;FUDGE RETURN ADDRESS FOR ESCAPE
      027734  032777  001000  151376         4$:      BIT     #BIT9,@SWR          ;&& SEE IF WE ARE TO LOOP ON ERROR
      027742  001402                                  BEQ     5$                  ;&& BRANCH OUT IF NOT
      027744  013716  001310                          MOV     $LPERR,(SP)         ;&& FUDGE RETURN
      027750                                 5$:
      027750  022737  023464  000042                  CMP     #$ENDAD,@#42        ;;ACT-11 AUTO-ACCEPT?
      027756  001001                                  BNE     6$                  ;;BRANCH IF NO
      027760  000000                                  HALT                        ;;YES
      027762                                 6$:
      027762  000002                                  RTI                         ;;RETURN
```

```
   2820                                      .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
                                             ;*******************************************************************
                                             ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                             ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
                                             ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
        027764                               $ERRTYP:
        027764  010046                                MOV     R0,-(SP)          ;;SAVE R0
        027766  005000                                CLR     R0                ;;CLEAR R0 TO RECEIVE ITEM INDEX
        027770  113700  001314                        MOVB    @#$ITEMB,R0       ;;PICKUP THE ITEM INDEX
        027774  001004                                BNE     1$                ;;IF ITEM NUMBER IS ZERO, TYPE THE PC OF THE ERROR
        027776  013746  001316                        MOV     $ERRPC,-(SP)      ;;SAVE $ERRPC FOR TYPEOUT
                                                                                ;;ERROR ADDRESS
        030002  104402                                TYPOC                     ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        030004  000513                                BR      14$               ;;GET OUT
        030006  010037  001360               1$:      MOV     R0,$TMP0          ;&& MOVE R0 TO $TMP0 FOR 200 TEST
        030012  042700  000200                        BIC     #200,R0           ;&& CLEAR BIT 7 IF PRESENT
        030016  005300                                DEC     R0                ;&& MAKE POINTER AN INDEX
        030020  006300                                ASL     R0                ;&& SHIFT TO MULTIPLY BY 10 (OCTAL)
        030022  006300                                ASL     R0                ;&&
        030024  006300                                ASL     R0                ;&&
        030026  105737  001360                        TSTB    $TMP0             ;&& SEE IF ITEM NUMBER IS OVER 200
        030032  100041                                BPL     4$                ;&& BRANCH IF ITEM NUMBER IS LESS THAN 200
        030034  023727  002716  000020                CMP     ERRCNT,#20        ;&& SEE IF 20 (OCTAL) ERRORS HAVE PRINTED
        030042  002404                                BLT     2$                ;&& BRANCH TO PRINT THE ERROR IF LESS
        030044  003073                                BGT     14$               ;&& BRANCH TO RETURN IF GREATER - NO MORE DATA IS TO PRINT
        030046  104401  035377                        TYPE    ,NOMORE           ;&& TYPE MESSAGE ANNOUNCING NO MORE PRINTING OF ERRORS
        030052  000470                                BR      14$               ;&& BRANCH TO RETURN
        030054  022737  000001  002716       2$:      CMP     #1,ERRCNT         ;&& SEE IF THIS IS THE FIRST ERROR
        030062  001415                                BEQ     3$                ;&& BRANCH IF IT WAS AND GO TYPE ERROR MESSAGE
        030064  123737  001360  030240                CMPB    $TMP0,MEPITM      ;&& SEE IF ITEM MATCHES LAST MULTIPLE ERROR
        030072  001011                                BNE     3$                ;&& BRANCH IF NOT - NEW HEADER NEEDED
        030074  032777  000200  151236                BIT     #BIT7,@SWR        ;&& SEE IF SWITCH REGISTER BIT 7 IS SET
        030102  001054                                BNE     14$               ;&& BRANCH TO RETURN IF SWITCH SET
        030104  042700  177400                        BIC     #177400,R0        ;&& CLEAR UPPER BYTE OF R0 EXPOSING ITEM BYTE
        030110  062700  002302                        ADD     #ER200+4,R0       ;&& POINT TO DATA TABLE ENTRY
        030114  000434                                BR      9$                ;&& BRANCH TO PRINT DATA
        030116  113737  001360  030240       3$:      MOVB    $TMP0,MEPITM      ;&& MOVE ITEM NUMBER TO MEPITM FOR POSSIBLE FUTURE USE
        030124  042700  177000                        BIC     #177000,R0        ;&& CLEAR UPPER BYTE OF R0
        030130  062700  000540                        ADD     #ER200-$ERRTB,R0;&& ADD 200 BASE POINTER TO R0 AND
        030134  000402                                BR      5$                ;&& BRANCH AROUND ERRCNT CLEAR
        030136  005037  002716               4$:      CLR     ERRCNT            ;&& CLEAR ERRCNT SO MULTIPLE ERRORS GET NEW HEADER
        030142  104401  001405               5$:      TYPE    ,$CRLF            ;&& TYPE  <CRLF>
        030146  062700  001536                        ADD     #$ERRTB,R0        ;;FORM TABLE POINTER
        030152  012037  030162                        MOV     (R0)+,6$          ;;PICKUP "ERROR MESSAGE" POINTER
        030156  001404                                BEQ     7$                ;;SKIP TYPEOUT IF NO POINTER
        030160  104401                                TYPE                      ;;TYPE THE "ERROR MESSAGE"
        030162  000000                       6$:      .WORD   0                 ;;"ERROR MESSAGE" POINTER GOES HERE
        030164  104401  001405                        TYPE    ,$CRLF            ;;"CARRIAGE RETURN" & "LINE FEED"
        030170  012037  030200               7$:      MOV     (R0)+,8$          ;;PICKUP "DATA HEADER" POINTER
        030174  001404                                BEQ     9$                ;;SKIP TYPEOUT IF 0
        030176  104401                                TYPE                      ;;TYPE THE "DATA HEADER"
        030200  000000                       8$:      .WORD   0                 ;;"DATA HEADER" POINTER GOES HERE
        030202  104401  001405                        TYPE    ,$CRLF            ;;"CARRIAGE RETURN" & "LINE FEED"
        030206  011000                       9$:      MOV     (R0),R0           ;;PICKUP "DATA TABLE" POINTER
        030210  001407                                BEQ     13$               ;;GO AROUND ROUTINE TO TYPE THE DATA IF NONE
        030212  013046                       10$:     MOV     @(R0)+,-(SP)      ;;PUT OCTAL DATA ON STACK FOR TYPING
        030214  104402                                TYPOC                     ;;TYPE AN OCTAL NUMBER
        030216  005710                          TST     (R0)            ;;IS THERE ANOTHER NUMBER?
        030220  001403                          BEQ     13$             ;;BR IF NO
        030222  104401  033764                  TYPE    ,SPACES         ;;TYPE TWO(2) SPACES
        030226  000771                          BR      10$             ;;GO BACK TO PRINT THE OCTAL NUMBER
        030230  104401  001405          13$:    TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
        030234  012600                  14$:    MOV     (SP)+,R0        ;;RESTORE R0
        030236  000207                          RTS     PC              ;;RETURN
        030240  000000                  MEPITM: .WORD   0               ;&& LOCATION TO STORE 200+ ERROR ITEM NUMBER
```

```
 2821                                           .SBTTL  APT COMMUNICATIONS ROUTINE
                                                ;*******************************************************************
      030242  112737  000001  030506  $ATY1:    MOVB    #1,$FFLG         ;;TO REPORT FATAL ERROR
      030250  112737  000001  030504  $ATY3:    MOVB    #1,$MFLG         ;;TO TYPE A MESSAGE
      030256  000403                            BR      $ATYC
      030260  112737  000001  030506  $ATY4:    MOVB    #1,$FFLG         ;;TO ONLY REPORT FATAL ERROR
      030266                          $ATYC:
      030266  010046                            MOV     R0,-(SP)         ;;PUSH R0 ON STACK
      030270  010146                            MOV     R1,-(SP)         ;;PUSH R1 ON STACK
      030272  105737  030504                    TSTB    $MFLG            ;;SHOULD TYPE A MESSAGE?
      030276  001450                            BEQ     5$               ;;IF NOT:  BR
      030300  122737  000001  001432            CMPB    #APTENV,$ENV     ;;OPERATING UNDER APT?
      030306  001031                            BNE     3$               ;;IF NOT:  BR
      030310  132737  000100  001433            BITB    #APTSPOOL,$ENVM  ;;SHOULD SPOOL MESSAGES?
      030316  001425                            BEQ     3$               ;;IF NOT:  BR
      030320  017600  000004                    MOV     @4(SP),R0        ;;GET MESSAGE ADDR.
      030324  062766  000002  000004            ADD     #2,4(SP)                 ;;BUMP RETURN ADDR.
      030332  005737  001410          1$:       TST     $MSGTYPE         ;;SEE IF DONE W/ LAST XMISSION?
      030336  001375                            BNE     1$               ;;IF NOT:  WAIT
      030340  010037  001426                    MOV     R0,$MSGAD        ;;PUT ADDR IN MAILBOX
      030344  105720                  2$:       TSTB    (R0)+            ;;FIND END OF MESSAGE
      030346  001376                            BNE     2$
      030350  163700  001426                    SUB     $MSGAD,R0        ;;SUB START OF MESSAGE
      030354  006200                            ASR     R0               ;;GET MESSAGE LNGTH IN WORDS
      030356  010037  001430                    MOV     R0,$MSGLGT       ;;PUT LENGTH IN MAILBOX
      030362  012737  000004  001410            MOV     #4,$MSGTYPE      ;;TELL APT TO TAKE MSG.
      030370  000413                            BR      5$
      030372  017637  000004  030416  3$:       MOV     @4(SP),4$        ;;PUT MSG ADDR IN JSR LINKAGE
      030400  062766  000002  000004            ADD     #2,4(SP)                 ;;BUMP RETURN ADDRESS
      030406  013746  177776                    MOV     177776,-(SP)     ;;PUSH 177776 ON STACK
      030412  004737  023546                    JSR     PC,$TYPE         ;;CALL TYPE MACRO
      030416  000000                  4$:       .WORD   0
      030420                          5$:
      030420  105737  030506          10$:      TSTB    $FFLG            ;;SHOULD REPORT FATAL ERROR?
      030424  001416                            BEQ     12$              ;;IF NOT:  BR
      030426  005737  001432                    TST     $ENV             ;;RUNNING UNDER APT?
      030432  001413                            BEQ     12$              ;;IF NOT:  BR
      030434  005737  001410          11$:      TST     $MSGTYPE         ;;FINISHED LAST MESSAGE?
      030440  001375                            BNE     11$              ;;IF NOT:  WAIT
      030442  017637  000004  001412            MOV     @4(SP),$FATAL    ;;GET ERROR #
      030450  062766  000002  000004            ADD     #2,4(SP)                 ;;BUMP RETURN ADDR.
      030456  005237  001410                    INC     $MSGTYPE         ;;TELL APT TO TAKE ERROR
      030462  105037  030506          12$:      CLRB    $FFLG            ;;CLEAR FATAL FLAG
      030466  105037  030505                    CLRB    $LFLG            ;;CLEAR LOG FLAG
      030472  105037  030504                    CLRB    $MFLG            ;;CLEAR MESSAGE FLAG
      030476  012601                            MOV     (SP)+,R1         ;;POP STACK INTO R1
      030500  012600                            MOV     (SP)+,R0         ;;POP STACK INTO R0
      030502  000207                            RTS     PC               ;;RETURN
      030504     000                  $MFLG:    .BYTE   0                ;;MESSG. FLAG
      030505     000                  $LFLG:    .BYTE   0                ;;LOG FLAG
      030506     000                  $FFLG:    .BYTE   0                ;;FATAL FLAG
                                                .EVEN
              000200                  APTSIZE=200
              000001                  APTENV=001
              000100                  APTSPOOL=100
              000040                  APTCSUP=040
 2822                                 .SBTTL  POWER DOWN AND UP ROUTINE
```

```
                                        ;*******************************************************************
                                        ;POWER DOWN AND UP ROUTINE
        030510  012737  030526  000024  $PWRDN: MOV     #$PWRUP,PWRVEC  ;&& SET UP VECTOR TO RETURN TO THE HALT BELOW
        030516  012737  000340  000026          MOV     #LEVEL7,PWRVEC+2;&& RETURN PRIORITY TO 7
        030524  000000                          HALT                    ;;HALT PROCESSOR
        030526  012737  030510  000024  $PWRUP: MOV     #$PWRDN,PWRVEC  ;&& RESET PWRVEC TO PWRDN ROUTINE AND
        030534  012737  000340  000026          MOV     #LEVEL7,PWRVEC+2;&& PRIORITY TO 7
        030542  012706  001300                  MOV     #STACK,SP       ;&& REINITIALIZE THE STACK,
        030546  012746  000340                  MOV     #LEVEL7,-(SP)   ;&& SET UP RETURN PRIORITY TO 7 AND
        030552  012746  000210                  MOV     #STAGIN,-(SP)   ;&& MOVE STAGIN ADDRESS TO STACK AND
        030556  005037  001360                  CLR     $TMPO           ;&& CLEAR WAIT LOOP COUNTER
        030562  005237  001360          1$:     INC     $TMPO           ;&& GIVE TTY TIME TO RECOVER FROM POWER FAILURE
        030566  001375                          BNE     1$              ;&& BRANCH BACK UNTIL ZERO AGAIN
        030570  104401  030576                  TYPE    ,$POWER         ;&& TYPE THE POWER FAILURE MESSAGE ASCIZED BELOW
        030574  000002                          RTI                     ;&& RETURN TO PROGRAM
        030576     200     120     117  $POWER: .ASCIZ  <CRLF>/POWER FAILURE - RESTARTING PROGRAM/<CRLF>
                                                .EVEN
```

```
                                              .SBTTL  MULTIPLE BOARD DIALOGUE ROUTINE
                                      ;*******************************************************************
                                      ;>>>>>>>>MULTIPLE BOARD DIALOGUE ROUTINE<<<<<<<<
                                      ;*******************************************************************
030644  012706  001300                MBD:     MOV     #STACK,SP        ;INITIALIZE THE STACK
030650  004737  005660                         JSR     PC,SETTUP        ;GO INITIALIZE THE COMMON TAGS
030654  104401  035245                         TYPE    ,MBDIAL          ;TYPE:  'MULTIPLE BOARD DIALOGUE'
030660  105037  027423                PROMPT:  CLRB    CHARCT           ;CLEAR LOCATION FOR POSSIBLE INPUT DURING PRINT
030664  104401  035300                         TYPE    ,ECELR           ;TYPE:  'ENTER COMMAND ([E]DIT, [L]IST, [B]URST CALIBRATION,
030670  012703  000001                         MOV     #1,R3            ;EXPECT 1 CHARACTER
030674  004737  002722                         JSR     PC,READ          ;GO READ 1 CHARACTER
030700  022737  000114  002666                 CMP     #'L,ANSWER       ;LIST PRESENT TABLE?
030706  001073                                 BNE     1$               ;BRANCH IF NO
030710  104401  035054                         TYPE    ,HEADER          ;TYPE:  '# OF     START                              2-N
                                                                        ;        'BOARDS  REGADR  VECADR   W-B    P-LEV   CYCLE      T
030714  013737  001476  002720                 MOV     $DDWO,DDW        ;SET UP THE DEVICE DESCRIPTOR WORD FOR PRINTING
030722  013746  002416                         MOV     QTYBRD,-(SP)     ;MOVE NUMBER OF DEVICES TO STACK FOR TYPING
030726  104405                                 TYPDS                    ;TYPE THE NUMBER OF DEVICES
030730  104401  033767                         TYPE    ,SPACE3          ;TYPE 3 SPACE CHARACTERS
030734  013746  002420                         MOV     REGADR,-(SP)     ;MOVE THE DEVICE REGISTER ADDRESS TO THE STACK
030740  104402                                 TYPOC                    ;TYPE THE DEVICE REGISTER ADDRESS
030742  104401  033773                         TYPE    ,SPACE6          ;TYPE 6 SPACE CHARACTERS
030746  013746  002460                         MOV     VECADR,-(SP)     ;MOVE THE DEVICE VECTOR ADDRESS TO THE STACK
030752  104403                                 TYPOS                    ;TYPE THE DEVICE VECTOR ADDRESS
030754     003     000                         .BYTE   3,0              ;TYPE 3 CHARACTERS, LEADING ZEROS SUPPRESSED
030756  104401  034002                         TYPE    ,SPACE7          ;TYPE 7 SPACE CHARACTERS
030762  032737  000001  002720                 BIT     #BIT0,DDW        ;SEE WHICH W/B STATE FOR BOARDS
030770  001403                                 BEQ     10$              ;GO PRINT W STATE IF W
030772  104401  034017                         TYPE    ,B               ;TYPE A 'B'
030776  000402                                 BR      11$              ;GO TO NEXT CHECK
031000  104401  034021                10$:     TYPE    ,W               ;TYPE A 'W'
031004  104401  034002                11$:     TYPE    ,SPACE7          ;TYPE 7 SPACE CHARACTERS
031010  004737  005630                         JSR     PC,PNTPRI        ;PRINT DEVICE PRIORITY
031014  104401  034002                         TYPE    ,SPACE7          ;TYPE 7 SPACE CHARACTERS
031020  032737  000002  002720                 BIT     #BIT1,DDW        ;SEE WHICH 2/N STATE FOR BOARDS
031026  001003                                 BNE     12$              ;GO PRINT N STATE IF N
031030  104401  034032                         TYPE    ,TWO             ;TYPE A '2'
031034  000402                                 BR      13$              ;GO TO NEXT CHECK
031036  104401  034034                12$:     TYPE    ,N               ;TYPE AN 'N'
031042  104401  034002                13$:     TYPE    ,SPACE7          ;TYPE 7 SPACE CHARACTERS
031046  032737  000004  002720                 BIT     #BIT2,DDW        ;SEE WHICH CABLE STATE FOR BOARDS
031054  001403                                 BEQ     14$              ;GO PRINT NO CABLE IF NONE
031056  104401  034026                         TYPE    ,YES             ;TYPE 'YES'
031062  000402                                 BR      15$              ;BRANCH TO CONTINUE
031064  104401  034023                14$:     TYPE    ,NO              ;TYPE 'NO'
031070  104401  034047                15$:     TYPE    ,CRLF2           ;TYPE 2 <CRLF>'S
031074  000671                                 BR      PROMPT           ;BRANCH TO PROMPT ANOTHER COMMAND
031076  022737  000122  002666        1$:      CMP     #'R,ANSWER       ;RUN PROGRAM?
031104  001020                                 BNE     4$               ;BRANCH IF NOT
031106  005737  002420                         TST     REGADR           ;SEE IF REGADR HAS BEEN LOADED
031112  001003                                 BNE     3$               ;BRANCH TO CHECK VECADR IF SO
031114  104401  033504                2$:      TYPE    ,MUSTED          ;TYPE:  'DEVICE ADDRESS AND/OR VECTOR TABLE NOT SET UP - MUS
031120  000657                                 BR      PROMPT           ;BRANCH BACK FOR PROMPT MESSAGE
031122  005737  002460                3$:      TST     VECADR           ;SEE IF VECADR HAS BEEN LOADED
031126  001772                                 BEQ     2$               ;BRANCH BACK TO PRINT ERROR MESSAGE IF NOT
031130  004737  003360                         JSR     PC,FIXTBL        ;FILL TABLE
031134  012737  177777  002672                 MOV     #-1,MANSIZE      ;MOVE -1 TO MANSIZE TO INDICATE WE HAVE MANUALLY SIZED
```

```
   2881 031142  000137  010272                  JMP     START           ;JUMP TO START
   2882 031146  022737  000105  002666  4$:     CMP     #'E,ANSWER      ;EDIT TABLE?
   2883 031154  001414                          BEQ     EDIT            ;BRANCH TO EDIT IF SO
   2884 031156  022737  000102  002666          CMP     #'B,ANSWER      ;ENTER BURST DATA LATE CALIBRATION?
   2885 031164  001235                          BNE     PROMPT          ;BRANCH TO PROMPT IF COMMAND NOT RECOGNIZED
   2886 031166  005737  002420                  TST     REGADR          ;SEE IF REGADR HAS BEEN LOADED
   2887 031172  001750                          BEQ     2$              ;BRANCH TO ERROR MESSAGE IF NOT
   2888 031174  005737  002460                  TST     VECADR          ;SEE IF VECADR HAS BEEN LOADED
   2889 031200  001745                          BEQ     2$              ;BRANCH TO ERROR MESSAGE IF NOT
   2890 031202  000137  032326                  JMP     BDLCR           ;JUMP TO BURST DATA LATE CALIBRATION ROUTINE
```

```
2891                                             .SBTTL  TABLE EDIT ROUTINE
2892 031206  104401  034147           EDIT:     TYPE    ,NOBUT           ;TYPE:  'NUMBER OF BOARDS UNDER TEST: '
2893 031212  013746  002416                     MOV     QTYBRD,-(SP)     ;PUT QUANTITY OF BOARDS ON STACK FOR PRINTING
2894 031216  104405                             TYPDS                    ;GO PRINT THE QUANTITY OF BOARDS
2895 031220  104401  034012                     TYPE    ,SPACEC          ;TYPE:  '  :  '
2896 031224  012703  000002                     MOV     #2,R3            ;EXPECT MAX OF 2 CHARACTERS
2897 031230  112737  000071  002706             MOVB    #'9,LRGSTC       ;MOVE ASCII '9' TO THE LARGEST CHARACTER LOCATION
2898 031236  004737  002722                     JSR     PC,READ          ;GO READ 2 CHARACTERS
2899 031242  022703  000002                     CMP     #2,R3            ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
2900 031246  001017                             BNE     2$               ;BRANCH IF NOT
2901 031250  022737  000033  002666             CMP     #ESC,ANSWER      ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
2902 031256  001453                             BEQ     5$               ;BRANCH TO PROMPT JUMP IF SO
2903 031260  022737  000003  002666             CMP     #CNTLC,ANSWER    ;SEE IF USER WANTS TO EXIT (^C)
2904 031266  001447                             BEQ     5$               ;BRANCH TO PROMPT JUMP IF EXIT REQUESTED
2905 031270  022737  000015  002666             CMP     #CARETN,ANSWER   ;SEE IF A <CR> WAS INPUTED
2906 031276  001412                             BEQ     4$               ;IF <CR> USE EXISTING NUMBER
2907 031300  104401  033023           1$:       TYPE    ,BDNERR          ;TYPE:  'ILLEGAL NUMBER (# OTHER THAN 1-16) OR CHARACTER INP
2908 031304  000740                             BR      EDIT             ;BRANCH BACK FOR NEW INPUT
2909 031306  005704                   2$:       TST     R4               ;CHECK FOR ZERO MODULES INPUT
2910 031310  001773                             BEQ     1$               ;BRANCH TO PRINT ERROR MESSAGE IF SO
2911 031312  022704  000020                     CMP     #20,R4           ;SEE IF BOARD NUMBER IS ILLEGAL
2912 031316  100770                             BMI     1$               ;BRANCH TO PRINT ERROR MESSAGE IF SO
2913 031320  010437  002416           3$:       MOV     R4,QTYBRD        ;MOVE INPUTED NUMBER TO QTYBRD
2914 031324  104401  034720           4$:       TYPE    ,SDADRS          ;TYPE:  ' STARTING DEVICE ADDRESS: '
2915 031330  013746  002420                     MOV     REGADR,-(SP)     ;MOVE THE PRESENT ADDRESS TO THE STACK FOR PRINTING
2916 031334  104402                             TYPOC                    ;PRINT THE ADDRESS
2917 031336  104401  034012                     TYPE    ,SPACEC          ;TYPE:  '  :  '
2918 031342  012703  000006                     MOV     #6,R3            ;EXPECT MAXIMUM 6 CHARACTERS
2919 031346  112737  000067  002706             MOVB    #'7,LRGSTC       ;MOVE ASCII '7' TO THE LARGEST CHARACTER LOCATION
2920 031354  004737  002722                     JSR     PC,READ          ;GO READ 6 CHARACTERS
2921 031360  022703  000006                     CMP     #6,R3            ;SEE IF NON-NUMERIC CHARACTER INPUTED
2922 031364  001022                             BNE     8$               ;BRANCH IF NOT
2923 031366  022737  000033  002666             CMP     #ESC,ANSWER      ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
2924 031374  001704                             BEQ     EDIT             ;BRANCH AROUND ESC PRINT AND PREVIOUS PROMPT BRANCH IF SO
2925 031376  022737  000003  002666             CMP     #CNTLC,ANSWER    ;SEE IF USER WANTS TO EXIT (^C)
2926 031404  001005                             BNE     7$               ;BRANCH AROUND PROMPT JUMP IF NOT
2927 031406  000137  030660           5$:       JMP     PROMPT           ;JUMP TO PROMPT A NEW COMMAND
2928 031412  104401  033146           6$:       TYPE    ,ADRERR          ;TYPE:  'ADDRESS INPUTED IS NOT IN THE RANGE 171000 TO 17700
2929 031416  000742                             BR      4$               ;BRANCH BACK FOR REINPUT
2930 031420  022737  000015  002666   7$:       CMP     #CARETN,ANSWER   ;SEE IF <CR> WAS ONLY CHARACTER INPUTED
2931 031426  001417                             BEQ     10$              ;IF <CR> USE EXISTING REG ADDRESS
2932 031430  000735                             BR      4$               ;BRANCH BACK - INPUT NOT LEGAL
2933 031432  022704  171000           8$:       CMP     #171000,R4       ;IS ANSWER BELOW 171000
2934 031436  101365                             BHI     6$               ;BRANCH TO PRINT ERROR MESSAGE IF IT IS
2935 031440  022704  177000                     CMP     #177000,R4       ;IS ANSWER ABOVE 177000
2936 031444  103762                             BLO     6$               ;BRANCH TO PRINT ERROR MESSAGE IF NOT
2937 031446  032704  000007                     BIT     #7,R4            ;TEST TO MAKE SURE A '0' IS PRESENT IN LOWEST OCTAL DIGIT
2938 031452  001403                             BEQ     9$               ;BRANCH AROUND ERROR MESSAGE TYPE IF SO
2939 031454  104401  033314                     TYPE    ,ADLCHR          ;TYPE:  'ADDRESS INPUTED HAS OTHER THAN 0 FOR LEAST'
2940                                                                      ;        'SIGNIFICANT OCTAL DIGIT'
2941 031460  000721                             BR      4$               ;BRANCH BACK FOR REINPUT
2942 031462  010437  002420           9$:       MOV     R4,REGADR        ;INSTALL NEW # IN TABLE
2943 031466  104401  034664           10$:      TYPE    ,SVADRS          ;TYPE:  'STARTING VECTOR ADDRESS:  '
2944 031472  013746  002460                     MOV     VECADR,-(SP)     ;MOVE PRESENT VECTOR TO STACK FOR PRINTING
2945 031476  104403                             TYPOS                    ;PRINT THE PRESENT VECTOR ADDRESS
2946 031500     003     000                     .BYTE   3,0              ;TYPE 3 CHARACTERS, SUPPRESS LEADING ZEROS
2947 031502  104401  034012                     TYPE    ,SPACEC          ;TYPE:  '  :  '
```

```
031506  012703  000003                  MOV     #3,R3             ;EXPECT ONLY 3 CHARACTERS
031512  004737  002722                  JSR     PC,READ           ;GO READ 3 CHARACTERS
031516  022703  000003                  CMP     #3,R3             ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
031522  001015                          BNE     11$               ;BRANCH IF NOT
031524  022737  000033  002666          CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
031532  001674                          BEQ     4$                ;BRANCH TO PREVIOUS PROMPT IF SO
031534  022737  000003  002666          CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
031542  001721                          BEQ     5$                ;BRANCH TO PROMPT JUMP IF SO
031544  022737  000015  002666          CMP     #CARETN,ANSWER    ;SEE IF <CR> WAS INPUTED
031552  001417                          BEQ     15$               ;BRANCH IF NO CHANGE WANTED
031554  000744                          BR      10$               ;BRANCH BACK - INPUT WAS ILLEGAL
031556  022704  000123          11$:    CMP     #123,R4           ;SEE IF ANSWER IS BELOW 124
031562  100403                          BMI     13$               ;BRANCH AROUND ERROR MESSAGE IF NOT
031564  104401  033233                  TYPE    ,VECERR           ;TYPE:  'VECTOR INPUTED IS NOT IN THE RANGE OF 124 TO 777'
031570  000736                          BR      10$               ;BRANCH BACK FOR REINPUT
031572  032704  000003          13$:    BIT     #3,R4             ;MAKE SURE LEAST SIGNIFICANT OCTAL DIGIT IS '0' OR '4'
031576  001403                          BEQ     14$               ;BRANCH OVER ERROR PRINTING IF NOT
031600  104401  033417                  TYPE    ,VCLCHR           ;TYPE:  'VECTOR INPUTED SHOULD HAVE ZERO AS LEAST DIGIT'
031604  000730                          BR      10$               ;BRANCH BACK FOR REINPUT
031606  010437  002460          14$:    MOV     R4,VECADR         ;INSTALL NEW VECTOR ADDRESS IN TABLE
031612  104401  034613          15$:    TYPE    ,DR1WOB           ;TYPE:  'DR11-W OR B (W=0, B=1) CURRENT STATE = '
031616  013737  001476  002720          MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
031624  012737  000001  002712          MOV     #BITO,BITTST      ;MOVE BIT STATE TO PRINT TO BITTST
031632  004737  005606                  JSR     PC,PSTATE         ;PRINT CURRENT W/B STATE
031636  104401  034012                  TYPE    ,SPACEC           ;TYPE:  '  :  '
031642  012703  000001                  MOV     #1,R3             ;ONLY INPUT 1 CHARACTER
031646  004737  002722                  JSR     PC,READ           ;GO READ 1 CHARACTER
031652  005703                          TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
031654  001415                          BEQ     16$               ;BRANCH AROUND NON-NUMERIC TESTS IF SO
031656  022737  000033  002666          CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
031664  001700                          BEQ     10$               ;BRANCH TO PREVIOUS PROMPT IF SO
031666  022737  000015  002666          CMP     #CARETN,ANSWER    ;SEE IF USER WANTS NO CHANGE
031674  001417                          BEQ     18$               ;BRANCH IF SO
031676  022737  000003  002666          CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
031704  001640                          BEQ     5$                ;BRANCH TO PROMPT JUMP IF SO
031706  000741                          BR      15$               ;BRANCH BACK - INPUT NOT LEGAL
031710  005704                  16$:    TST     R4                ;CHECK FOR LEGAL INPUT
031712  001403                          BEQ     17$               ;BRANCH IF OK
031714  022704  000001                  CMP     #1,R4             ;CHECK FOR ILLEGAL INPUT
031720  001334                          BNE     15$               ;BRANCH BACK IF ILLEGAL STATE INPUTED
031722  042737  000001  001476  17$:    BIC     #BITO,$DDWO       ;CLEAR THE BIT TO BE ALTERED
031730  050437  001476                  BIS     R4,$DDWO          ;PUT USER INPUT INTO $DDWO
031734  104401  034551          18$:    TYPE    ,DEVPRI           ;TYPE:  'DEVICE PRIORITY PRESENT LEVEL = '
031740  013737  001476  002720          MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
031746  004737  005630                  JSR     PC,PNTPRI         ;PRINT DEVICE PRIORITY
031752  104401  034012                  TYPE    ,SPACEC           ;TYPE:  '  :  '
031756  012703  000001                  MOV     #1,R3             ;ONLY INPUT 1 CHARACTER
031762  004737  002722                  JSR     PC,READ           ;GO READ 1 CHARACTER
031766  005703                          TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
031770  001415                          BEQ     19$               ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
031772  022737  000033  002666          CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
032000  001704                          BEQ     15$               ;BRANCH TO PREVIOUS PROMPT IF SO
032002  022737  000003  002666          CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
032010  001544                          BEQ     26$               ;BRANCH IF EXIT WANTED
032012  022737  000015  002666          CMP     #CARETN,ANSWER    ;SEE IF <CR> INPUTED FOR NO CHANGE WANTED
032020  001413                          BEQ     20$               ;BRANCH IF NO CHANGE WANTED
032022  000744                          BR      18$               ;BRANCH BACK - INPUT NOT LEGAL
```

```
032024  006304                         19$:   ASL     R4                ;PUT PRIORITY IN PROPER POSITION
032026  006304                                ASL     R4                ;BY SHIFTING TO THE LEFT 5 PLACES
032030  006304                                ASL     R4
032032  006304                                ASL     R4
032034  006304                                ASL     R4
032036  042737  000340  001476                BIC     #LEVEL7,$DDWO     ;CLEAR OLD PRIORITY
032044  050437  001476                        BIS     R4,$DDWO          ;SET PRIORITY INTQ DEVICE DESCRIPTOR WORD
032050  104401  034463                 20$:   TYPE    ,TORNCB           ;TYPE:  '2 OR N CYCLE BURST (2 CY=0, N CY=1) PRESENT STATE =
032054  013737  001476  002720                MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
032062  012737  000002  002712                MOV     #BIT1,BITTST      ;MOVE BIT STATE TO PRINT TO BITTST
032070  004737  005606                        JSR     PC,PSTATE         ;PRINT 2/N CYCLE STATE
032074  104401  034012                        TYPE    ,SPACEC           ;TYPE:   '  : '
032100  012703  000001                        MOV     #1,R3             ;ONLY ONE CHARACTER TO INPUT
032104  004737  002722                        JSR     PC,READ           ;READ 1 CHARACTER
032110  005703                                TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
032112  001415                                BEQ     21$               ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
032114  022737  000033  002666                CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
032122  001704                                BEQ     18$               ;BRANCH TO PREVIOUS PROMPT IF SO
032124  022737  000003  002666                CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
032132  001473                                BEQ     26$               ;BRANCH IF USER WANTS TO EXIT
032134  022737  000015  002666                CMP     #CARETN,ANSWER    ;SEE IF USER WANTS NO CHANGE
032142  001414                                BEQ     23$               ;BRANCH IF USER WANTS NO CHANGE
032144  000741                                BR      20$               ;BRANCH BACK - USER INPUT NOT LEGAL
032146  005704                         21$:   TST     R4                ;CHECK FOR LEGAL INPUT
032150  001403                                BEQ     22$               ;BRANCH IF OK
032152  022704  000001                        CMP     #1,R4             ;CHECK FOR ILLEGAL INPUT
032156  001334                                BNE     20$               ;BRANCH BACK IF ILLEGAL STATE INPUTED
032160  006304                         22$:   ASL     R4                ;SHIFT BIT OVER 1 PLACE
032162  042737  000002  001476                BIC     #BIT1,$DDWO       ;CLEAR OLD STATE
032170  050437  001476                        BIS     R4,$DDWO          ;SET THE USERS INPUTED STATE TO $DDWO
032174  104401  034775                 23$:   TYPE    ,DOCTS            ;TYPE:   'DO CABLE TESTS (NO=0, YES=1) PRESENT STATE = '
032200  013737  001476  002720                MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
032206  012737  000004  002712                MOV     #BIT2,BITTST      ;MOVE BIT STATE TO PRINT TO BITTST
032214  004737  005606                        JSR     PC,PSTATE         ;PRINT CABLE STATE
032220  104401  034012                        TYPE    ,SPACEC           ;TYPE:   '  : '
032224  012703  000001                        MOV     #1,R3             ;INPUT ONLY 1 CHARACTER
032230  004737  002722                        JSR     PC,READ           ;GO INPUT 1 CHARACTER
032234  005703                                TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
032236  001415                                BEQ     24$               ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
032240  022737  000033  002666                CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
032246  001700                                BEQ     20$               ;BRANCH TO PREVIOUS PROMPT IF SO
032250  022737  000003  002666                CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
032256  001421                                BEQ     26$               ;BRANCH IF USER WANTS TO EXIT
032260  022737  000015  002666                CMP     #CARETN,ANSWER    ;SEE IF USER WANTS NO CHANGE
032266  001415                                BEQ     26$               ;BRANCH IF USER WANTS NO CHANGE
032270  000741                                BR      23$               ;BRANCH BACK - USER INPUT NOT LEGAL
032272  005704                         24$:   TST     R4                ;CHECK FOR LEGAL INPUT
032274  001403                                BEQ     25$               ;BRANCH IF OK
032276  022704  000001                        CMP     #1,R4             ;CHECK FOR ILLEGAL INPUT
032302  001334                                BNE     23$               ;BRANCH BACK IF ILLEGAL STATE INPUTED
032304  006304                         25$:   ASL     R4                ;SHIFT INPUTED BIT OVER 2 PLACES
032306  006304                                ASL     R4
032310  042737  000004  001476                BIC     #BIT2,$DDWO       ;CLEAR BIT TO BE CHANGED
032316  050437  001476                        BIS     R4,$DDWO          ;SET THE USERS INPUTED STATE TO $DDWO
032322  000137  030660                 26$:   JMP     PROMPT            ;JUMP TO GET NEW DEVICE NUMBER
```

```
                                                .SBTTL  BURST DATA LATE CALIBRATION ROUTINE
                                                ;*******************************************************************
                                                ;>>>>>>>BURST DATA LATE CALIBRATION ROUTINE<<<<<<<
                                                ;*******************************************************************

032326  012737  177777  002672  BDLCR:  MOV     #-1,MANSIZE             ;MOVE -1 TO MANSIZE
032334  004737  003360                  JSR     PC,FIXTBL               ;GO FILL TABLE
032340  104401  033624                  TYPE    ,BDLCRM                 ;TYPE:  'BURST DATA LATE CALIBRATION'
                                                                        ;TYPE:  'ATTACH SCOPE PROBE...'
                                                                        ;       'TO CALIBRATE NEXT BOARD, TYPE ANY CHARACTER'
032344  012737  000001  002546          MOV     #BIT0,DEVMSK            ;SET UP BIT MASK TO TEST $DEVM FOR DEVICES
032352  012700  002460                  MOV     #VECADR,R0              ;MOVE VECADR TO R0
032356  012701  002420                  MOV     #REGADR,R1              ;MOVE REGADR TO R1
032362  005037  001424                  CLR     $UNIT                   ;CLEAR $UNIT
032366  033737  002546  001470  2$:     BIT     DEVMSK,$DEVM            ;CHECK TO SEE IF DEVICE IS TO BE TESTED
032374  001015                          BNE     5$                      ;BRANCH IF SO
032376  005737  002546                  TST     DEVMSK                  ;SEE IF BIT 15 IS SET
032402  100004                          BPL     4$                      ;BRANCH TO CONTINUE IF NOT SET
032404  104401  033113                  TYPE    ,BCDONE                 ;TYPE:  'BURST CALIBRATION COMPLETE'
032410  000137  030660                  JMP     PROMPT                  ;JUMP TO PROMPT A NEW COMMAND
032414  022021                  4$:     CMP     (R0)+,(R1)+             ;INCREMENT THE TWO POINTERS
032416  006337  002546                  ASL     DEVMSK                  ;UPDATE DEVICE MAP TEST MASK
032422  005237  001424                  INC     $UNIT                   ;INCREMENT UNIT NUMBER
032426  000757                          BR      2$                      ;GO TEST NEXT BIT OF DEVICE MASK
032430  011137  002524          5$:     MOV     (R1),CSR                ;PUT UUT CSR ADDRESS INTO DEVICE CSR LOCATION
032434  062737  000004  002524          ADD     #4,CSR                  ;POINT CSR TO CSR ADDRESS
032442  011037  002530                  MOV     (R0),DRINV              ;PUT UUT VECTOR ADDRESS INTO DEVICE DRINV
032446  104401  033612                  TYPE    ,DEVICE                 ;TYPE:  'DEVICE # '
032452  013746  001424                  MOV     $UNIT,-(SP)             ;PUT UNIT NUMBER ON STACK FOR TYPEOUT
032456  104405                          TYPDS                           ;GO TYPE THE UNIT NUMBER IN DECIMAL
032460  104401  034123                  TYPE    ,UCAL                   ;TYPE:  ' UNDER CALIBRATION'
032464  004737  004036                  JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
032470  005077  150030          6$:     CLR     @CSR                    ;CLR CYCLE BIT
032474  012737  000077  002662          MOV     #77,TIME                ;MOVE WAIT LOOP COUNTER TO TIME
032502  052777  000400  150014          BIS     #CY,@CSR                ;SET CYCLE BIT
032510  005337  002662          7$:     DEC     TIME                    ;SUBTRACT 1 FROM TIME UNTIL ZERO
032514  001375                          BNE     7$                      ;BRANCH BACK IF NOT ZERO YET
032516  105777  146622                  TSTB    @$TKS                   ;IS A CHARACTER WAITING INDICATING USER WANTS TO GO ON?
032522  100362                          BPL     6$                      ;BRANCH IF NOT
032524  017737  150110  002662          MOV     @TKB,TIME               ;WASTE THE CHARACTER, CLEARING THE CHARACTER FLAG
032532  000730                          BR      4$                      ;GO ON TO NEXT BOARD
```

```
3101                                         .SBTTL  ASCII AND ASCIZ MESSAGES AND LOCATIONS
3102 032534      200      123      124  STKIFL: .ASCIZ  <CRLF>/STACK IS FULL - DATA MAY HAVE BEEN LOST/<CRLF><CRLF>
3103 032607      136      131      200  ERCHDR: .ASCII  /^Y/<CRLF>/SUMMATION OF ERRORS SINCE START OR LAST REPORT/
3104 032670      200      200      102          .ASCIZ  <CRLF><CRLF>/BOARD #   PASS #   ERRTTL/<CRLF>
3105 032725      136      131      200  NODATA: .ASCIZ  /^Y/<CRLF>/NO ERROR TOTALS TO REPORT/<CRLF><CRLF>
3106 032764      040      055      040  ETDEV:  .ASCIZ  / - TOTAL ERRORS THIS DEVICE = /
3107 033023      111      114      114  BDNERR: .ASCIZ  /ILLEGAL NUMBER (# OTHER THAN 1-16) OR CHARACTER INPUTED/
3108 033113      102      125      122  BCDONE: .ASCIZ  /BURST CALIBRATION COMPLETE/
3109 033146      101      104      104  ADRERR: .ASCIZ  /ADDRESS INPUTED IS NOT IN THE RANGE 171000 TO 177000/
3110 033233      126      105      103  VECERR: .ASCIZ  /VECTOR INPUTED IS NOT IN THE RANGE OF 124 TO 777/
3111 033314      101      104      104  ADLCHR: .ASCIZ  /ADDRESS INPUTED HAS OTHER THAN 0 FOR LEAST SIGNIFICANT OCTAL DIGIT/
3112 033417      126      105      103  VCLCHR: .ASCIZ  /VECTOR INPUTED SHOULD HAVE ZERO AS LEAST DIGIT/
3113 033476      074      105      123  ESCAPE: .ASCIZ  /<ESC>/
3114 033504      200      104      105  MUSTED: .ASCII  <CRLF>/DEVICE ADDRESS AND-OR VECTOR TABLE NOT SET UP - /
3115 033565      115      125      123          .ASCIZ  /MUST EDIT FIRST/
3116 033605      040      000           LETNCR: .ASCIZ  / /
3117 033607      136      103      000  CNTRLC: .ASCIZ  /^C/
3118 033612      104      105      126  DEVICE: .ASCIZ  /DEVICE # /
3119 033624      200      102      125  BDLCRM: .ASCII  <CRLF>/BURST DATA LATE CALIBRATION/
3120 033660      200      101      124          .ASCII  <CRLF>/ATTACH SCOPE PROBE.../
3121 033706      200      124      117          .ASCIZ  <CRLF>/TO CALIBRATE NEXT BOARD, TYPE ANY CHARACTER/<CRLF>
3122 033764      040      040      000  SPACES: .ASCIZ  /  /
3123 033767      040      040      040  SPACE3: .ASCIZ  /   /
3124 033773      040      040      040  SPACE6: .ASCIZ  /      /
3125 034002      040      040      040  SPACE7: .ASCIZ  /       /
3126 034012      040      040      072  SPACEC: .ASCIZ  /   : /
3127 034017      102      000           B:      .ASCIZ  /B/
3128 034021      127      000           W:      .ASCIZ  /W/
3129 034023      116      117      000  NO:     .ASCIZ  /NO/
3130 034026      131      105      123  YES:    .ASCIZ  /YES/
3131 034032      062      000           TWO:    .ASCIZ  /2/
3132 034034      116      000           N:      .ASCIZ  /N/
3133 034036      102      117      101  BOARD:  .ASCIZ  /BOARD # /
3134 034047      200      200      000  CRLF2:  .ASCIZ  <CRLF><CRLF>
3135 034052      200      101      114  BCFIN:  .ASCIZ  <CRLF>/ALL BOARDS CALIBRATED - BEGINNING TEST/<CRLF>
3136 034123      040      125      116  UCAL:   .ASCIZ  / UNDER CALIBRATION/<CRLF>
3137 034147      200      116      125  NOBUT:  .ASCIZ  <CRLF>/NUMBER OF BOARDS UNDER TEST: /
3138 034206      200      200      104  BRVWPC: .ASCII  <CRLF><CRLF>/DIAGNOSTIC HAS DETERMINED THE FOLLOWING ABOUT THE/<CRLF>
3139 034272      104      122      061          .ASCII  /DR11-W(S) IT HAS FOUND.  USER *MUST* DETERMINE ACCURACY/<CRLF><CRLF>
3140 034363      040      040      040          .ASCIZ  /  BOARD#   REGADR   VECADR    W-B   P-LEV   2-N CY   CABLE/<CRLF>
3141 034463      200      062      040  TORNCB: .ASCIZ  <CRLF>/2 OR N CYCLE BURST (2 CY=0, N CY=1) PRESENT STATE = /
3142 034551      200      104      105  DEVPRI: .ASCIZ  <CRLF>/DEVICE PRIORITY PRESENT LEVEL = /
3143 034613      200      104      122  DR1WOB: .ASCIZ  <CRLF>/DR11-W OR B (W=0, B=1) CURRENT STATE = /
3144 034664      200      123      124  SVADRS: .ASCIZ  <CRLF>/STARTING VECTOR ADDRESS:  /
3145 034720      200      123      124  SDADRS: .ASCIZ  <CRLF>/STARTING DEVICE ADDRESS: /
3146 034753      040      124      105  TSTCOM: .ASCIZ  / TESTING COMPLETE/
3147 034775      200      104      117  DOCTS:  .ASCIZ  <CRLF>/DO CABLE TESTS (NO=0, YES=1) PRESENT STATE = /
3148 035054      200      200      043  HEADER: .ASCII  <CRLF><CRLF>/# OF     START                                    2-N    CABLE/
3149 035150      200      102      117          .ASCIZ  <CRLF>/BOARDS   REGADR   VECADR     W-B   P-LEV   CYCLE   TESTS/<CRLF>
3150 035245      200      200      115  MBDIAL: .ASCIZ  <CRLF><CRLF>/MULTIPLE BOARD DIALOGUE/<CRLF>
3151 035300      200      105      116  ECELR:  .ASCIZ  <CRLF>/ENTER COMMAND ([E]DIT, [L]IST, [B]URST CALIBRATION, [R]UN):  /
3152 035377      124      110      105  NOMORE: .ASCII  /THERE ARE STILL MORE ERRORS, BUT WILL NOT BE PRINTED./<CRLF>
3153 035465      105      122      122          .ASCIZ  /ERRORS WILL STILL BE COUNTED AND PRINTED AT THE EOP./<CRLF>
3154 035553      200      116      117  NODVPR: .ASCII  <CRLF>/NO DEVICES RECOGNIZED - DIAGNOSTIC CANNOT BE RUN/<CRLF>
3155 035635      122      105      123          .ASCIZ  /RESTART AT 204 IF A DEVICE IS PRESENT/<CRLF>
3156 035704      200      050      136  M1:     .ASCII  <CRLF>/(^X) INHIBITS EOP'S, (^Y) FOR ERROR SUMMARY/<CRLF>
3157 035761      125      116      111          .ASCIZ  /UNIBUS HANG?  RESTART AT ADDRESS /
```

```
036023     200     200     103  M1A:     .ASCIZ  <CRLF><CRLF>/CZDRLB0 DR11 GEN NPR INTFC LOGIC TEST/<CRLF>
036074     104     105     126  BARADR:  .ASCIZ  /DEVICE ADDRESS - /
036116     054     040     124  TSNUMB:  .ASCIZ  /, TEST NUMBER - /
036137     054     040     120  PASNUM:  .ASCIZ  /, PASS NUMBER - /
                                         .EVEN
036160  000000                  .SAV:    .WORD   0
036162                                   .BLKW   400
037162  000000                  BUFF:    .WORD   0
037164  037164                  XINBUF:  .
037166                                   .BLKW   400
040166  040166                  XCHKBU:  .
040170                                   .BLKW   400
041170  041172                  CAPNTR:  .WORD   CAPSTK          ;LOCATION TO HOLD POINTER FOR CAPTURE STACK
041172                          CAPSTK:  .BLKW   600.            ;LOCATIONS TO STORE UP TO 150 DECIMAL PASSES AND THEIR ERROR
043452  000000                  ENDSTK:  .WORD   0               ;FLAG SIGNALING END OF THE STACK
```

```
   3173                                          .SBTTL  ERROR MESSAGES
   3174 043454      124      105      123  EM1:     .ASCIZ  /TEST SEQUENCING ERROR/
   3175 043502      103      101      116  EM2:     .ASCIZ  /CANNOT ACCESS DR11 REGISTER/
   3176 043536      104      122      061  EM3:     .ASCIZ  /DR11-B OR W MODE INCORRECT (0=B, 1=W)/
   3177 043604      111      116      111  EM4:     .ASCIZ  /INIT FAILED TO CLEAR WCR/
   3178 043635      111      116      111  EM5:     .ASCIZ  /INIT FAILED TO CLEAR BAR/
   3179 043666      111      116      111  EM6:     .ASCIZ  /INIT FAILED TO CLEAR BDR/
   3180 043717      111      116      111  EM7:     .ASCIZ  /INIT FAILED TO CLEAR ALL CSR R-W BITS/
   3181 043765      122      105      123  EM10:    .ASCIZ  /RESET FAILED TO CLEAR WCR/
   3182 044017      101      124      124  EM11:    .ASCIZ  /ATTEMPT TO SET ALL WCR BITS FAILED/
   3183 044062      122      105      123  EM12:    .ASCIZ  /RESET FAILED TO CLEAR BAR/
   3184 044114      101      124      124  EM13:    .ASCIZ  /ATTEMPT TO SET ALL BAR BITS TO 1 FAILED/
   3185 044164      103      123      122  EM14:    .ASCIZ  /CSR BIT TEST FAILED (FATAL - DIAGNOSTIC NOT CONTINUED)/
   3186 044253      103      123      122  EM15:    .ASCIZ  /CSR BIT TEST FAILED/
   3187 044277      105      111      122  EM16:    .ASCIZ  /EIR BIT TEST FAILED/
   3188 044323      122      105      101  EM17:    .ASCIZ  /READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR/
   3189 044412      101      124      124  EM20:    .ASCIZ  /ATTN AND ERROR FAILED TO SET PROPERLY/
   3190 044460      101      124      124  EM21:    .ASCIZ  /ATTN AND ERROR FAILED TO CLEAR PROPERLY/
   3191 044530      105      122      122  EM22:    .ASCIZ  /ERROR BIT SHOULD HAVE BEEN CLEAR/
   3192 044571      102      111      124  EM23:    .ASCIZ  /BIT PATTERN NOT LOADED PROPERLY IN WCR/
   3193 044640      122      105      101  EM24:    .ASCIZ  /READY OF CSR WAS NOT SET/
   3194 044671      102      111      124  EM25:    .ASCIZ  /BIT 0 OF THE BAR WAS SET/
   3195 044722      102      111      124  EM26:    .ASCIZ  /BIT PATTERN TEST FAILED IN BAR/
   3196 044761      127      103      122  EM27:    .ASCIZ  /WCR DATA PATTERN NOT CORRECT/
   3197 045016      106      125      116  EM30:    .ASCIZ  /FUNCTION BIT(S) ARE NOT CLEAR/
   3198 045054      104      123      124  EM31:    .ASCIZ  /DSTAT A, B OR C ARE NOT AS EXPECTED/
   3199 045120      102      104      122  EM32:    .ASCIZ  /BDR IS NOT CLEAR/
   3200 045141      101      114      114  EM33:    .ASCIZ  /ALL BDR BITS ARE NOT SET/
   3201 045172      102      104      122  EM34:    .ASCIZ  /BDR FAILS TO HOLD A BIT PATTERN/
   3202 045232      102      104      122  EM35:    .ASCIZ  /BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN/
   3203 045313      102      104      122  EM36:    .ASCIZ  /BDR PATTERN NOT CORRECT/
   3204 045343      122      105      101  EM37:    .ASCIZ  /READY IS NOT THE ONLY BIT SET/
   3205 045401      122      105      101  EM40:    .ASCIZ  /READY SHOULD NOT BE SET/
   3206 045431      122      105      101  EM41:    .ASCIZ  /READY WAS CLEARED BUT NEVER SET AGAIN/
   3207 045477      122      105      101  EM42:    .ASCIZ  /READY CANNOT BE SET BY INIT/
   3208 045533      104      122      061  EM43:    .ASCIZ  /DR11 FAILED TO INTERRUPT/
   3209 045564      104      122      061  EM44:    .ASCIZ  /DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE/
   3210 045634      105      122      122  EM45:    .ASCIZ  /ERROR BIT SHOULD NOT BE CLEAR/
   3211 045672      106      125      116  EM46:    .ASCIZ  /FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE/
   3212 045747      103      123      122  EM47:    .ASCIZ  /CSR IS WRONG/
   3213 045764      124      122      101  EM50:    .ASCIZ  /TRANSFERS SHOULD HAVE BEEN INHIBITED/
   3214 046031      104      122      061  EM51:    .ASCIZ  /DR11 SHOULD NOT HAVE INTERRUPTED A SECOND TIME/
   3215 046110      105      130      120  EM52:    .ASCIZ  /EXPECTED INTERRUPT DID NOT OCCUR/
   3216 046151      127      103      122  EM53:    .ASCIZ  /WCR NOT EQUAL TO ZERO/
   3217 046177      102      101      122  EM54:    .ASCIZ  /BAR IS WRONG/
   3218 046214      102      101      104  EM55:    .ASCIZ  /BAD DATA IN BDR/
   3219 046234      104      101      124  EM56:    .ASCIZ  /DATA NOT TRANSFERED CORRECTLY/
   3220 046272      102      125      106  EM57:    .ASCIZ  /BUFFER DATA NOT CORRECT/
   3221 046322      124      117      117  EM60:    .ASCIZ  /TOO MANY WORDS WERE TRANSFERED/
   3222 046361      125      116      105  EM61:    .ASCIZ  /UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW/
   3223 046444      103      123      122  EM62:    .ASCIZ  /CSR AND-OR WCR AND-OR BAR ARE INCORECT/
   3224 046513      104      122      061  EM63:    .ASCIZ  /DR11 INTERRUPTED AT WRONG LEVEL/
   3225 046553      062      055      116  EM65:    .ASCIZ  /2-N CYCLE BURST SWITCH IN WRONG POSITION/
   3226 046624      115      125      114  EM66:    .ASCIZ  /MULTICYCLE BIT IN THE EIR IS WRONG/
   3227 046667      103      123      122  EM202:   .ASCIZ  /CSR PATTERN NOT CORRECT/
   3228 046717      102      104      122  EM211:   .ASCIZ  /BDR AND-OR WCR AND-OR BAR ARE INCORECT/
```

```
                                        .SBTTL  DATA HEADERS
046766      105      130      120  DH1:     .ASCII  /EXPCTD  RECVD/<CRLF>
047004      124      105      123           .ASCIZ  /TEST #  TEST #/
047023      124      105      123  DH2:     .ASCIZ  /TEST #  ERR PC  ABRTPC  REGISTER/
047064      124      105      123  DH3:     .ASCIZ  /TEST #  ERR PC  EXPMOD  ACTMOD  CSRADR/
047133      124      105      123  DH4:     .ASCIZ  /TEST #  ERR PC  WCRADR  WCRCONTENTS/
047177      124      105      123  DH5:     .ASCIZ  /TEST #  ERR PC  BARADR  BAREXP  BARRCV/
047246      124      105      123  DH6:     .ASCIZ  /TEST #  ERR PC  BDRADR  BDRCONTENTS/
047312      124      105      123  DH7:     .ASCIZ  /TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS/
047366      040      040      040  DH14:    .ASCII  /                BIT(S)/<CRLF>
047415      124      105      123           .ASCIZ  /TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS/
047501      040      040      040  DH16:    .ASCII  /                BIT(S)/<CRLF>
047530      124      105      123           .ASCIZ  /TEST #  ERR PC  TESTED  EIRADR  EIREXP  EIRCONTENTS/
047614      124      105      123  DH17:    .ASCIZ  /TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS/
047670      124      105      123  DH23:    .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRCONTENTS/
047744      124      105      123  DH26:    .ASCIZ  /TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS/
050020      124      105      123  DH34:    .ASCIZ  /TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS/
050074      124      105      123  DH43:    .ASCIZ  /TEST #  ERR PC  CSRADR  CSRCONTENTS/
050140      124      105      123  DH50:    .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BARADR  BAREXP  BARRCV/
050237      124      105      123  DH56:    .ASCIZ  /TEST #  ERR PC  NPR1AD  NPR1EX  NPR1RC  CSRADR/
050316      040      040      040  DH57:    .ASCII  /                CHECK   CHECK   INPUT   INPUT/<CRLF>
050374      124      105      123           .ASCIZ  /TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR/
050463      040      040      040  DH60:    .ASCII  /                DIDNOT/<CRLF>
050512      124      105      123           .ASCIZ  /TEST #  ERR PC  EXPECT  ADRESS  CSRADR/
050561      124      105      123  DH61:    .ASCIZ  /TEST #  ERR PC  WCRADR  OLDPC   TRAP ADR/
050632      124      105      123  DH62:    .ASCII  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  CSREXP  /
050712      103      123      122           .ASCIZ  /CSRRCV  BAREXP  BARRCV/
050741      124      105      123  DH63:    .ASCIZ  /TEST #  ERR PC  EXPLVL  RCVLVL  CSRADR/
051010      124      105      123  DH64:    .ASCIZ  /TEST #  ERR PC  EXPLVL  CSRADR/
051047      124      105      123  DH65:    .ASCIZ  /TEST #  ERR PC  CSRADR  EIREXP  EIRRCV/
051116      124      105      123  DH66:    .ASCIZ  /TEST #  ERR PC  PATERN  CSRADR  CSRRCV/
051165      124      105      123  DH202:   .ASCIZ  /TEST #  ERR PC  CSRADR  PATLDD  CSREXP  CSRRCV/
051244      124      105      123  DH203:   .ASCIZ  /TEST #  ERR PC  CSRADR  PATERN  CSREXP  CSRCONTENTS/
051330      124      105      123  DH207:   .ASCIZ  /TEST #  ERR PC  PATERN  CSRADR  CSRCONTENTS/
051404      124      105      123  DH210:   .ASCIZ  /TEST #  ERR PC  WCRADR  WCRCONTENTS/
051450      124      105      123  DH211:   .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BDREXP  BDRRCV  BAREXP  BARRCV/
                                            .EVEN
```

```
3266                                                    .SBTTL  DATA TABLES
3267 051560  001362  001414  000000  DT1:       .WORD   $TMP1,$TESTN,0
3268 051566  001414  001316  002674  DT2:       .WORD   $TESTN,$ERRPC,OLDPC1,DREG,0
3269 051600  001414  001316  001362  DT3:       .WORD   $TESTN,$ERRPC,$TMP1,BORW,CSR,0
3270 051614  001414  001316  002520  DT4:       .WORD   $TESTN,$ERRPC,WCR,RWCR,0
3271 051626  001414  001316  002522  DT5:       .WORD   $TESTN,$ERRPC,BAR,EBAR,RBAR,0
3272 051642  001414  001316  002526  DT6:       .WORD   $TESTN,$ERRPC,BDR,RBDR,0
3273 051654  001414  001316  002524  DT7:       .WORD   $TESTN,$ERRPC,CSR,ECSR,RCSR,0
3274 051670  001414  001316  002540  DT14:      .WORD   $TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
3275 051706  001414  001316  002540  DT16:      .WORD   $TESTN,$ERRPC,BUT,CSR,EEIR,REIR,0
3276 051724  001414  001316  002524  DT17:      .WORD   $TESTN,$ERRPC,CSR,ECSR,RCSR,0
3277 051740  001414  001316  002520  DT23:      .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,0
3278 051754  001414  001316  002522  DT26:      .WORD   $TESTN,$ERRPC,BAR,EBAR,RBAR,
3279 051770  001414  001316  002526  DT34:      .WORD   $TESTN,$ERRPC,BDR,EBDR,RBDR,0
3280 052004  001414  001316  002524  DT43:      .WORD   $TESTN,$ERRPC,CSR,RCSR,0
3281 052016  001414  001316  002520  DT50:      .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,BAR,EBAR,RBAR,0
3282 052040  001414  001316  002610  DT56:      .WORD   $TESTN,$ERRPC,ANPR1,ENPR1,NPR1,CSR,0
3283 052056  001414  001316  001370  DT57:      .WORD   $TESTN,$ERRPC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
3284 052076  001414  001316  001364  DT60:      .WORD   $TESTN,$ERRPC,$TMP2,$TMP3,CSR,0
3285 052112  001414  001316  002520  DT61:      .WORD   $TESTN,$ERRPC,WCR,OLDPC2,BDVECT,0
3286 052126  001414  001316  002520  DT62:      .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
3287 052152  001414  001316  002554  DT63:      .WORD   $TESTN,$ERRPC,DRLEV,LEVEL,CSR,0
3288 052166  001414  001316  001362  DT64:      .WORD   $TESTN,$ERRPC,$TMP1,CSR,0
3289 052200  001414  001316  002524  DT65:      .WORD   $TESTN,$ERRPC,CSR,EEIR,REIR,0
3290 052214  001414  001316  002606  DT66:      .WORD   $TESTN,$ERRPC,ENPR1,CSR,RCSR,0
3291 052230  001414  001316  002524  DT202:     .WORD   $TESTN,$ERRPC,CSR,BUT,ECSR,RCSR,0
3292 052246  001414  001316  002524  DT203:     .WORD   $TESTN,$ERRPC,CSR,$TMP0,ECSR,RCSR,0
3293 052264  001414  001316  001362  DT207:     .WORD   $TESTN,$ERRPC,$TMP1,CSR,RCSR,0
3294 052300  001414  001316  002520  DT210:     .WORD   $TESTN,$ERRPC,WCR,RWCR,0
3295 052312  001414  001316  002520  DT211:     .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,EBDR,RBDR,EBAR,RBAR,0
```

```
                                            .SBTTL  BUS HANG ROUTINE
052336  104401  036074          UBHANG:     TYPE    ,BARADR         ;TYPE:  'DEVICE ADDRESS - '
052342  013746  002520                      MOV     WCR,-(SP)       ;PUT DEVICE ADDRESS ON STACK
052346  104402                              TYPOC                   ;GO TYPE IT IN OCTAL
052350  104401  036116                      TYPE    ,TSNUMB         ;TYPE:  ', TEST NUMBER - '
052354  013746  001414                      MOV     $TESTN,-(SP)    ;PUT TEST NUMBER ON STACK
052360  104403                              TYPOS                   ;GO TYPE IT IN OCTAL
052362     002     000                      .BYTE   2,0             ;TYPE 2 DIGITS, LEADING ZEROS SUPRESSED
052364  104401  036137                      TYPE    ,PASNUM         ;TYPE:  ', PASS NUMBER - '
052370  013746  001420                      MOV     $PASS+2,-(SP)   ;MOVE OVERFLOW NUMBER TO THE STACK
052374  013746  001416                      MOV     $PASS,-(SP)     ;PUT PASS NUMBER ON STACK
052400  104406                              TYPDE                   ;GO TYPE IT IN EXTENDED DECIMAL
052402  104401  001405                      TYPE    ,$CRLF          ;TYPE A <CRLF>
052406  000000                              HALT                    ;WHOA - YOU GOTTA SERIOUSA PROBLEMA, BUDDY!
052410  000137  010266                      JMP     START1          ;JUMP TO RESTART PROGRAM
052414  000000                  NOCARE:     .WORD   0       ;LOCATION FOR USE WHENEVER CYCLE BIT OF CSR IS USED. THIS
                                                            ;SHOULD *ALWAYS* BE THE LAST WORD LOCATION IN THIS DIAGNOSTIC
        000001                              .END
```

```
ABASE = 172410        AVECT1= 000300        CARETN= 000015        DATCHK  003716        DT1     051560
ACDW1 = 000000        AVECT2= 000000        CAT   = 157777        DATCH1  003736        DT14    051670
ACDW2 = 000000        B       034017        CATCH   005536        DATCH2  004014        DT16    051706
ACPUOP= 000000        BAR     002522        CBIT0 = 177776        DATOCK  004106        DT17    051724
ADDR    002650        BARADR  036074        CBIT1 = 177775        DATOC1  004126        DT2     051566
ADDW0 = 000000        BCDONE  033113        CBIT10= 175777        DATOC2  004170        DT202   052230
ADDW1 = 000000        BCFIN   034052        CBIT11= 173777        DBC   = 003000        DT203   052246
ADDW10= 000000        BDFAIL  002670        CBIT12= 167777        DDISP = 177570        DT207   052264
ADDW11= 000000        BDLCR   032326        CBIT13= 157777        DDW     002720        DT210   052300
ADDW12= 000000        BDLCRM  033624        CBIT14= 137777        DEVADS  004344        DT211   052312
ADDW13= 000000        BDNERR  033023        CBIT15= 077777        DEVICE  033612        DT23    051740
ADDW14= 000000        BDR     002526        CBIT2 = 177773        DEVMSK  002546        DT26    051754
ADDW15= 000000        BDVECT  002544        CBIT3 = 177767        DEVPRI  034551        DT3     051600
ADDW2 = 000000        BEGIN   010466        CBIT4 = 177757        DH1     046766        DT34    051770
ADDW3 = 000000        BEGIN1  011006        CBIT5 = 177737        DH14    047366        DT4     051614
ADDW4 = 000000        BITTST  002712        CBIT6 = 177677        DH16    047501        DT43    052004
ADDW5 = 000000        BIT0  = 000001        CBIT7 = 177577        DH17    047614        DT5     051626
ADDW6 = 000000        BIT00 = 000001        CBIT8 = 177377        DH2     047023        DT50    052016
ADDW7 = 000000        BIT01 = 000002        CBIT9 = 176777        DH202   051165        DT56    052040
ADDW8 = 000000        BIT02 = 000004        CB1513= 057777        DH203   051244        DT57    052056
ADDW9 = 000000        BIT03 = 000010        CCY   = 177377        DH207   051330        DT6     051642
ADEVCT= 000000        BIT04 = 000020        CDAB  = 171777        DH210   051404        DT60    052076
ADEVM = 000000        BIT05 = 000040        CDAC  = 172777        DH211   051450        DT61    052112
ADLCHR  033314        BIT06 = 000100        CDBC  = 174777        DH23    047670        DT62    052126
ADRERR  033146        BIT07 = 000200        CDSA  = 173777        DH26    047744        DT63    052152
AENV  = 000000        BIT08 = 000400        CDSB  = 175777        DH3     047064        DT64    052166
AENVM = 000000        BIT09 = 001000        CDSC  = 176777        DH34    050020        DT65    052200
AFATAL= 000000        BIT1  = 000002        CDST  = 170777        DH4     047133        DT66    052214
AMADR1= 000000        BIT10 = 002000        CEIR  = 077777        DH43    050074        DT7     051654
AMADR2= 000000        BIT11 = 004000        CER   = 077777        DH5     047177        EBAR    002602
AMADR3= 000000        BIT12 = 010000        CFNC  = 177761        DH50    050140        EBDR    002600
AMADR4= 000000        BIT13 = 020000        CF1   = 177775        DH56    050237        ECELR   035300
AMAMS1= 000000        BIT14 = 040000        CF2   = 177773        DH57    050316        ECSR    002574
AMAMS2= 000000        BIT15 = 100000        CF3   = 177767        DH6     047246        EDIT    031206
AMAMS3= 000000        BIT2  = 000004        CGO   = 177776        DH60    050463        EEIR    002576
AMAMS4= 000000        BIT3  = 000010        CHARCT  027423        DH61    050561        EIR   = 100000
AMSGAD= 000000        BIT4  = 000020        CHKBFF  003520        DH62    050632        EMTVEC= 000030
AMSGLG= 000000        BIT5  = 000040        CHKBUF  002622        DH63    050741        EM1     043454
AMSGTY= 000000        BIT6  = 000100        CHKCAB  004060        DH64    051010        EM10    043765
AMTYP1= 000000        BIT7  = 000200        CHK4DR  005104        DH65    051047        EM11    044017
AMTYP2= 000000        BIT8  = 000400        CIE   = 177677        DH66    051116        EM12    044062
AMTYP3= 000000        BIT9  = 001000        CKSWR = 104410        DH7     047312        EM13    044114
AMTYP4= 000000        BOARD   034036        CLENUP  004036        DIOMEM  002616        EM14    044164
ANPR1   002610        BORW    002612        CMA   = 167777        DISPLA  001342        EM15    044253
ANSWER  002666        BPINIT  004374        CNTLC = 000003        DISPRE  000174        EM16    044277
APASS = 000000        BPT   = 000003        CNTRLC  033607        DOCTS   034775        EM17    044323
APRIOR= 000000        BPTINT  004436        CNX   = 137777        DREG    002552        EM2     043502
APTCSU= 000040        BPTVCT  000014        CR    = 000015        DRGET   004452        EM20    044412
APTENV= 000001        BPTVEC= 000014        CRLF  = 000200        DRINV   002530        EM202   046667
APTSIZ= 000200        BRVWPC  034206        CRLF2   034047        DRLEV   002554        EM21    044460
APTSPO= 000100        BRWAIT  002630        CRY   = 177577        DRVS    002532        EM211   046717
ASIZE   005274        BUFF    037162        CSR     002524        DR1WOB  034613        EM22    044530
ASWREG= 000000        BUFLEN  002624        CX6   = 177757        DSA   = 004000        EM23    044571
AT    = 020000        BUSERR= 000004        CX7   = 177737        DSB   = 002000        EM24    044640
ATESTN= 000000        BUT     002540        CY    = 000400        DSC   = 001000        EM25    044671
AUNIT = 000000        CAPNTR  041170        DAB   = 006000        DST   = 007000        EM26    044722
AUSWR = 000000        CAPSTK  041172        DAC   = 005000        DSWR  = 177570        EM27    044761
```

```
EM3      043536     F1     = 000002     NXTTST   002556     STACK  = 001300     TST12    013750
EM30     045016     F2     = 000004     N2     = 000400     STAGIN   000210     TST13    014106
EM31     045054     F3     = 000010     OFL      002704     START    010272     TST14    014244
EM32     045120     GO     = 000001     OLDPC1   002674     START1   010266     TST15    014406
EM33     045141     GOAGIN   023516     OLDPC2   002700     STKIFL   032534     TST16    014612
EM34     045172     GTSWR  = 104407     OLDPS1   002676     STKLMT=  177774     TST17    015022
EM35     045232     HAKTPM   027042     OLDPS2   002702     SVADRS   034664     TST2     011414
EM36     045313     HEADER   035054     PASCNT   002560     SWR      001340     TST20    015372
EM37     045343     HT     = 000011     PASNUM   036137     SWREG    000176     TST21    015750
EM4      043604     IE     = 000100     PATRNS   006250     SW0    = 000001     TST22    016236
EM40     045401     INBUF    002620     PIRQ   = 177772     SW00   = 000001     TST23    016506
EM41     045431     INBUF1   002660     PIRQVE=  000240     SW01   = 000002     TST24    017216
EM42     045477     INOOUT   020340     PNTPRI   005630     SW02   = 000004     TST25    017472
EM43     045533     INTA     003546     PROMPT   030660     SW03   = 000010     TST26    017734
EM44     045564     IOTVEC=  000020     PR0    = 000000     SW04   = 000020     TST27    020164
EM45     045634     KDPAR2=  172364     PR1    = 000040     SW05   = 000040     TST3     011516
EM46     045672     KDPDR2=  172324     PR2    = 000100     SW06   = 000100     TST30    020354
EM47     045747     KIPAR2=  172344     PR3    = 000140     SW07   = 000200     TST31    020614
EM5      043635     KIPDR2=  172304     PR4    = 000200     SW08   = 000400     TST32    020716
EM50     045764     LENCHK   002626     PR5    = 000240     SW09   = 001000     TST33    021250
EM51     046031     LETNCR   033605     PR6    = 000300     SW1    = 000002     TST34    021526
EM52     046110     LEVEL    002542     PR7    = 000340     SW10   = 002000     TST35    022062
EM53     046151     LEVELS   005264     PS     = 177776     SW11   = 004000     TST36    022332
EM54     046177     LEVEL3=  000140     PSTATE   005606     SW12   = 010000     TST37    022620
EM55     046214     LEVEL4=  000200     PSW    = 177776     SW13   = 020000     TST4     012030
EM56     046234     LEVEL5=  000240     PTCAPT   003170     SW14   = 040000     TST40  = 023074
EM57     046272     LEVEL6=  000300     PWRVEC=  000024     SW15   = 100000     TST5     012572
EM6      043666     LEVEL7=  000340     QTYBRD   002416     SW2    = 000004     TST6     012740
EM60     046322     LF     = 000012     RA     = 002420     SW3    = 000010     TST7     013254
EM61     046361     LODBUF   003472     RBAR     002570     SW4    = 000020     TWO      034032
EM62     046444     LOOP     002664     RBDR     002566     SW5    = 000040     TYPCNF   004630
EM63     046513     LRGSTC   002706     RCSR     002562     SW6    = 000100     TYPDE  = 104406
EM65     046553     MA     = 010000     RDCHR  = 104411     SW7    = 000200     TYPDS  = 104405
EM66     046624     MAICLR   006266     RDDEC  = 104414     SW8    = 000400     TYPE   = 104401
EM7      043717     MAISET   007266     RDLIN  = 104412     SW9    = 001000     TYPOC  = 104402
ENDEV    023074     MANSIZ   002672     RDOCT  = 104413     TABINX   002550     TYPON  = 104404
ENDSTK   043452     MBD      030644     RDYCHK   002634     TBITVE=  000014     TYPOS  = 104403
ENPR1    002606     MBDIAL   035245     READ     002722     TESLR    027424     UBHANG   052336
EOPLOC   002710     MEMGMT   002714     REGADR   002420     TIME     002662     UCAL     034123
EOPRSM   027352     MEPITM   030240     REINIT   011206     TKB      002640     VA     = 002460
ER     = 100000     MESSAG   002652     REIR     002564     TKS      002636     VCLCHR   033417
ERCAPT   003126     MMPS   = 000252     RESVEC=  000010     TKVEC  = 000060     VCTADS   005502
ERCHDR   032607     MMRO   = 177572     RSTRT    023536     TMOPSY=  000006     VECADR   002460
ERRCHK   004254     MMVECT=  000250     RWCR     002572     TORNCB   034463     VECERR   033233
ERRCNT   002716     MSG      002646     RY     = 000200     TOVECT=  000004     W        034021
ERROR  = 104000     MUSTED   033504     R6     =%000006     TPB      002644     WCLEN    002632
ERRVEC=  000004     M1       035704     R7     =%000007     TPS      002642     WCR      002520
ER200    002276     M1A      036023     SCOPE  = 000004     TPVEC  = 000064     XCHKBU   040166
ESC    = 000033     N        034034     SDADRS   034720     TRAPVE=  000034     XINBUF   037164
ESCAPE   033476     NO       034023     SDRINV   002534     TRTVEC=  000014     X6     = 000020
ETDEV    032764     NOBUT    034147     SDRVS    002536     TSNUMB   036116     X7     = 000040
EWCR     002604     NOCARE   052414     SETTUP   005660     TSTCOM   034753     YES      034026
EXPAND   024670     NODATA   032725     SPACEC   034012     TSTDEV   011020     $APTHD   001000
FIXTBL   003360     NODVPR   035553     SPACES   033764     TSTMM    006134     $ATYC    030266
FLAG     002654     NOMORE   035377     SPACE3   033767     TST1     011244     $ATY1    030242
FNC    = 000016     NPR1     002614     SPACE6   033773     TST10    013404     $ATY3    030250
FNCCNT   002656     NX     = 040000     SPACE7   034002     TST11    013612     $ATY4    030260
```

```
$AUTOB  001334        $DEVCT  001422        $HIOCT  026262        $OMODE  024340        $TMP6   001374
$BASE   001466        $DEVM   001470        $ICNT   001304        $OVER   027026        $TN   = 000040
$BDADR  001322        $DOAGN  023474        $INTAG  001335        $PASS   001416        $TPB    001352
$BDDAT  001326        $DTBL   024646        $ITEMB  001314        $PASTM  001006        $TPFLG  001357
$BELL   001400        $ENDAD  023464        $LF     001406        $POWER  030576        $TPS    001350
$CDW1   001472        $ENDCT  023302        $LFLG   030505        $PWRDN  030510        $TRAP   026264
$CDW2   001474        $ENDMG  023503        $LPADR  001306        $PWRUP  030526        $TRAP2  026306
$CHARC  024110        $ENULL  023500        $LPERR  001310        $QUES   001404        $TRP  = 000015
$CKSWR  025136        $ENV    001432        $MADR1  001444        $RDCHR  025454        $TRPAD  026320
$CMTAG  001300        $ENVM   001433        $MADR2  001450        $RDDEC  025746        $TSTM   001004
$CM3  = 000000        $EOP    023246        $MADR3  001454        $RDLIN  025574        $TSTNM  001302
$CM4  = 000007        $EOPCT  023274        $MADR4  001460        $RDOCT  026124        $TTYIN  025702
$CNTLG  025716        $ERFLG  001303        $MAIL   001410        $RDSZ = 000007        $TYPD   024356
$CNTLU  025711        $ERMAX  001315        $MAMS1  001442        $RTNAD  023476        $TYPDE  024342
$CPUOP  001440        $ERROR  027564        $MAMS2  001446        $SCOPE  026352        $TYPDS  024352
$CRLF   001405        $ERRPC  001316        $MAMS3  001452        $SETUP= 000137        $TYPE   023546
$DBLK   024656        $ERRTB  001536        $MAMS4  001456        $STUP = 177777        $TYPEC  023760
$DDW0   001476        $ERRTY  027764        $MBADR  001002        $SVLAD  026772        $TYPEX  024112
$DDW1   001500        $ERTTL  001312        $MFLG   030504        $SVPC = 001000        $TYPOC  024140
$DDW10  001522        $ESCAP  001376        $MNEW   025734        $SWR  = 163400        $TYPON  024154
$DDW11  001524        $ETABL  001432        $MSGAD  001426        $SWREG  001434        $TYPOS  024114
$DDW12  001526        $ETEND  001536        $MSGLG  001430        $SWRMK= 000200        $UNIT   001424
$DDW13  001530        $FATAL  001412        $MSGTY  001410        $SW08T  027466        $UNITM  001010
$DDW14  001532        $FFLG   030506        $MSWR   025723        $TESTN  001414        $USWR   001436
$DDW15  001534        $FILLC  001356        $MTYP1  001443        $TKB    001346        $VECT1  001462
$DDW2   001502        $FILLS  001355        $MTYP2  001447        $TKS    001344        $VECT2  001464
$DDW3   001504        $GDADR  001320        $MTYP3  001453        $TMP0   001360        $XTSTR  026634
$DDW4   001506        $GDDAT  001324        $MTYP4  001457        $TMP1   001362        $$GET4= 000000
$DDW5   001510        $GET42  023454        $NULL   001354        $TMP2   001364        $$SW08= 000040
$DDW6   001512        $GTSWR  025236        $NUMS   025124        $TMP3   001366        $OFILL  024337
$DDW7   001514        $HD   = 000000        $NWTST= 000001        $TMP4   001370        .SAV    036160
$DDW8   001516        $HIBTS  001000        $OCNT   024336        $TMP5   001372        .$X   = 001000
$DDW9   001520

. ABS.  052416      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  55704 WORDS  ( 218 PAGES)
DYNAMIC MEMORY:  20346 WORDS  ( 78 PAGES)
ELAPSED TIME:  00:11:55
CZDRLB.BIN,CZDRLB.SEQ/-SP=CZDRLB.MLB/ML,CZDRLB.P11
```