DR11-W

DR11 GEN NPR INTFC
CZDRLDO

AH-E780D-MC
FICHE 1 OF 1

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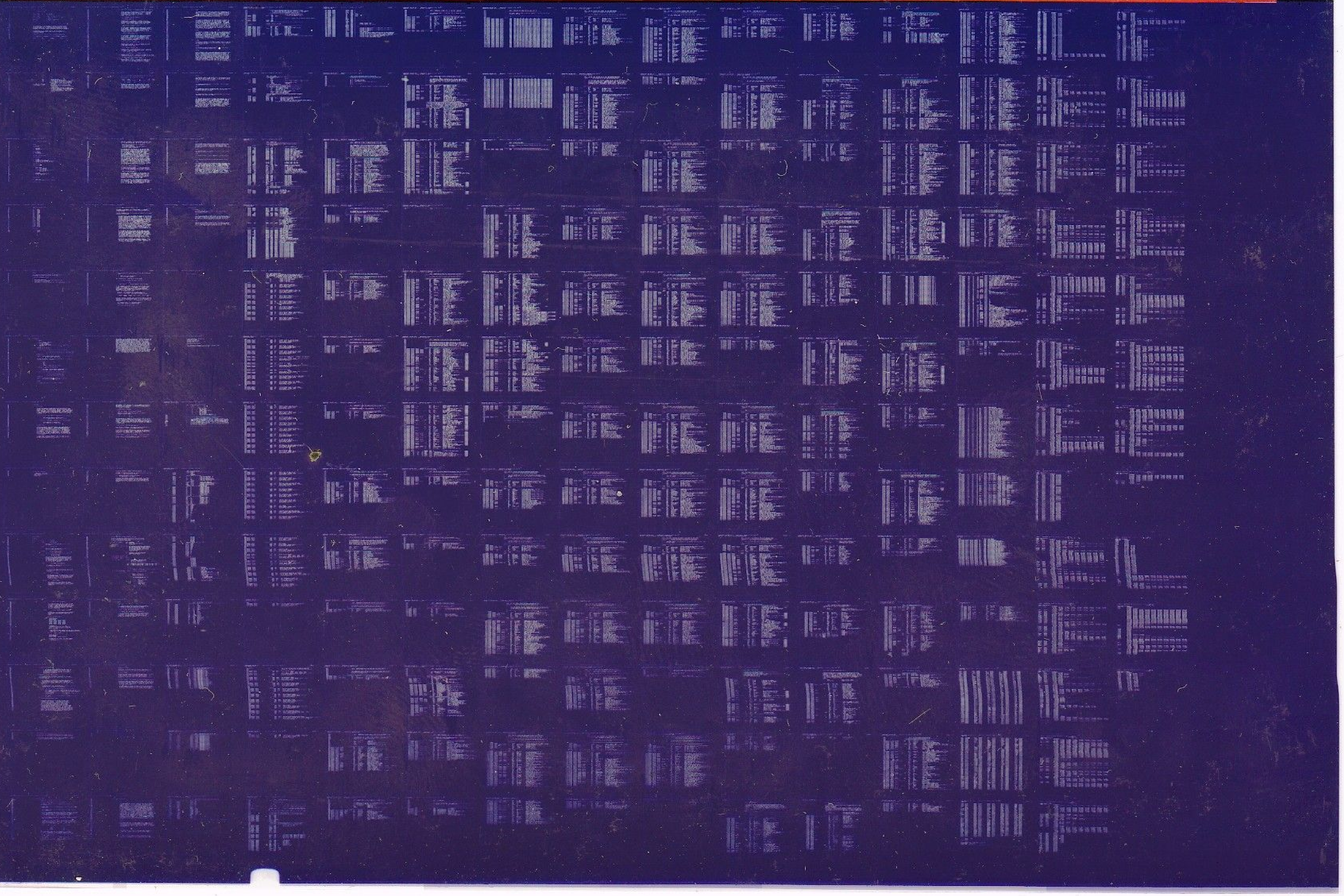

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             IDENTIFICATION


PRODUCT CODE:               AC-E779D-MC

PRODUCT NAME:               CZDRLDO DR11 GEN NPR INTFC

DATE RELEASED:              OCTOBER, 1981

MAINTAINER:                 DIAGNOSTIC ENGINEERING

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                          HISTORY

        REV               DATE              NOTE

        A                 1977              INITIAL RELEASE
        B                 1980              CORRECTION OF CODING ERRORS
        C                 1980              11/05 PROBLEM AND ENDLESS LOOP PROBLEM FIXED
        D                 1981            > 11/10 PROBLEM - FAILS TEST 4 MISTAKENLY
                                          > CORRECTION OF CODING PROBLEMS WHEN RUN
        (ALL REV 'D' FIXES ARE              ON 11/34'S.
        HIGHLIGHTED BY ';DPM001'          > ADDITION OF CODE TO CHECK THE POWER
        IN THE COMMENT FIELD)               MONITOR BIT OF THE CPU ERROR REGISTER,
                                            IF ONE EXISTS.
                                          > CHANGED AUTOSIZE ROUTINE TO PROMPT USER
                                            FOR DEVICE ADDRESS IF NON-OPTION MANU-
                                            FACTURING ENVIRONMENT (IF OPTION MANF.,
                                            SIZING OCCURS AS BEFORE), AND (IF MODULE
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                                            PRIORITY.
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```
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. 56000 WORDS OF MEMORY
```

3.0 TESTING MODE

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)

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          100% AUTOSIZE MODE

                                THIS IS TO BE USED BY OPTION MANUFACTURING ONLY.
                                BECAUSE OF THE LARGE ADDRESSING WINDOW, OTHER
                                OPTIONS HAVE BEEN FOUND THAT GIVE THE AUTOSIZER
                                THE IMPRESSION A DR11 IS WHERE IT IS NOT.  THIS
                                BIT SET WILL BYPASS THE ROUTINE PROMPTING THE
                                USER FOR THE DR11 ADDRESSES.

        SW11=1          004000          TEST NUMBER TRACE ENABLING

                                THIS ENABLES THE PRINTING OF THE FOLLOWING AT
                                THE BEGINNING OF EACH TEST:

                                        T # XX

                                THIS CAN BE USED WHEN AN UNEXPECTED TRAP OCCURS
                                IN A TEST, BUT LOOPING ON THAT TEST RESULTS IN
                                NO ERROR(S).

        SW10=1          002000          BELL ON ERROR

                                THIS FUNCTION CAUSES THE TERMINAL BELL TO SOUND
                                WHEN AN ERROR OCCURS.  THIS CAN BE USED IN CON-
                                JUNCTION 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 UNCON-
                         DITIONALY.  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 ADDI-
                         TIONAL 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 MODE

                        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 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 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 PROMPT THE USER FOR THE STARTING ADDRESSES OF ALL BOARD(S) TO TEST. IF THIS IS NOT DESIRED, RAISE BIT 9 (1000) IN THE SWR *ONLY*IF*THERE*ARE* *NO*OTHER*NON-DR11*OPTIONS*THAT*COULD*BE*MISTAKENLY*AUTO-* *SIZED*IN*THE*160010*TO*172770*ADDRESS*RANGE*. THE DIAGNOSTIC *WILL* FAIL IF IT FINDS A NON-DR11 OPTION AND STARTS TO TEST IT AS SUCH. IF THE BOARD WHOS ADDRESS YOU JUST INPUTED FAILS TO INTERRUPT, THE AUTOSIZE ROUTINE WILL PROMPT YOU FOR THE VECTOR AND PRIORITY. ALL OTHER INFORMATION ON THE BOARD IS AUTO-SIZED. THE ONLY LEGAL INTERRUPT VECTORS THE DR11 CAN BE SET UP FOR ARE 300-774, 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 160010, 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 (ONLY IF THE BOARD INTERRUPTS PROPERLY), 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 ONE OF THE FOLLOWING:

  I) DO YOU WISH TO RELOAD THE TABLE (Y OR <CR>) ?

                         OR

  II) INPUT DEVICE    X STARTING ADDRESS (<CR> IF NO MORE) ?

IF THE DIAGNOSTIC HAS BEEN RUN AND THE TABLE HAS BEEN LOADED,
IT WILL PRINT PROMPT I).  IF YOU ANSWER 'Y', IT WILL PRINT
PROMPT II), ALLOWING INPUT OF ALL DR11 DEVICE ADDRESSES.  IF
THE DIAGNOSTIC HAS NOT BEEN RUN, IT WILL BYPASS PRINTING I)
AND PROMPT II) WILL APPEAR.  AFTER INPUTING A <CR> TO THE II)
PROMPT, THE FOLLOWING WILL PRINT:

  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.  IF YOU INPUTED OTHER THAN A 'Y' TO THE I) PROMPT, THE
ABOVE MESSAGE WILL NOT PRINT.  THE FOLLOWING WILL PRINT UNCON-
DITIONALLY:

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

  CZDRLDO DR11 GEN NPR INTFC LOGIC TEST
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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 NO PAPER (IF NO ERRORS). 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 OBTAIN 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 WHEN 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 (*NOTE*: STARTING
                                        WITH REV 'D' AND ABOVE, RUNNING DIAG
                                        IN THIS MODE REQUIRES USER TO INPUT
                                        THE STARTING ADDRESSES, AS IS WITH
                                        STANDALONE MODE)

                                  200 - DIAGNOSTIC MUST USE CONFIGURA-
                                        TION SPECIFIED BY APT ($VECT1,
                                        $BASE, $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

                    UNTIL THE CPU                                           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 ONCE EVERY 20 SECONDS, APPROXIMATELY (17 SECONDS ON AN 11/44), AS FOLLOWS WITH NO ERRORS ON THAT PASS:

END PASS # XXXXXX

THE EOP WILL PRINT AFTER 64 DEVICES HAVE BEEN TESTED. IF THERE IS ONLY 1 MODULE, THE EOP WILL PRINT AFTER 64 PASSES. WITH 16 MODULES, THE EOP WILL PRINT AFTER ONLY 4 PASSES.
THE EOP WILL PRINT AS FOLLOWS WITH SOME ERRORS WHEN TESTING 1 DEVICE:

END PASS # XXXXXX   TOTAL ERRORS THIS PASS ALL MODULE(S) XXXXXX

THE EOP WILL PRINT THE SAME AS WITH NO ERRORS ON ANY PART:CULAR 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 64 DEVICE PASSES IN 17 SECONDS, ALL MODES.
```

10.0 SUBROUTINE ABSTRACT.

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 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.

10.4 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.

10.5 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.

10.6 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.

10.7 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.

10.8 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.

10.9 CHKCAB

THIS ROUTINE IS USED IN VARIOUS TESTS TO ALTER THE EXPECTED DATA IF THE WRAR-AROUND CABLE IS OUT.

10.10 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.

10.11 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.

10.12 BPINIT

THIS SUBROUTINE RELOADS THE ".+2" AND 'BPT" INTO THE UNUSED LOCATIONS BETWEEN 4 AND 776.

10.13 DRGET

THIS SUBROUTINE EXTRACTS INFORMATION ABOUT THE DR11 WHOS ADDRESS WAS INPUTED AND LOADS THE ACCUMULATED DATA INTO THE DEVICE DESCRIPTOR WORD FOR THAT BOARD.

10.14 TYPCNF

THIS SUBROUTINE PRINTS THE BOARD CONFIGURATIONS THAT THE ASIZE SUBROUTINE SIZED FOR ON THE UNIBUS.

10.15 ASIZE

THIS ROUTINE SEMI-AUTOSIZES THE BOARD CONFIGURATION (DUE TO THE WIDE ADDRESS WINDOW, REV 'D' WAS MODIFIED TO PROMPT USER FOR STARTING ADDRESS(ES) OF THE MODULE(S) UNDER TEST. AUTOSIZE ROUTINE DOES GET CABLE STATUS, INTERRUPT PRIORITY, ETC. ONCE ADDRESS IS INPUTED. IF BOARD FAILS TO INTERRUPT, DIAGNOSTIC THEN PROMPTS USER FOR THE VECTOR AND PRIORITY. EVERYTHING ELSE IS AUTO-SIZED) AND PRINTS THE CONFIGURATION IF THE TABLE WAS NEWLY CREATED THIS RUN. IF THE TABLE ALREADY EXISTS, THE ROUTINE ASKS THE USER IF A NEW TABLE IS TO BE CREATED. IF NOT, THE ROUTINE IS BYPASSED.

10.16 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.

10.17 PSTATE

THIS ROUTINE PRINTS THE STATE OF THE BIT IN THE DDW THAT WAS PRELOADED IN LOCATION 'BITTST'.

10.18 PNTPRI

THIS ROUTINE PRINTS THE DEVICE PRIORITY IN THE DDW LOCATION.

10.19 SETTUP

THIS SUBROUTINE INITIALIZES THE TRAP AND INTERRUPT VECTORS.

10.20 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 STACK

        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 POS-
                SIBLE 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.
```

```
    977                             @
    978                             .NLIST  MC,MD,CND
```

```
3032                                    .TITLE  CZDRLDO-DR11 GEN NPR INTFC
                                        ;*COPYRIGHT (C) 1981
                                        ;*DIGITAL EQUIPMENT CORP.
                                        ;*MAYNARD, MASS. 01754
                                        ;*
                                        ;*PROGRAM BY DAN MILLEVILLE
                                        ;*
                                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                        ;*PACKAGE (MAINDEC-11-DZQAC-C5), JAN, 1981.
                                        ;*
```

```
.SBTTL  OPERATIONAL SWITCH SETTINGS
;*
;*      SWITCH                  USE
;*      ------          --------------------
;*        15            HALT ON ERROR
;*        14            LOOP ON TEST
;*        13            INHIBIT ERROR TYPEOUTS
;*        12            100% AUTOSIZE
;*        10            BELL ON ERROR
;*         9            LOOP ON ERROR
;*         8            LOOP ON TEST IN SWR<6:0>
;*         7            INHIBIT MULTIPLE ERROR TYPEOUTS

;;*****************************************************************
;*                      >>>>>>>>>>>>>>NOTE<<<<<<<<<<<<<<<<<
;*      THE ''TEST NUMBER TRACE ENABLING'' ABOVE IS TO ENABLE PRINTING OF THE
;*      TEST NUMBER AT THE BEGINNING OF EACH TEST, SHOULD YOU HAVE A PROBLEM
;*      WITH THE DIAGNOSTIC JUMPING TO AN ILLEGAL LOCATION FROM ANYWHERE IN
;*      THE TEST.  BY ENABLING IT, YOU CAN SEE THE LAST TEST ENTERED BEFORE
;*      THE OUT-OF-SEQUENCE JUMPING OCCURED.  THIS IS USEFUL IF YOU ENCOUNTER
;*      AN UNEXPECTED TRAP FROM A PARTICULAR TEST, BUT DISCOVER THAT THE TEST
;*      RAN SUCCESSFULLY WHEN LOOPED.
;*
;;*****************************************************************
```

```
  3049                                  .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
 3050         000004                  BUSERR  =ERRVEC
 3051         172410                  ABASE   =172410                 ;BASE DEVICE ADDRESS
 3052         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                 CBIT9   =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
```

```
3121                                      .SBTTL  PRIORITY LEVELS AND OTHER DEFINITIONS
3122                              ;;*****************************************************************
3123            000140            LEVEL3  =140
3124            000200            LEVEL4  =200
3125            000240            LEVEL5  =240
3126            000300            LEVEL6  =300
3127            000340            LEVEL7  =340
3128            000033            ESC     =33
3129            000003            CNTLC   =3
3130            000015            CARETN  =15
3131            177572            MMR0    =177572
3132            172300            KIPDR0  =172300
3133            172304            KIPDR2  =172304
3134            172324            KDPDR2  =172324
3135            172340            KIPAR0  =172340
3136            172344            KIPAR2  =172344
3137            172364            KDPAR2  =172364
3138            000250            MMVECT  =250
3139            000252            MMPS    =252
3140            000004            TOVECT  =4
3141            000006            TMOPSW  =6
3142            000003            BPT     =3
3143            025622            TST40=ENDEV       ;BRANCH TO TEST 40 = BRANCH TO ENDEV (THERE IS NO TEST 40)
```

```
   3144                                            ;;*******************************************************************
   3145                                                    ;* ALL UNUSED LOCATIONS FROM 4-776 WILL CONTAIN A ".+2,BPT" SEQUENCE
   3146                                                    ;* TO CATCH ILLEGAL TRAPS & INTERRUPTS TO THE 'CATCH' LOCATION
   3147                                                    ;* 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
   3148                                            ;;*******************************************************************
   3149           000014                                   .=14                    ;THE BPT TRAP VECTOR POINTS TO THE
   3150 000014    006466                           BPTVCT: .WORD   CATCH           ;   ILLEGAL TRAP HANDLER "CATCH"
   3151 000016    000340                                   .WORD   LEVEL7
   3153           000042                                   .=42
   3154 000042    000000                                   .WORD   0               ;CLEAR THIS LOCATION (FOR APT MONITOR STARTING ADDRESS)
   3155           000174                                   .=174
   3156 000174    000000                           DISPRE: .WORD   0
   3157 000176    000000                           SWREG:  .WORD   0
   3158                                            ;;*******************************************************************
   3159                                            ;
   3160                                            ;PROGRAM STARTING LOCATIONS
   3161                                            ;
   3162                                            ;;*******************************************************************
   3163 000200    000137  011420                           JMP     START1          ;NORMAL START
   3164 000204    000137  034230                           JMP     MBD             ;ENTER MULTIPLE BOARD DIALOQUE
   3165 000210    005037  001416                   STAGIN: CLR     $PASS           ;CLEAR $PASS
   3166 000214    005037  002716                           CLR     $PASS2          ;CLEAR $PASS2
   3167 000220    005037  001422                           CLR     $UNIT           ;CLEAR $UNIT
   3168 000224    005037  001420                           CLR     $DEVCT          ;CLEAR $DEVCT
   3169 000230    005037  001414                           CLR     $TESTN          ;CLEAR $TESTN
   3170 000234    005037  002706                           CLR     EOPLOC          ;CLEAR EOPLOC
   3171 000240    012737  044652  044650                   MOV     #CAPSTK,CAPNTR  ;RESET THE CAPTURE POINTER
   3172 000246    012706  011424                           MOV     #START,SP       ;RESET THE STACK POINTER
   3173 000252    000137  012356                           JMP     BEGIN1          ;JUMP TO BEGIN1 FOR RESTART WITHOUT HEADER PRINTING
   3174           001000                                   .=1000
```

```
                                  .SBTTL  ACT11 HOOKS
                                  ;;*****************************************************************
                                  ;HOOKS REQUIRED BY ACT11
              001000                      $SVPC=.                           ;SAVE PC
              000046                      .=46
     000046   026324                      $ENDAD                            ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
              000052                      .=52
     000052   000000                      .WORD   0                         ;;2)SET LOC.52 TO ZERO
              001000                      .=$SVPC                           ;; RESTORE PC
                                  .SBTTL  APT PARAMETER BLOCK
                                  ;;*****************************************************************
                                  ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                  ;;*****************************************************************
              001000                      .$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 OF APT MAILBOX (BITS 0-15)
     001004   000001              $TSTM:  .WORD    1        ;;RUN TIM OF LONGEST TEST
     001006   000001              $PASTM: .WORD    1        ;;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   000052                      .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
      0C1326  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                    $PASS:  .WORD   APASS   ;;PASS COUNT
```

```
        001420  000000                  $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
        001422  000000                  $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
        001424  000000                  $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
        001426  000000                  $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
        001430                          $ETABLE:                ;;APT ENVIRONMENT TABLE
        001430     000                  $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
        001431     000                  $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
        001432  000000                  $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
        001434  000000                  $USWR:  .WORD   AUSWR   ;;USER SWITCHES
        001436  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
        001440     000                  $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
        001441     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
        001442  000000                  $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                                        ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
        001444     000                  $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
        001445     000                  $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
        001446  000000                  $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
        001450     000                  $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
        001451     000                  $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
        001452  000000                  $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
        001454     000                  $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
        001455     000                  $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
        001456  000000                  $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
        001460  000300                  $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
        001462  000000                  $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
        001464  172410                  $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
        001466  000000                  $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
        001470  000000                  $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
        001472  000000                  $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
        001474  000000                  $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
        001476  000000                  $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
        001500  000000                  $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
        001502  000000                  $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
        001504  000000                  $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
        001506  000000                  $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
        001510  000000                  $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
        001512  000000                  $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
        001514  000000                  $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
        001516  000000                  $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
        001520  000000                  $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
        001522  000000                  $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
        001524  000000                  $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
        001526  000000                  $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
        001530  000000                  $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
        001532  000000                  $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
        001534                          $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
     001534                             $ERRTB:
                                        ;ITEM 1
     001534  047162                             .WORD   EM2     ;CANNOT ACCESS DR11 REGISTER
     001536  052503                             .WORD   DH2     ;TEST #  ERR PC  ABRTPC  REGISTER
     001540  055246                             .WORD   DT2     ;$TESTN,$ERRPC,OLDPC1,DREG,0
     001542  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 2
     001544  047216                             .WORD   EM3     ;DR11-B OR W MODE INCORRECT (0=B, 1=W)
     001546  052544                             .WORD   DH3     ;TEST #  ERR PC  EXPMOD  ACTMOD  CSRADR
     001550  055260                             .WORD   DT3     ;$TESTN,$ERRPC,$TMP1,BORW,CSR,0
     001552  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 3
     001554  047264                             .WORD   EM4     ;INIT FAILED TO CLEAR WCR
     001556  052613                             .WORD   DH4     ;TEST #  ERR PC  WCRADR  WCRCONTENTS
     001560  055274                             .WORD   DT4     ;$TESTN,$ERRPC,WCR,RWCR,0
     001562  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 4
     001564  047315                             .WORD   EM5     ;INIT FAILED TO CLEAR BAR
     001566  052657                             .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
     001570  055306                             .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
     001572  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 5
     001574  047346                             .WORD   EM6     ;INIT FAILED TO CLEAR BDR
     001576  052726                             .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
     001600  055322                             .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
     001602  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 6
     001604  047377                             .WORD   EM7     ;INIT FAILED TO CLEAR ALL CSR R-W BITS
     001606  052772                             .WORD   DH7     ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     001610  055334                             .WORD   DT7     ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     001612  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 7
     001614  047445                             .WORD   EM10    ;RESET FAILED TO CLEAR WCR
     001616  052613                             .WORD   DH4     ;TEST #  ERR PC  WCRADR  WCRCONTENTS
     001620  055274                             .WORD   DT4     ;$TESTN,$ERRPC,WCR,RWCR,0
     001622  000000                             .WORD   0       ;PRINT ALL DATA OCTAL
```

```
                                ;ITEM 10
001624  047477                          .WORD   EM11    ;ATTEMPT TO SET ALL WCR BITS FAILED
001626  052613                          .WORD   DH4     ;TEST #  ERR PC  WCRADR  WCRCONTENTS
001630  055274                          .WORD   DT4     ;$TESTN,$ERRPC,WCR,RWCR,0
001632  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 11
001634  047542                          .WORD   EM12    ;RESET FAILED TO CLEAR BAR
001636  052657                          .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001640  055306                          .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001642  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 12
001644  047574                          .WORD   EM13    ;ATTEMPT TO SET ALL BAR BITS TO 1 FAILED
001646  052657                          .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001650  055306                          .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001652  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 13
001654  047644                          .WORD   EM14    ;CSR BIT TEST FAILED (FATAL - DIAGNOSTIC NOT CONTINUED)
001656  053046                          .WORD   DH14    ;                  BIT(S)
                                                        ;TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS
001660  055350                          .WORD   DT14    ;$TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
001662  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 14
001664  047733                          .WORD   EM15    ;CSR BIT TEST FAILED
001666  053046                          .WORD   DH14    ;                  BIT(S)
                                                        ;TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS
001670  055350                          .WORD   DT14    ;$TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
001672  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 15
001674  047757                          .WORD   EM16    ;EIR BIT TEST FAILED
001676  053161                          .WORD   DH16    ;                  BIT(S)
                                                        ;TEST #  ERR PC  TESTED  EIRADR  EIREXP  EIRCONTENTS
001700  055366                          .WORD   DT16    ;$TESTN,$ERRPC,BUT,CSR,EEIR,REIR,0
001702  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 16
001704  050003                          .WORD   EM17    ;READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR
001706  053274                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001710  055404                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001712  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 17
001714  050072                          .WORD   EM20    ;ATTN AND ERROR FAILED TO SET PROPERLY
001716  053274                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001720  055404                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001722  000000                          .WORD   0       ;PRINT ALL DATA OCTAL

                                ;ITEM 20
001724  050140                          .WORD   EM21    ;ATTN AND ERROR FAILED TO CLEAR PROPERLY
001726  053274                          .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001730  055404                          .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001732  000000                          .WORD   0       ;PRINT ALL DATA OCTAL
```

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                                        ;ITEM 21
001734  050210                                  .WORD   EM22    ;ERROR BIT SHOULD HAVE BEEN CLEAR
001736  053274                                  .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001740  055404                                  .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001742  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 22
001744  050320                                  .WORD   EM24    ;READY OF CSR WAS NOT SET
001746  053274                                  .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001750  055404                                  .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001752  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 23
001754  050351                                  .WORD   EM25    ;BIT 0 OF THE BAR WAS SET
001756  052657                                  .WORD   DH5     ;TEST #  ERR PC  BARADR  BAREXP  BARRCV
001760  055306                                  .WORD   DT5     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,0
001762  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 24
001764  050476                                  .WORD   EM30    ;FUNCTION BIT(S) ARE NOT CLEAR
001766  053274                                  .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
001770  055404                                  .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
001772  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 25
001774  050534                                  .WORD   EM31    ;DSTAT A, B OR C ARE NOT AS EXPECTED
001776  053274                                  .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
002000  055404                                  .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
002002  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 26
002004  050600                                  .WORD   EM32    ;BDR IS NOT CLEAR
002006  052726                                  .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
002010  055322                                  .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
002012  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 27
002014  050621                                  .WORD   EM33    ;ALL BDR BITS ARE NOT SET
002016  052726                                  .WORD   DH6     ;TEST #  ERR PC  BDRADR  BDRCONTENTS
002020  055322                                  .WORD   DT6     ;$TESTN,$ERRPC,BDR,RBDR,0
002022  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 30
002024  050712                                  .WORD   EM35    ;BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN
002026  053500                                  .WORD   DH34    ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002030  055450                                  .WORD   DT34    ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002032  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 31
002034  050773                                  .WORD   EM36    ;BDR PATTERN NOT CORRECT
002036  053500                                  .WORD   DH34    ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002040  055450                                  .WORD   DT34    ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002042  000000                                  .WORD   0       ;PRINT ALL DATA OCTAL
```

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                                        ;ITEM 32
     002044  051023                             .WORD   EM37    ;READY IS NOT THE ONLY BIT SET
     002046  053274                             .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002050  055404                             .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002052  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 33
     002054  051061                             .WORD   EM40    ;READY SHOULD NOT BE SET
     002056  053274                             .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002060  055404                             .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002062  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 34
     002064  051111                             .WORD   EM41    ;READY WAS CLEARED BUT NEVER SET AGAIN
     002066  053274                             .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002070  055404                             .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002072  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 35
     002074  051213                             .WORD   EM43    ;DR11 FAILED TO INTERRUPT
     002076  053554                             .WORD   DH43    ;TEST #  ERR PC  CSRADR  CSRCONTENTS
     002100  055464                             .WORD   DT43    ;$TESTN,$ERRPC,CSR,RCSR,0
     002102  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 36
     002104  051244                             .WORD   EM44    ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
     002106  053554                             .WORD   DH43    ;TEST #  ERR PC  CSRADR  CSRCONTENTS
     002110  055464                             .WORD   DT43    ;$TESTN,$ERRPC,CSR,RCSR,0
     002112  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 37
     002114  051314                             .WORD   EM45    ;ERROR BIT SHOULD NOT BE CLEAR
     002116  053274                             .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002120  055404                             .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002122  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 40
     002124  051427                             .WORD   EM47    ;CSR IS WRONG
     002126  053274                             .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002130  055404                             .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002132  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 41
     002134  051444                             .WORD   EM50    ;TRANSFERS SHOULD HAVE BEEN INHIBITED
     002136  053620                             .WORD   DH50    ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BARADR  BAREXP  BARRCV
     002140  055476                             .WORD   DT50    ;$TESTN,$ERRPC,WCR,EWCR,RWCR,BAR,EBAR,RBAR,0
     002142  000000                             .WORD   0       ;PRINT ALL DATA OCTAL

                                        ;ITEM 42
     002144  051511                             .WORD   EM51    ;DR11 SHOULD NOT HAVE INTERRUPTED A SECOND TIME
     002146  053554                             .WORD   DH43    ;TEST #  ERR PC  CSRADR  CSRCONTENTS
     002150  055464                             .WORD   DT43    ;$TESTN,$ERRPC,CSR,RCSR,0
     002152  000000                             .WORD   0       ;PRINT ALL DATA OCTAL
```

```
 3382                                       ;ITEM 43
 3383 002154  051570                                .WORD   EM52     ;EXPECTED INTERRUPT DID NOT OCCUR
 3384 002156  053554                                .WORD   DH43     ;TEST #  ERR PC  CSRADR  CSRCONTENTS
 3385 002160  055464                                .WORD   DT43     ;$TESTN,$ERRPC,CSR,RCSR,0
 3386 002162  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3387
 3388                                       ;ITEM 44
 3389 002164  051657                                .WORD   EM54     ;BAR IS WRONG
 3390 002166  053424                                .WORD   DH26     ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
 3391 002170  055434                                .WORD   DT26     ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
 3392 002172  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3393
 3394                                       ;ITEM 45
 3395 002174  051674                                .WORD   EM55     ;BAD DATA IN BDR
 3396 002176  053500                                .WORD   DH34     ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
 3397 002200  055450                                .WORD   DT34     ;$TESTN,$ERRPC,BDR,EBDR,RBDR,
 3398 002202  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3399
 3400                                       ;ITEM 46
 3401 002204  051752                                .WORD   EM57     ;BUFFER DATA NOT CORRECT
 3402 002206  053776                                .WORD   DH57     ;                  CHECK   CHECK   INPUT   INPUT
 3403                                                                ;TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR
 3404 002210  055536                                .WORD   DT57     ;$TESTN,$ERROC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
 3405 002212  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3406
 3407                                       ;ITEM 47
 3408 002214  052002                                .WORD   EM60     ;TOO MANY WORDS WERE TRANSFERED
 3409 002216  054143                                .WORD   DH60     ;                  DIDNOT
 3410                                                                ;TEST #  ERR PC  EXPECT  ADRESS  CSRADR
 3411 002220  055556                                .WORD   DT60     ;$TESTN,$ERRPC,$TMP2,$TMP3,CSR,0
 3412 002222  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3413
 3414                                       ;ITEM 50
 3415 002224  052041                                .WORD   EM61     ;UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW
 3416 002226  054241                                .WORD   DH61     ;TEST #  ERR PC  WCRADR  OLDPC   TRAP ADR
 3417 002230  055572                                .WORD   DT61     ;$TESTN,$ERRPC,WCR,OLDPC2,BDVECT,0
 3418 002232  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3419
 3420                                       ;ITEM 51
 3421 002234  052124                                .WORD   EM62     ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 3422 002236  054312                                .WORD   DH62     ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  CSREXP  CSRRCV  BAREXP  BAR
 3423 002240  055606                                .WORD   DT62     ;$TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
 3424 002242  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3425
 3426                                       ;ITEM 52
 3427 002244  052173                                .WORD   EM63     ;DR11 INTERRUPTED AT WRONG LEVEL
 3428 002246  054421                                .WORD   DH63     ;TEST #  ERR PC  EXPLVL  RCVLVL  CSRADR
 3429 002250  055632                                .WORD   DT63     ;$TESTN,$ERRPC,DRLEV,LEVEL,CSR,0
 3430 002252  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
 3431
 3432                                       ;ITEM 53
 3433 002254  051213                                .WORD   EM43     ;DR11 FAILED TO INTERRUPT
 3434 002256  054470                                .WORD   DH64     ;TEST #  ERR PC  EXPLVL  CSRADR
 3435 002260  055646                                .WORD   DT64     ;$TESTN,$ERRPC,$TMP1,CSR,0
 3436 002262  000000                                .WORD   0        ;PRINT ALL DATA OCTAL
```

```
                                ;ITEM 54
     002264  052233                     .WORD   EM65    ;2-N CYCLE BURST SWITCH IN WRONG POSITION
     002266  054527                     .WORD   DH65    ;TEST #  ERR PC  CSRADR  EIREXP  EIRRCV
     002270  055660                     .WORD   DT65    ;$TESTN,$ERRPC,CSR,EEIR,REIR,0
     002272  000000                     .WORD   0       ;PRINT ALL DATA OCTAL
```

```
002274                    ER200:                        ;THIS IS THE STARTING POINT FOR ERROR MESSAGES 201
                                                        ;THROUGH 277.  THEY ARE USED FOR MULTIPLE ERROR MESSAGES.
                          ;ITEM 201
002274  051752                      .WORD   EM57        ;BUFFER DATA NOT CORRECT
002276  053776                      .WORD   DH57        ;                   CHECK   CHECK   INPUT   INPUT
                                                        ;TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR
002300  055536                      .WORD   DT57        ;$TESTN,$ERRPC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
002302  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 202
002304  052347                      .WORD   EM202       ;CSR PATTERN NOT CORRECT
002306  054645                      .WORD   DH202       ;TEST #  ERR PC  CSRADR  PATLDD  CSREXP  CSRRCV
002310  055710                      .WORD   DT202       ;$TESTN,$ERRPC,CSR,BUT,ECSR,RCSR,0
002312  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 203
002314  050402                      .WORD   EM26        ;BIT PATTERN TEST FAILED IN BAR
002316  053424                      .WORD   DH26        ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
002320  055434                      .WORD   DT26        ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
002322  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 204
002324  050441                      .WORD   EM27        ;WCR DATA PATTERN NOT CORRECT
002326  053350                      .WORD   DH23        ;TEST #  ERR PC  WCRADR  WCREXP  WCRCONTENTS
002330  055420                      .WORD   DT23        ;$TESTN,$ERRPC,WCR,EWCR,RWCR,0
002332  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 205
002334  050773                      .WORD   EM36        ;BDR PATTERN NOT CORRECT
002336  053500                      .WORD   DH34        ;TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS
002340  055450                      .WORD   DT34        ;$TESTN,$ERRPC,BDR,EBDR,RBDR,0
002342  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 206
002344  051631                      .WORD   EM53        ;WCR NOT EQUAL TO ZERO
002346  055064                      .WORD   DH210       ;TEST #  ERR PC  WCRADR  WCRCONTENTS
002350  055760                      .WORD   DT210       ;$TESTN,$ERRPC,WCR,RWCR,0
002352  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 207
002354  051657                      .WORD   EM54        ;BAR IS WRONG
002356  053424                      .WORD   DH26        ;TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS
002360  055434                      .WORD   DT26        ;$TESTN,$ERRPC,BAR,EBAR,RBAR,
002362  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 210
002364  051714                      .WORD   EM56        ;DATA NOT TRANSFERED CORRECTLY
002366  053717                      .WORD   DH56        ;TEST #  ERR PC  NPR1AD  NPR1EX  NPR1RC  CSRADR
002370  055520                      .WORD   DT56        ;$TESTN,$ERRPC,ANPR1,ENPR1,NPR1,CSR,0
002372  000000                      .WORD   0           ;PRINT ALL DATA OCTAL

                          ;ITEM 211
002374  052377                      .WORD   EM211       ;BDR AND-OR WCR AND-OR BAR ARE INCORECT
002376  055130                      .WORD   DH211       ;TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BDREXP  BDRRCV  BAREXP  BAR
002400  055772                      .WORD   DT211       ;$TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
002402  000000                      .WORD   0           ;PRINT ALL DATA OCTAL
```

```
                                   ;ITEM 212
     002404  051352                         .WORD   EM46    ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
     002406  053274                         .WORD   DH17    ;TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS
     002410  055404                         .WORD   DT17    ;$TESTN,$ERRPC,CSR,ECSR,RCSR,0
     002412  000000                         .WORD   0       ;PRINT ALL DATA OCTAL
```

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

 002414  000000                QTYBRD: .WORD   0         ;TOTAL # DR11 BOARDS BEING TESTED (DEFAULT = 0)

 002416                        REGADR: .BLKW   16.       ;TOTAL: 16 LOCATIONS FOR BOARD ADDRESSES
 002456                        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
                               ;;*************************************************************
 002516  000000                WCR:    .WORD   0
 002520  000000                BAR:    .WORD   0
 002522  000000                CSR:    .WORD   0
 002524  000000                BDR:    .WORD   0
 002526  000000                DRINV:  .WORD   0
 002530  000000                DRVS:   .WORD   0
 002532  000000                SDRINV: .WORD   0
 002534  000000                SDRVS:  .WORD   0
                               ;;*************************************************************
                               ;DO NOT INSERT ANY ITEMS BETWEEN ANY OF THE LOCATIONS ABOVE
                               ;;*************************************************************
 002536  000000                BUT:    .WORD   0         ;BIT(S) UNDER TEST LOCATION
 002540  000000                LEVEL:  .WORD   0         ;BR LEVEL LOCATION
 002542  000000                BDVECT: .WORD   0
 002544  000000                DEVMSK: .WORD   0
 002546  000000                TABINX: .WORD   0
 002550  000000                DREG:   .WORD   0
 002552  000000                DRLEV:  .WORD   0
 002554  000000                NXTTST: .WORD   0
 002556  000000                PASCNT: .WORD   0

 002560  000000                RCSR:   .WORD   0         ;CSR ACTUALLY READ FROM DEVICE UNDER TEST
 002562  000000                REIR:   .WORD   0         ;EIR ACTUALLY READ FROM DEVICE UNDER TEST
 002564  000000                RBDR:   .WORD   0         ;BDR ACTUALLY READ FROM DEVICE UNDER TEST
 002566  000000                RBAR:   .WORD   0         ;BAR ACTUALLY READ FROM DEVICE UNDER TEST
 002570  000000                RWCR:   .WORD   0         ;WCR ACTUALLY READ FROM DEVICE UNDER TEST

 002572  000000                ECSR:   .WORD   0         ;CSR EXPECTED
 002574  000000                EEIR:   .WORD   0         ;EIR EXPECTED
 002576  000000                EBDR:   .WORD   0         ;BDR EXPECTED
 002600  000000                EBAR:   .WORD   0         ;BAR EXPECTED
 002602  000000                EWCR:   .WORD   0         ;WCR EXPECTED
 002604  000000                ENPR1:  .WORD   0         ;EXPECTED OF NPR1
 002606  002612                ANPR1:  .WORD   NPR1      ;ADDRESS OF NPR1
 002610  000000                BORW:   .WORD   0
 002612  052525                NPR1:   .WORD   52525
 002614  173000                DIOMEM: .WORD   173000
 002616  042644                INBUF:  .WORD   XINBUF
 002620  043646                CHKBUF: .WORD   XCHKBU
 002622  000000                BUFLEN: .WORD   0
```

```
   3560 002624  000000               LENCHK: .WORD   0
   3561 002626  000000               BRWAIT: .WORD   0
   3562 002630  000000               WCLEN:  .WORD   0
   3563 002632  000000               RDYCHK: .WORD   0
   3564 002634  177560               TKS:    .WORD   177560
   3565 002636  177562               TKB:    .WORD   177562
   3566 002640  177564               TPS:    .WORD   177564
   3567 002642  177566               TPB:    .WORD   177566
   3568 002644  000000               MSG:    .WORD   0
   3569 002646  000000               ADDR:   .WORD   0
   3570 002650  000000               MESSAG: .WORD   0
   3571 002652  000000               FLAG:   .WORD   0
   3572 002654  000000               FNCCNT: .WORD   0
   3573 002656  000000               INBUF1: .WORD   0
   3574 002660  000000               TIME:   .WORD   0       ;GENERAL PURPOSE TIMER
   3575 002662  000000               LOOP:   .WORD   0       ;GENERAL PURPOSE LOOP COUNTER
   3576 002664  000000               ANSWER: .WORD   0
   3577 002666  000000               BDFAIL: .WORD   0
   3578 002670  000000               MANSIZ: .WORD   0
   3579 002672  000000               OLDPC1: .WORD   0       ;LOCATION TO STORE RETURN PC IN SUBROUTINES WITH ERROR CALLS
   3580 002674  000000               OLDPS1: .WORD   0       ;LOCATION TO STORE PS
   3581 002676  000000               OLDPC2: .WORD   0       ;LOCATION TO STORE RETURN PC IN SUBROUTINES WITH ERROR CALLS
   3582 002700  000000               OLDPS2: .WORD   0       ;LOCATION TO STORE PS
   3583 002702  000000               OFL:    .WORD   0       ;FIRST CHAR FLAG
   3584 002704  000000               LRGSTC: .WORD   0       ;LOCATION FOR LARGEST NUMBER CHARACTER FOR THE READ SUBROUTINE
   3585 002706  000000               EOPLOC: .WORD   0       ;LOCATION TO HOLD FLAG DECIDING IF EOP MSGS ARE TO BE PRINTED
   3586 002710  000000               BITTST: .WORD   0       ;LOCATION TO PUT THE BIT STATE TO PRINT - USED BY SUBROUTINE PSTATE
   3587 002712  000000               MEMGMT: .WORD   0       ;LOCATION TO HOLD FLAG SAYING MEMORY MANAGEMENT IS AVAILABLE
   3588 002714  000000               ERRCNT: .WORD   0       ;LOCATION TO HOLD TOTAL ERRORS FOR A PARTICULAR TEST
   3589 002716  000000               $PASS2: .WORD   0       ;LOCATION TO HOLD OVERFLOW PASS NUMBER
```

```
                                 .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  032555                           TSTB    CHARCT          ;SEE IF A CHARACTER WAS INPUTED DURING PRINTING
002730  001406                                   BEQ     1$              ;BRANCH TO INPUT A CHARACTER IF NOT
002732  113737  032555  002664                   MOVB    CHARCT,ANSWER   ;MOVE THE CHARACTER TO THE ANSWER LOCATION
002740  105037  032555                           CLRB    CHARCT          ;CLEAR THAT GUY
002744  000403                                   BR      2$              ;GO CHECK IT OUT
002746  104410                          1$:      RDCHR                   ;GET A CHARACTER
002750  012637  002664                           MOV     (SP)+,ANSWER    ;POP INPUTED CHARACTER OFF STACK
002754  022737  000003  002664          2$:      CMP     #CNTLC,ANSWER   ;SEE IF A ^C WAS INPUTED
002762  001003                                   BNE     3$              ;BRANCH AROUND ITS PRINTING IF NOT
002764  104401  037175                           TYPE    ,CNTRLC         ;TYPE:  '^C'
002770  000453                                   BR      6$              ;KICK OUT OF THIS ROUTINE
002772  022737  000033  002664          3$:      CMP     #ESC,ANSWER     ;SEE IF AN <ESC> WAS INPUTED
003000  001003                                   BNE     4$              ;BRANCH AROUND ITS PRINTING IF NOT
003002  104401  037064                           TYPE    ,ESCAPE         ;TYPE:  '<ESC>'
003006  000444                                   BR      6$              ;KICK OUT OF THIS ROUTINE
003010  113737  002664  037173          4$:      MOVB    ANSWER,LETNCR   ;MOVE CHARACTER FOR PRINTING
003016  104401  037173                           TYPE    ,LETNCR         ;GO TYPE THE INPUTED CHARACTER
003022  022737  000057  002664                   CMP     #'/,ANSWER      ;SEE IF A NON-NUMERIC/ALPH CHARACTER WAS INPUTED
003030  100016                                   BPL     5$              ;BRANCH TO R4 TEST IF SO
003032  123737  002704  002664                   CMPB    LRGSTC,ANSWER   ;SEE IF A NON-OCTAL/NUMERIC CHARACTER WAS INPUTED
003040  100427                                   BMI     6$              ;BRANCH TO EXIT IF SO
003042  013746  002664                           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  002704          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  002664                   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 $EOP AND ENDEV TO SAVE THE UNIT NUMBER,
                                   ;*      PASS NUMBER, AND TOTAL ERRORS FOR THAT DEVICE/PASS FOR SAVING WHENEVER
                                   ;*      A DEVICE PASS CONTAINS ERRORS.
                                   ;*
                                   ;;***************************************************************
003126  022737  047132  044650     ERCAPT: CMP     #ENDSTK,CAPNTR  ;SEE IF STACK IS FULL OF BULL
003134  001414                             BEQ     1$              ;KICK OUT IF FULL
003136  013700  044650                     MOV     CAPNTR,R0       ;MOVE CAPNTR CONTENTS TO R0
003142  013720  001422                     MOV     $UNIT,(R0)+     ;PUT UNIT NUMBER ON STACK
003146  013720  002716                     MOV     $PASS2,(R0)+    ;PUT OVERFLOW PASS NUMBER ON STACK
003152  013720  001416                     MOV     $PASS,(R0)+     ;PUT PASS NUMBER ON STACK
003156  013720  001312                     MOV     $ERTTL,(R0)+    ;PUT TOTAL ERRORS ON STACK
003162  010037  044650                     MOV     R0,CAPNTR       ;RESTORE CAPNTR TO NEW POINTER VALUE
003166  000207                     1$:     RTS     PC              ;EXIT
```

```
3676                                          .SBTTL  SUBROUTINE TO FILL ALL TABLE BOARD ENTRIES
3677                                    ;;******************************************************************
3678                                    ;*
3679                                    ;*      THIS SUBROUTINE FILLS ALL TABLE BOARD ENTRIES FOR THE ADDRESSES AND
3680                                    ;*      VECTORS FROM THE VALUES IN 'REGADR' AND 'VECADR', AND SHOULD BE SET
3681                                    ;*      UP BEFORE ENTERING THIS SUBROUTINE.
3682                                    ;*
3683                                    ;;******************************************************************
3684 003170  005037  001466             FIXTBL: CLR     $DEVM             ;CLEAR THE DEVICE MASK
3685 003174  000261                             SEC                       ;SET THE CARRY BIT AND
3686 003176  006137  001466                     ROL     $DEVM             ;ROTATE IT INTO $DEVM FOR 1 BOARD
3687 003202  022737  000001  002414             CMP     #1,QTYBRD         ;SEE IF ONLY 1 BOARD PRESENT
3688 003210  001433                             BEQ     2$                ;KICK OUT IF SO - TABLE DOESN'T NEED FILLING
3689 003212  013701  002414                     MOV     QTYBRD,R1         ;FILL ALL TABLE BOARD ENTRIES FROM FIRST
3690 003216  005301                             DEC     R1                ;DECREMENT SINCE 1ST POSITION IS ALREADY FILLED
3691 003220  005002                             CLR     R2                ;CLEAR INDEX TO SEND POINTER
3692 003222  012703  000002                     MOV     #2,R3             ;PUT 2 IN INDEX TO RECEIVE POINTER
3693 003226  000261                     1$:     SEC                       ;SET THE CARRY BIT AND
3694 003230  006137  001466                     ROL     $DEVM             ;ROTATE IT INTO $DEVM
3695         002416                     RA=REGADR                 ;REDEFINE REGADR AS RA FOR SPACE REASONS
3696 003234  016263  002416  002416             MOV     RA(R2),RA(R3)     ;TRANSFER ADDRESS TO NEXT POSITION AND
3697 003242  062763  000010  002416             ADD     #10,RA(R3)        ;ADD 10 FOR NEXT POSITION
3698         002456                     VA=VECADR                 ;REDEFINE VECADR AS VA FOR SPACE REASONS
3699 003250  016263  002456  002456             MOV     VA(R2),VA(R3)     ;TRANSFER VECTOR TO NEXT POSITION AND
3700 003256  062763  000010  002456             ADD     #10,VA(R3)        ;ADD 10 FOR NEXT POSITION
3701 003264  013763  001474  001474             MOV     $DDW0,$DDW0(R3)   ;MOVE DEVICE DESCRIPTOR WORD TO NEXT POSITION
3702 003272  022223                             CMP     (R2)+,(R3)+       ;UPDATE INDEX POINTERS
3703 003274  005301                             DEC     R1                ;DECREMENT THE LOOP COUNTER
3704 003276  001353                             BNE     1$                ;BRANCH BACK IF NOT DONE
3705 003300  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.
                              ;*
                              ;;*******************************************************************
003302  013702  002616        LODBUF: MOV     INBUF,R2        ;MOVE STARTING ADDRESS OF INBUF TO R2
003306  013703  002622                MOV     BUFLEN,R3       ;MOVE LOOP COUNTER TO R3
003312  005203                        INC     R3              ;CORRECT COUNTER
003314  005001                        CLR     R1              ;CLEAR THE LOADING COUNTER
003316  010122                1$:     MOV     R1,(R2)+        ;LOAD NEXT BUFFER WORD
003320  005201                        INC     R1              ;INCREMENT THE LOADING COUNTER
003322  005303                        DEC     R3              ;DECREMENT THE LOOP COUNTER AND
003324  001374                        BNE     1$              ;BRANCH BACK IF NOT DONE
003326  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.
                                 ;*
                                 ;;*********************************************************************
 003330  013702  002620          CHKBFF: MOV     CHKBUF,R2       ;STARTING ADDRESS OF CHECK-BUFFER TO R2
 003334  013701  002622                  MOV     BUFLEN,R1       ;MOVE LOOP COUNTER TO R1
 003340  005003                          CLR     R3              ;WIPE OUT R3
 003342  010322                  1$:     MOV     R3,(R2)+        ;MOVE R3 TO CHKBUF ADDRESS AND INC BY 2
 003344  010322                          MOV     R3,(R2)+        ;MOVE R3 TO NEXT CHKBUF ADDRESS AND INC BY 2
 003346  022341                          CMP     (R3)+,-(R1)     ;ADD 2 TO NUMBER FOR BUFFER & SUBTRACT 2 FROM LOOP COUNTER
 003350  005701                          TST     R1              ;SEE IF R1 HAS REACHED ZERO YET
 003352  001373                          BNE     1$              ;BRANCH BACK IF NOT DONE
 003354  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
                                        ;*
                                        ;;*****************************************************************
003356  042777  000100  177136  INTA:   BIC     #IE,@CSR        ;CLEAR IE
003364  013702  002622                  MOV     BUFLEN,R2       ;BUFFER LENGTH TO R2
003370  063702  002622                  ADD     BUFLEN,R2       ;NUMBER OF XFERS TIMES 2
003374  063702  002616                  ADD     INBUF,R2        ;CORRECT BAR
003400  017737  177116  002560          MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
003406  032737  010000  002560          BIT     #MA,RCSR        ;SEE IF WE ARE IN MAINTENANCE MODE
003414  001005                          BNE     1$              ;BRANCH AROUND CABLE TEST IF WE ARE, BIT 0 WILL BE CLEAR
003416  032737  000004  002720          BIT     #BIT2,DDW       ;SEE IF THERE IS A CABLE
003424  001401                          BEQ     1$              ;BRANCH IF NO CABLE
003426  005202                          INC     R2              ;CABLE MODE TESTING LEAVES BIT 0 OF BAR SET. CHECK ODD ADRS
003430  017737  177064  002566  1$:     MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
003436  005037  002602                  CLR     EWCR            ;CLEAR EXPECTED LOCATION
003442  010237  002600                  MOV     R2,EBAR         ;MOVE EXPECTED DATA TO EBAR
003446  013737  002560  002572          MOV     RCSR,ECSR       ;MOVE EXPECTED DATA TO ECSR
003454  042737  100000  002572          BIC     #ER,ECSR        ;MAKE SURE ERROR BIT IS CLEAR
003462  052737  000200  002572          BIS     #RY,ECSR        ;MAKE SURE READY BIT IS SET
003470  017737  177022  002570          MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
003476  001012                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003500  023737  002560  002572          CMP     RCSR,ECSR       ;DOES CSR CONTAIN WHAT IT SHOULD
003506  001006                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003510  023737  002566  002600          CMP     RBAR,EBAR       ;DOES BAR CONTAIN WHAT IT SHOULD
003516  001002                          BNE     2$              ;BRANCH TO RETURN WITHOUT UPDATING PC SO ERROR WILL CALL
003520  062716  000002                  ADD     #2,(SP)         ;CORRECT PC RETURN TO AFTER THE ERROR CALL
003524  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
                                        ;*
                                        ;;*******************************************************************
 003526  011637  001362                 DATCHK: MOV     (SP),$TMP1             ;SAVE PC RETURN
 003532  013702  002620                         MOV     CHKBUF,R2              ;STARTING ADDRESS OF CHECK BUFFER TO R2
 003536  013703  002616                         MOV     INBUF,R3               ;STARTING ADDRESS OF IN BUFFER TO R3
 003542  005037  002624                         CLR     LENCHK                 ;CLEAR LENGTH CHECK
 003546  005237  002624                 DATCH1: INC     LENCHK                 ;MAKE A COMPARISON
 003552  022223                                 CMP     (R2)+,(R3)+            ;IS THE DATA CORRECT?
 003554  001423                                 BEQ     DATCH2                 ;BRANCH IF OK
 003556  013716  001362                         MOV     $TMP1,(SP)             ;RESTORE ORIGINAL PC RETURN
 003562  016237  177776  001364                 MOV     -2(R2),$TMP2           ;MOVE CHECK BUFFER CONTENTS TO $TMP2
 003570  010237  001370                         MOV     R2,$TMP4               ;MOVE ADDRESS +2 TO $TMP4
 003574  162737  000002  001370                 SUB     #2,$TMP4               ;CORRECT SO IT POINTS TO ADDRESS CAUSING ERROR
 003602  016337  177776  001366                 MOV     -2(R3),$TMP3           ;MOVE INPUT BUFFER CONTENTS TO $TMP3
 003610  010337  001372                         MOV     R3,$TMP5               ;MOVE ADDRESS +2 TO $TMP5
 003614  162737  000002  001372                 SUB     #2,$TMP5               ;CORRECT SO IT POINTS TO ADDRESS CAUSING ERROR
 003622  000410                                 BR      DATCHX                 ;RETURN TO ERROR CALL - PC ON STACK ALREADY POINTS THERE
 003624  023737  002624  002622         DATCH2: CMP     LENCHK,BUFLEN          ;SEE IF THE BUFFER HAS BEEN CHECKED
 003632  001345                                 BNE     DATCH1                 ;GO BACK FOR ANOTHER TRY IF NOT
 003634  013716  001362                         MOV     $TMP1,(SP)             ;RESTORE PC RETURN
 003640  062716  000006                         ADD     #6,(SP)                ;CORRECT IT SO RETURN IS AFTER THE ERROR CALL
 003644  000207                         DATCHX: RTS     PC                     ;RETURN
```

```
  3810                                           .SBTTL  SUBROUTINE TO RESTORE DR11 INT VECT & SET CPU PRIORITY TO 7.
  3811                                   ;;*******************************************************************
  3812                                   ;*
  3813                                   ;*      THIS ROUTINE IS USED IN VARIOUS TESTS TO CLEAR ANY DATA THAT
  3814                                   ;*      MAY BE LEFT IN ANY REGISTERS, AND RESTORE CPU PRIORITY TO 7.
  3815                                   ;*
  3816                                   ;;*******************************************************************
  3817 003646  012737  000340  177776  CLENUP: MOV     #LEVEL7,PSW     ;RESTORE CPU TO PRIORITY LEVEL 7
  3818 003654  012777  010000  176640          MOV     #MA,@CSR        ;DO AN INIT CLEARING WCR, BAR & BDR BY SETTING
  3819 003662  005077  176634                  CLR     @CSR            ;AND CLEARING THE MAINT BIT AND CLEAR THE CSR
  3820 003666  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.
                                        ;*
                                        ;;*******************************************************************
003670  032737  000004  002720          CHKCAB: BIT     #BIT2,DDW       ;CHECK FOR CABLE STATUS
003676  001006                                  BNE     1$              ;EXIT IF CABLE DOES EXIST
003700  052737  127000  002572                  BIS     #127000,ECSR    ;SET BITS 12, 10, 8, 7 & 6 - CABLE DOESN'T EXIST
003706  052737  127000  002536                  BIS     #127000,BUT     ;SET BITS 12, 10, 8, 7 & 6 IN BITS UNDER TEST LOCATION TOO
003714  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 DONE
                                        ;*
                                        ;;****************************************************************
 003716  011637  001362                 DATOCK: MOV     (SP),$TMP1      ;SAVE PC RETURN
 003722  012702  052525                         MOV     #52525,R2       ;DATO NUMBER TO R2
 003726  013703  002616                         MOV     INBUF,R3        ;STARTING ADDRESS OF IN BUFFER TO R3
 003732  005037  002624                         CLR     LENCHK          ;CLEAR LENGTH CHECK
 003736  005237  002624                 DATOC1: INC     LENCHK          ;MAKE A COMPARISON
 003742  020223                                 CMP     R2,(R3)+        ;IS THE DATA CORRECT?
 003744  001415                                 BEQ     DATOC2          ;BRANCH IF OK
 003746  013716  001362                         MOV     $TMP1,(SP)      ;MOVE OLD PC RETURN TO STACK
 003752  010237  001364                         MOV     R2,$TMP2        ;MOVE EXPECTED DATA TO $TMP2
 003756  016337  177776  001366                 MOV     -2(R3),$TMP3    ;MOVE RECEIVED DATA TO $TMP3
 003764  010337  001370                         MOV     R3,$TMP4        ;MOVE ADDRESS +2 TO $TMP4
 003770  162737  000002  001370                 SUB     #2,$TMP4        ;CORRECT ADDRESS SO IT POINTS TO ADDRESS CAUSING ERROR
 003776  000431                                 BR      DATOCX          ;RETURN TO ERROR CALL
 004000  023737  002624  002622         DATOC2: CMP     LENCHK,BUFLEN   ;SEE IF THE BUFFER HAS BEEN CHECKED
 004006  001353                                 BNE     DATOC1          ;BUFFER CHECKED?
 004010  020223                                 CMP     R2,(R3)+        ;CHECK END OF BUFFER + 1
 004012  001017                                 BNE     1$              ;BRANCH IF NOT LOADED
 004014  010237  001364                         MOV     R2,$TMP2        ;MOVE EXPECTED DATA TO $TMP2
 004020  016337  177776  001366                 MOV     -2(R3),$TMP3    ;MOVE RECEIVED DATA TO $TMP3
 004026  010337  001370                         MOV     R3,$TMP4        ;MOVE ADDRESS +2 TO $TMP4
 004032  162737  000002  001370                 SUB     #2,$TMP4        ;CORRECT ADDRESS SO IT POINTS TO ADDRESS CAUSING ERROR
 004040  013716  001362                         MOV     $TMP1,(SP)      ;CORRECT PC RETURN
 004044  062716  000006                         ADD     #6,(SP)         ;POINT TO 2ND ERROR CALL AFTER JSR PC,DATOCK
 004050  000404                                 BR      DATOCX          ;RETURN TO ERROR CALL
 004052  013716  001362                 1$:     MOV     $TMP1,(SP)      ;RESTORE RETURN ADDRESS
 004056  062716  000010                         ADD     #10,(SP)        ;POINT TO PROPER RETURN AFTER THE ERROR CALLS
 004062  000207                         DATOCX: 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
                                        ;*
                                        ;;*****************************************************************
004064  042777  000100  176430          ERRCHK: BIC     #IE,@CSR        ;CLEAR IE
004072  017737  176424  002560                  MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR
004100  013737  002560  002572                  MOV     RCSR,ECSR       ;MOVE EXPECTED DATA TO ECSR
004106  042737  100000  002572                  BIC     #ER,ECSR        ;CLEAR THE ERROR BIT
004114  052737  000200  002572                  BIS     #RY,ECSR        ;SET THE READY BIT
004122  013701  002560                          MOV     RCSR,R1         ;MOVE DATA TO R1 FOR CHECKING
004126  012737  000200  001360                  MOV     #RY,$TMPO       ;MOVE EXPECTED DATA TO $TMPO
004134  042701  077577                          BIC     #77577,R1       ;CLEAR ALL BUT THE ERROR AND READY BITS
004140  022701  000200                          CMP     #RY,R1          ;SEE IF ERROR BIT IS CLEAR AND READY IS SET
004144  001002                                  BNE     1$              ;BRANCH AROUND PC CORRECTION SO ERROR WILL CALL
004146  062716  000002                          ADD     #2,(SP)         ;CORRECT PC RETURN - DATA OK
004152  000207                          1$:     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.
                                        ;*
                                        ;;*******************************************************************
004154  012700  004216                  BPINIT: MOV     #BPTINT,R0          ;POINT R0 TO TABLE OF BPT INIT LOCATIONS
004160  012701  000003                          MOV     #3,R1               ;DO 3 SETS OF ".+2" AND 'BPT'' SETUPS
004164  012002                          1$:     MOV     (R0)+,R2            ;MOVE START ADDRESS TO R2
004166  012003                                  MOV     (R0)+,R3            ;MOVE END ADDRESS TO R3
004170  010204                                  MOV     R2,R4               ;MOVE ADDRESS TO R4
004172  005724                                  TST     (R4)+               ;INCREMENT R4 TO PRODUCE THE ".+2" NUMBER
004174  010422                          2$:     MOV     R4,(R2)+            ;MOVE THE NUMBER TO THE LOCATION
004176  012722  000003                          MOV     #BPT,(R2)+          ;MOVE 'BPT'' TO THE NEXT LOCATION
004202  022424                                  CMP     (R4)+,(R4)+         ;ADD 4 TO R4
004204  020203                                  CMP     R2,R3               ;SEE IF WE HAVE DONE ALL FOR THIS LOCATION
004206  001372                                  BNE     2$                  ;BRANCH BACK FOR ANOTHER TRANSFER IF NOT
004210  005301                                  DEC     R1                  ;DECREMENT R1
004212  001364                                  BNE     1$                  ;BRANCH BACK IF 3 GROUPS NOT DONE
004214  000207                                  RTS     PC                  ;EXIT

004216  000004  000014  000050          BPTINT: .WORD   4,14,50             ;ADDRESSES USED TO PUT ".+2" & 'BPT'' BACK
004224  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. (ADDED TO REV 'F'): ALSO DOES A MINI-TEST OF THE CSR TO MAKE
                                           ;*      SURE BOARD IS A DR11, EXITING WITH A MODIFIED RETURN IF IT FAILS THIS
                                           ;*      MINI-TEST.
                                           ;*
                                           ;;*******************************************************************
004232   012737   000340   002540   DRGET:  MOV     #LEVEL7,LEVEL     ;MOVE PRIORITY 7 TO LEVEL
004240   012703   004732                    MOV     #LEVELS,R3        ;MOVE ADDRESS OF PRIORITY LEVELS TO R3
004244   012704   000004                    MOV     #4,R4             ;DO 4 PRIORITY CHECKS
004250   012737   000400   002660   1$:     MOV     #400,TIME         ;SET UP WAIT LOOP COUNTER
004256   012710   010000                    MOV     #MA,(R0)          ;SET THE MAINTENANCE BIT AND
004262   005010                             CLR     (R0)              ;CLEAR TO DO AN INIT
004264   013737   000014   001362           MOV     BPTVCT,$TMP1      ;SAVE BPT TRAP VECTOR
004272   012737   004520   000014           MOV     #9$,BPTVCT        ;INTERRUPTS TO 9$
004300   012337   177776                    MOV     (R3)+,PSW         ;SET CPU PRIORITY TO NEXT LEVEL
004304   000240                             NOP                       ;KILL A LITTLE TIME
004306   012710   000105                    MOV     #IE+F2+GO,(R0)    ;SET IE, FNCT2 AND GO ATTEMPTING AN INTERRUPT
004312   005337   002660            2$:     DEC     TIME              ;DECREMENT TIME
004316   001375                             BNE     2$                ;BRANCH BACK UNTIL ZERO
004320   012737   000340   177776           MOV     #LEVEL7,PSW       ;SET CPU PRIORITY BACK TO 7
004326   013737   001362   000014           MOV     $TMP1,BPTVCT      ;RESTORE BPT TRAP VECTOR
004334   162737   000040   002540           SUB     #40,LEVEL         ;PUT LOCATION 'LEVEL' AT NEXT PRIORITY - INTERRUPT FAILED
004342   005304                             DEC     R4                ;DECREMENT LOOP COUNTER
004344   001341                             BNE     1$                ;BRANCH BACK IF NOT ALL PRIORITY LEVELS CHECKED YET
                                           ;;*******************************************************************
                                           ; IF ROUTINE GETS HERE AND YOU ARE NOT IN A MANUFACTURING ENVIRONMENT, AND
                                           ; IT IS A DR11, YOU PROBABLY HAVE A BAD BOARD.  PROMPTING USER FOR THE VECTOR
                                           ; WILL ALLOW ONE MORE OPORTUNITY TO CHECK THE DR11 WITHOUT HAVING TO GO INTO
                                           ; MANUAL MODE.  IT IS EVEN *MORE* IMPORTANT FOR THE USER TO *MAKE*SURE* THE
                                           ; REST OF THE DATA (I.E. CABLE STATE, ETC.) IS AS THE MODULE IS SET UP.
                                           ;;*******************************************************************
004346   132737   000001   001430   3$:     BITB    #BIT0,$ENV        ;SEE IF WE ARE UNDER APT                   ;DPM001
004354   001165                             BNE     14$               ;BRANCH OUT IF SO                          ;DPM001
004356   032777   010000   174754           BIT     #BIT12,@SWR       ;IS THIS A MANUFACTURING ENVIRONMENT?      ;DPM001
004364   001161                             BNE     14$               ;BRANCH IF SO - ASSUMED TO NOT BE A DR11;DPM001
004366   104401   004742                    TYPE    ,ASK4VC           ;TYPE:  'INPUT VECTOR ? '                  ;DPM001
004372   012703   000003                    MOV     #3,R3             ;EXPECT 3 DIGITS                           ;DPM001
004376   004737   002722                    JSR     PC,READ           ;GO READ VECTOR INPUT                      ;DPM001
004402   020427   000300                    CMP     R4,#300           ;SEE IF VECTOR INPUTED IS BELOW 300        ;DPM001
004406   100403                             BMI     4$                ;BRANCH IF LESS THAN 300                   ;DPM001
004410   022704   000774                    CMP     #774,R4           ;SEE IF VECTOR IS ABOVE 774                ;DPM001
004414   100003                             BPL     5$                ;BRANCH IF NOT TO LOAD INFO                ;DPM001
004416   104401   004762            4$:     TYPE    ,OUTORG           ;TYPE:  'VFCTOR OUT OF 300-774 RANGE'      ;DPM001
004422   000751                             BR      3$                ;BRANCH BACK FOR ANOTHER TRY               ;DPM001
004424   032704   000003            5$:     BIT     #3,R4             ;MAKE SURE BITS 0 & 1 ARE CLEAR            ;DPM001
004430   001403                             BEQ     55$               ;BRANCH IF OK                              ;DPM001
004432   104401   005017                    TYPE    ,NOTVEC           ;TYPE:  'VECTOR IS NOT A MULTIPLE OF 4'    ;DPM001
004436   000743                             BR      3$                ;BRANCH BACK FOR ANOTHER TRY               ;DPM001
004440   010412                     55$:    MOV     R4,(R2)           ;MOVE INPUTED VECTOR TO LOCATION           ;DPM001
004442   104401   005056            6$:     TYPE    ,ASK4PR           ;TYPE:  'INPUT BOARD BR PRIORITY'          ;DPM001
004446   012703   000001                    MOV     #1,R3             ;EXPECT 1 DIGIT                            ;DPM001
004452   004737   002722                    JSR     PC,READ           ;GO GET PRIORITY                           ;DPM001
004456   022704   000003                    CMP     #3,R4             ;SEE IF INPUT IS BELOW 4                   ;DPM001
```

```
  3979 004462  100003                             BPL     7$                    ;BRANCH IF SO TO TELL USER IT IS WRONG  ;DPM001
  3980 004464  020427  000007                     CMP     R4,#7                 ;SEE IF INPUT IS ABOVE 7                ;DPM001
  3981 004470  100403                             BMI     8$                    ;BRANCH TO LOAD DATA IF OK              ;DPM001
  3982 004472  104401  005107          7$:        TYPE    ,PROUT                ;TYPE:  'PRIORITY OUT OF 4-7 RANGE'     ;DPM001
  3983 004476  000761                             BR      6$                    ;BRANCH BACK TO TRY AGAIN               ;ᴜPM001
  3984 004500  006304                  8$:        ASL     R4                    ;SHIFT LEVEL OVER 5 PLACES              ;DPM001
  3985 004502  006304                             ASL     R4                    ;                                       ;DPM001
  3986 004504  006304                             ASL     R4                    ;                                       ;DPM001
  3987 004506  006304                             ASL     R4                    ;                                       ;DPM001
  3988 004510  006304                             ASL     R4                    ;                                       ;DPM001
  3989 004512  010437  002540                     MOV     R4,LEVEL              ;PUT PRI LEVEL INTO THE LEVEL LOCATION  ;DPM001
  3990 004516  000410                             BR      10$                   ;BRANCH OVER DR11 INTERRUPT HANDLER     ;DPM001
  3991 004520  012737  000340  177776  9$:        MOV     #LEVEL7,PSW           ;SET CPU PRIORITY BACK TO 7
  3992 004526  011612                             MOV     (SP),(R2)             ;MOVE VECTOR+4 TO VECTOR LOCATION       ;DPM001
  3993 004530  162712  000004                     SUB     #4,(R2)               ;VECTOR IS WRONG - CORRECT IT
  3994 004534  062706  000010                     ADD     #10,SP                ;CLEAN STACK                            ;DPM001
  3995 004540  013711  002540          10$:       MOV     LEVEL,(R1)            ;STORE THE OBTAINED PRIORITY LEVEL      ;DPM001
  3996 004544  013737  001362  000014             MOV     $TMP1,BPTVCT          ;RESTORE BPT TRAP VECTOR
  3997 004552  000261                             SEC                           ;SET THE CARRY BIT FOR THE 'ROL'        ;DPM001
  3998 004554  006137  001466                     ROL     $DEVM                 ;INDICATE DEVICE EXISTENCE IN DEVICE MAP
  3999 004560  005237  002414                     INC     QTYBRD                ;INCREMENT DEVICE COUNT
  4000 004564  052710  100000                     BIS     #EIR,(R0)             ;GO TO EIR TO GET B/W STATE
  4001 004570  011037  002562                     MOV     (R0),REIR             ;MOVE EIR TO REIR
  4002 004574  005010                             CLR     (R0)                  ;GO BACK TO CSR
  4003 004576  012710  010000                     MOV     #MA,(R0)              ;SET THE MAINT BIT
  4004 004602  005010                             CLR     (R0)                  ;DO AN INIT
  4005 004604  032737  000001  002562             BIT     #BIT0,REIR            ;TEST FOR B/W STATE
  4006 004612  001003                             BNE     11$                   ;BRANCH IF A W
  4007 004614  052711  000001                     BIS     #BIT0,(R1)            ;SET STATE IN DEVICE DESCRIPTOR WORD
  4008 004620  000406                             BR      12$                   ;GO TO CABLE STATUS TEST
  4009 004622  032737  000400  002562  11$:       BIT     #N2,REIR              ;CHECK 2/N CYCLE STATE
  4010 004630  001402                             BEQ     12$                   ;BRANCH IF 2 CYCLE
  4011 004632  052711  000002                     BIS     #BIT1,(R1)            ;N CYCLE - SET BIT IN DEVICE DESC
  4012 004636  011037  002560          12$:       MOV     (R0),RCSR             ;MOVE RECEIVED DATA TO RCSR TO GET CABLE STATUS
  4013 004642  032737  127000  002560             BIT     #127000,RCSR          ;CHECK IF ANY BITS ARE SET - THEY ARE IF NO CABLE
  4014 004650  001015                             BNE     13$                   ;BRANCH IF NO CABLE
  4015 004652  112710  000004                     MOVB    #F2,(R0)              ;CABLE IS POSSIBLY IN - SET FNCT2
  4016 004656  011037  002560                     MOV     (R0),RCSR             ;MOVE RECEIVED DATA TO RCSR
  4017 004662  052710  010000                     BIS     #MA,(R0)              ;SET THE MAINTENANCE BIT
  4018 004666  005010                             CLR     (R0)                  ;CLEAR THE CSR TO DO AN INIT
  4019 004670  032737  020000  002560             BIT     #AT,RCSR              ;TEST THE ATTN BIT
  4020 004676  001402                             BEQ     13$                   ;BRANCH IF NOT SET - NO CABLE
  4021 004700  052711  000004                     BIS     #BIT2,(R1)            ;SET CABLE BIT IN DEVICE DESC
  4022 004704  013704  006122          13$:       MOV     BDNUMB,R4             ;MOVE BOARD NUMBER TO R4                ;DPM001
  4023 004710  005304                             DEC     R4                    ;DECREMENT FOR CORRECT OFFSET           ;DPM001
  4024 004712  006304                             ASL     R4                    ;SHIFT LEFT TO PRODUCE WORD OFFSET      ;DPM001
  4025 004714  010064  002416                     MOV     R0,REGADR(R4)         ;MOVE CSR ADDRESS TO LOCATION AND       ;DPM001
  4026 004720  162764  000004  002416             SUB     #4,REGADR(R4)         ;SUB 4 TO FORM ADDRESS FOR THIS MODULE  ;DPM001
  4027 004726  022122                             CMP     (R1)+,(R2)+           ;R1 & R2 GET NEW DEVICE & VECTOR LOC'S  ;DPM001
  4028 004730  000207                  14$:       RTS     PC                    ;EXIT
  4029
  4030 004732  000300  000240          LEVELS:    .WORD   LEVEL6,LEVEL5         ;PRIORITY LEVELS TO LOAD INTO THE PSW
  4031 004736  000200  000140                     .WORD   LEVEL4,LEVEL3
  4032 004742     111     116     120  ASK4VC:    .ASCIZ  ¦INPUT VECTOR ? ¦                                             ;DPM001
  4033 004762     126     105     103  OUTORG:    .ASCIZ  ¦VECTOR OUT OF 300-774 RANGE¦<CRLF>                           ;DPM001
  4034 005017     126     105     103  NOTVEC:    .ASCIZ  ¦VECTOR IS NOT A MULTIPLE OF 4¦<CRLF>                         ;DPM001
  4035 005056     111     116     120  ASK4PR:    .ASCIZ  ¦INPUT BOARD BR PRIORITY ¦                                    ;DPM001
```

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   4036 005107     120     122     111  PROUT:  .ASCIZ  !PRIORITY OUT OF 4-7 RANGE!<CRLF>                    ;DPM001
   4037                                         .EVEN
```

```
                                                 .SBTTL  SUBROUTINE TO PRINT THE AUTOSIZED BOARD CONFIGURATIONS
                                        ;;****************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE PRINTS THE BOARD CONFIGURATIONS FOUND BY ASIZE
                                        ;*
                                        ;;****************************************************************
005142  005037  002662                  TYPCNF: CLR     LOOP                    ;CLEAR THE BOARD NUMBER COUNTER
005146  013705  001466                          MOV     $DEVM,R5                ;GET DEVICE MAP
005152  012701  002416                          MOV     #REGADR,R1              ;MOVE THE ADDRESS OF THE REGISTER ADDRESS TABLE TO R1
005156  012702  002456                          MOV     #VECADR,R2              ;MOVE THE ADDRESS OF THE VECTOR ADDRESS TABLE TO R2
005162  005003                                  CLR     R3                      ;CLEAR THE DEVICE DESCRIPTOR ADDRESS POINTER
005164  104401  037535                          TYPE    ,NOBUT                  ;TYPE:  'NO. BOARDS UNDER TEST:  '
005170  013746  002414                          MOV     QTYBRD,-(SP)            ;MOVE THE QUANTITY TO THE STACK FOR TYPEOUT
005174  104405                                  TYPDS                           ;TYPE THE NUMBER
005176  104401  037574                          TYPE    ,BRVWPC                 ;TYPE THE HEADER
005202  012700  000020                          MOV     #16.,R0                 ;SET UP LOOP COUNTER FOR 16 BOARDS
005206  032705  000001                  1$:     BIT     #BIT0,R5                ;DEVICE UNDER TEST?
005212  001466                                  BEQ     8$                      ;BRANCH IF NO
005214  013746  002662                          MOV     LOOP,-(SP)              ;PUT BOARD # ON STACK FOR TYPEOUT
005220  104405                                  TYPDS                           ;PRINT BOARD # (0 TO 16)
005222  104401  037361                          TYPE    ,SPACE6                 ;TYPE 6 SPACE CHARACTERS
005226  011146                                  MOV     (R1),-(SP)              ;SAVE REGISTER ADDRESS FOR TYPEOUT
005230  104402                                  TYPOC                           ;PRINT DEVICE REGISTER ADDRESS
005232  104401  037361                          TYPE    ,SPACE6                 ;TYPE 6 SPACE CHARACTERS
005236  011246                                  MOV     (R2),-(SP)              ;SAVE VECTOR ADDRESS FOR TYPEOUT
005240  104403                                  TYPOS                           ;PRINT VECTOR ADDRESS
005242     003     000                          .BYTE   3,0                     ;PRINT 3 DIGITS, LEADING ZEROS SUPPRESSED
005244  104401  037370                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005250  016337  001474  002720                  MOV     $DDW0(R3),DDW           ;MOVE DEVICE DESCRIPTOR WORD TO DDW
005256  032737  000001  002720                  BIT     #BIT0,DDW               ;TEST WHICH STATE, B OR W, FOR THIS BOARD
005264  001403                                  BEQ     2$                      ;GO PRINT W STATE IF W
005266  104401  037405                          TYPE    ,B                      ;TYPE A 'B'
005272  000402                                  BR      3$                      ;GO TO NEXT CHECK
005274  104401  037407                  2$:     TYPE    ,W                      ;'TYPE A 'W'
005300  104401  037370                  3$:     TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005304  004737  006560                          JSR     PC,PNTPRI               ;PRINT DEVICE PRIORITY
005310  104401  037370                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005314  032737  000002  002720                  BIT     #BIT1,DDW               ;TEST 2/N CYCLE STATE
005322  001403                                  BEQ     4$                      ;GO PRINT 2 STATE IF 2
005324  104401  037422                          TYPE    ,N                      ;TYPE AN 'N'
005330  000402                                  BR      5$                      ;GO TO NEXT CHECK
005332  104401  037420                  4$:     TYPE    ,TWO                    ;TYPE A '2'
005336  104401  037370                  5$:     TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
005342  032737  000004  002720                  BIT     #BIT2,DDW               ;TEST CABLE STATE
005350  001403                                  BEQ     6$                      ;GO PRINT 'NO' IF NO CABLE
005352  104401  037414                          TYPE    ,YES                    ;TYPE 'YES'
005356  000402                                  BR      7$                      ;GO TO LOOP CHECK
005360  104401  037411                  6$:     TYPE    ,NO                     ;TYPE 'NO'
005364  104401  001405                  7$:     TYPE    ,$CRLF                  ;TYPE A <CRLF>
005370  005237  002662                  8$:     INC     LOOP                    ;INCREMENT BOARD COUNT FOR POSSIBLE NEXT PASS
005374  022122                                  CMP     (R1)+,(R2)+             ;INCREMENT COUNTERS
005376  006205                                  ASR     R5                      ;SHIFT R5 TO THE RIGHT TO MOVE BOARD BIT INTO BIT 0
005400  062703  000002                          ADD     #2,R3                   ;ADD 2 TO THE DEVICE DESCRIPTOR WORD POINTER
005404  005300                                  DEC     R0                      ;DECREMENT THE LOOP COUNTER AND
005406  001277                                  BNE     1$                      ;BRANCH BACK FOR CHECK IF 16 BOARDS NOT DONE
005410  104401  001405                          TYPE    ,$CRLF                  ;TYPE ANOTHER <CRLF>
005414  000207                                  RTS     PC                      ;EXIT
```

```
                                        .SBTTL  SUBROUTINE TO AUTO SIZE DR11 BOARD CONFIGURATION
                                ;;************************************************************
                                ;*
                                ;*      THIS SUBROUTINE AUTOSIZES THE BOARD CONFIGURATION IF PROMPTED BY THE
                                ;*      USER THAT SYSTEM IS OPERATING UNDER AN OPTION MANUFACTURING CONFIGURA-
                                ;*      TION (NO OTHER DEVICES HAVING CSR'S SIMILAR TO THAT OF A DR11), OR
                                ;*      PROMPTS USER FOR EACH DR11 ADDRESS (SEMI-AUTOSIZE).  IT THEN CALLS FOR
                                ;*      THE PRINTING OF THE CONFIGURATION IF THE TABLE WAS MADE BY THIS ROUTINE.
                                ;*
                                ;;************************************************************
005416  004737  004154          ASIZE:  JSR     PC,BPINIT       ;GO RESET THE ".+2" AND 'BPT" LOCATIONS
005422  013737  000004  002672          MOV     TOVECT,OLDPC1   ;SAVE TIMEOUT VECTOR
005430  012737  005724  000004          MOV     #7$,TOVECT      ;TIMEOUTS TO 7$
005436  013737  000006  002674          MOV     TMOPSW,OLDPS1   ;SAVE TIMEOUT PS
005444  012737  000340  000006          MOV     #340,TMOPSW     ;TIMEOUT PRIORITY TO 7
005452  132737  000001  001430          BITB    #BIT0,$ENV      ;SEE IF WE ARE UNDER APT                ;DPM001
005460  001004                          BNE     100$            ;BRANCH OUT IF SO                       ;DPM001
005462  032777  010000  173650          BIT     #BIT12,@SWR     ;DOES USER WANT 100% AUTOSIZE?          ;DPM001
005470  001416                          BEQ     1$              ;BRANCH IF NOT                          ;DPM001
005472  005037  002414          100$:   CLR     QTYBRD          ;CLEAR DEVICE COUNT                     ;DPM001
005476  005037  001466                  CLR     $DEVM           ;CLEAR THE DEVICE MAP                   ;DPM001
005502  012737  000001  006122          MOV     #1,BDNUMB       ;START WITH BOARD NUMBER 1              ;DPM001
005510  012700  160014                  MOV     #160014,R0      ;MOVE START ADDRESS OF WINDOW TO R0     ;DPM001
005514  012701  001474                  MOV     #$DDW0,R1       ;LOAD DEVICE DESC ADDRESS               ;DPM001
005520  012702  002456                  MOV     #VECADR,R2      ;POINT R2 TO UNIT #1 VECTOR ADRS LOC    ;DPM001
005524  000524                          BR      10$             ;GO START THE DR11 SEARCH               ;DPM001
005526  005737  002414          1$:     TST     QTYBRD          ;SEE IF TABLE HAS BEEN LOADED           ;DPM001
005532  001414                          BEQ     2$              ;BRANCH TO LOAD TABLE IF NOT            ;DPM001
005534  104401  006401                  TYPE    ,DYWTLT         ;TYPE:  'DO YOU WISH TO CHANGE          ;DPM001
                                                                ;        THE CONFIGURATION (Y OR <CR>)' ;DPM001
005540  012703  000001                  MOV     #1,R3           ;EXPECT 1 CHARACTER                     ;DPM001
005544  004737  002722                  JSR     PC,READ         ;GO READ 1 CHARACTER OF USER INPUT      ;DPM001
005550  022737  000131  002664          CMP     #'Y,ANSWER      ;WAS A <Y> INPUTED?                     ;DPM001
005556  001156                          BNE     13$             ;BRANCH OUT OF ROUTINE IF NOT           ;DPM001
005560  005037  002414                  CLR     QTYBRD          ;CLEAR DEVICE COUNT
005564  012700  001474          2$:     MOV     #$DDW0,R0       ;MOVE ADDRESS OF 1ST DDW TO R0
005570  012701  000020                  MOV     #16.,R1         ;CLEAR 16 WORDS
005574  005020                  3$:     CLR     (R0)+           ;CLEAR THE WORD
005576  005301                          DEC     R1              ;DECREMENT THE LOOP COUNTER AND
005600  001375                          BNE     3$              ;BRANCH BACK IF NOT DONE YET
005602  005037  001466                  CLR     $DEVM           ;CLEAR DEVICE MAP
005606  012737  000001  006122          MOV     #1,BDNUMB       ;START WITH 1 BOARD                     ;DPM001
005614  012701  001474                  MOV     #$DDW0,R1       ;LOAD DEVICE DESC ADDRESS               ;DPM001
005620  012702  002456                  MOV     #VECADR,R2      ;POINT R2 TO UNIT #1 VECTOR ADRS LOC    ;DPM001
005624  012737  000067  002704          MOV     #'7,LRGSTC      ;MOVE ASCII 7 TO LRGSTC FOR OCTAL INPUT ;DPM001
005632  104401  006124          4$:     TYPE    ,INDEV          ;TYPE:  'INPUT DEVICE '                 ;DPM001
005636  013746  006122                  MOV     BDNUMB,-(SP)    ;SAVE BDNUMB FOR TYPEOUT                ;DPM001
005642  104403                          TYPOS                   ;TYPE THE BOARD NUMBER                  ;DPM001
005644     002                          .BYTE   2               ;TYPE 2 DIGITS                          ;DPM001
005645     000                          .BYTE   0               ;SUPPRESS LEADING ZEROS                 ;DPM001
005646  104401  006142                  TYPE    ,STAD           ;TYPE:  'STARTING ADDRESS               ;DPM001
                                                                ;        (<CR> IF NO MORE)'             ;DPM001
005652  012703  000006                  MOV     #6,R3           ;EXPECT 6 DIGITS                        ;DPM001
005656  004737  002722                  JSR     PC,READ         ;GO READ THE USER'S INPUT               ;DPM001
005662  005704                          TST     R4              ;SEE IF AN INPUT WAS MADE               ;DPM001
005664  001505                          BEQ     12$             ;BRANCH OUT IF NO MORE                  ;DPM001
005666  022704  160010                  CMP     #160010,R4      ;SEE IF ADDRESS IS TOO LOW              ;DPM001
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005672  103003                            BHIS    5$                ;BRANCH TO REPORT ERROR INPUT IF SO       ;DPM001
005674  022704  172770                    CMP     #172770,R4        ;SEE IF ADDRESS IS TOO HIGH               ;DPM001
005700  103003                            BHIS    6$                ;BRANCH IF OK                             ;DPM001
005702  104401  006255           5$:      TYPE    ,OUTRAN           ;TYPE:  'ADDRESS OUT OF 160010-172770     ;DPM001
                                                                    ;       RANGE - TRY AGAIN'                ;DPM001
005706  000751                            BR      4$                ;GO DECREMENT BDNUM AND TRY AGAIN         ;DPM001
005710  032704  000007           6$:      BIT     #7,R4             ;SEE THAT ADDRESS IS A START ADDRESS      ;DPM001
005714  001425                            BEQ     9$                ;BRANCH IF OK                             ;DPM001
005716  104401  006335                    TYPE    ,NOTST            ;TYPE:  'NOT A STARTING ADDRESS -         ;DPM001
                                                                    ;       TRY AGAIN'                        ;DPM001
005722  000743                            BR      4$                ;GO DECREMENT BDNUM AND TRY AGAIN         ;DPM001
005724  022626                   7$:      CMP     (SP)+,(SP)+       ;CORRECT STACK AFTER TIMEOUT
005726  132737  000001  001430            BITB    #BIT0,$ENV        ;SEE IF WE ARE UNDER APT                  ;DPM001
005734  001004                            BNE     75$               ;BRANCH OUT IF NOT                        ;DPM001
005736  032777  010000  173374            BIT     #BIT12,@SWR       ;SEE IF UNDER MANUFACTURING ENVIRONMENT   ;DPM001
005744  001406                            BEQ     8$                ;BRANCH IF NOT                            ;DPM001
005746  062700  000010           75$:     ADD     #10,R0            ;MOVE TO NEXT MODULE ADDRESS              ;DPM001
005752  022700  173004                    CMP     #173004,R0        ;HAVE WE LOOKED OUT THE ENTIRE WINDOW?    ;DPM001
005756  001007                            BNE     10$               ;BRANCH IF NOT - MORE DAYDREAMING         ;DPM001
005760  000447                            BR      12$               ;BRANCH TO EXIT - BOSS JUST CAME IN       ;DPM001
005762  104401  006207           8$:      TYPE    ,NOBD             ;TYPE:  'CAN'T SEE THE DR11 BOARD -       ;DPM001
                                                                    ;       TRY AGAIN'                        ;DPM001
005766  000721                            BR      4$                ;BRANCH BACK FOR NEW INPUT                ;DPM001
005770  010400                   9$:      MOV     R4,R0             ;MOVE CHECKED ADDRESS TO R0               ;DPM001
005772  062700  000004                    ADD     #4,R0             ;MAKE R0 ADDRESS THE CSR                  ;DPM001
005776  005010                   10$:     CLR     (R0)              ;MAKE SURE IT IS THERE                    ;DPM001
006000  010146                            MOV     R1,-(SP)          ;SAVE PRESENT VALUE OF R1 ON THE STACK    ;DPM001
006002  004737  004232                    JSR     PC,DRGET          ;GO EXTRACT INFO FROM THE DR11
006006  020126                            CMP     R1,(SP)+          ;WAS THE LOCATION A DR11?                 ;DPM001
006010  001010                            BNE     11$               ;BRANCH TO BOARD INCREMENT IF SO          ;DPM001
006012  132737  000001  001430            BITB    #BIT0,$ENV        ;SEE IF WE ARE UNDER APT                  ;DPM001
006020  001022                            BNE     110$              ;BRANCH OUT IF SO                         ;DPM001
006022  032777  010000  173310            BIT     #BIT12,@SWR       ;IS THIS A MANUFACTURING CONFIGURATION?   ;DPM001
006030  001754                            BEQ     8$                ;GO CALL ERROR IF NOT                     ;DPM001
006032  022737  000020  006122   11$:     CMP     #16.,BDNUMB       ;SEE IF THE TABLE IS FULL                 ;DPM001
006040  001417                            BEQ     12$               ;EXIT IF SO                               ;DPM001
006042  005237  006122                    INC     BDNUMB            ;INCREMENT BOARD NUMBER                   ;DPM001
006046  132737  000001  001430            BITB    #BIT0,$ENV        ;SEE IF WE ARE UNDER APT                  ;DPM001
006054  001004                            BNE     110$              ;BRANCH OUT IF SO                         ;DPM001
006056  032777  010000  173254            BIT     #BIT12,@SWR       ;SEE IF UNDER MANUFACTURING ENVIRONMENT   ;DPM001
006064  001662                            BEQ     4$                ;BRANCH IF NOT                            ;DPM001
006066  062700  000010           110$:    ADD     #10,R0            ;MOVE TO NEXT MODULE ADDRESS              ;DPM001
006072  022700  173004                    CMP     #173004,R0        ;HAVE WE LOOKED OUT THE ENTIRE WINDOW?    ;DPM001
006076  001337                            BNE     10$               ;BRANCH IF NOT - MORE DAYDREAMING         ;DPM001
006100  013737  002674  000006   12$:     MOV     OLDPS1,TMOPSW     ;RESTORE TIMEOUT PS
006106  013737  002672  000004            MOV     OLDPC1,TOVECT     ;RESTORE TIMEOUT VECTOR
006114  004737  005142           13$:     JSR     PC,TYPCNF         ;GO TYPE THE BOARD CONFIGURATIONS
006120  000207                            RTS     PC                ;EXIT

006122  000000                   BDNUMB:  .WORD   0                 ;LOCATION TO HOLD BOARD NUMBER                          ;DPM001
006124     111     116     120   INDEV:   .ASCIZ  |INPUT DEVICE |                                                           ;DPM001
006142     040     123     124   STAD:    .ASCIZ  | STARTING ADDRESS (<CR> IF NO MORE) |                                    ;DPM001
006207     103     101     116   NOBD:    .ASCIZ  |CAN'T SEE THE DR11 BOARD - TRY AGAIN|<CRLF>                              ;DPM001
006255     101     104     104   OUTRAN:  .ASCIZ  |ADDRESS OUT OF 160010-172770 RANGE - TRY AGAIN|<CRLF>                    ;DPM001
006335     116     117     124   NOTST:   .ASCIZ  |NOT A STARTING ADDRESS - TRY AGAIN|<CRLF>                                ;DPM001
006401     104     117     040   DYWTLT:  .ASCIZ  |DO YOU WISH TO CHANGE THE CONFIGURATION (Y OR <CR>) |                    ;DPM001
                                          .EVEN
```

```
                                                  .SBTTL  ROUTINE TO REPORT UNEXPECTED OR ERRONEOUS TRAPS OR INTERRUPTS
                                          ;;*******************************************************************
                                          ;*
                                          ;*      THIS IS THE ROUTINE TO REPORT UNEXPECTED OR ERRONEOUS TRAPS OR INTERRUPTS
                                          ;*
                                          ;;*******************************************************************
     006466  012737  000340  177776  CATCH:  MOV     #LEVEL7,PSW       ;REESTABLISH CPU PRIORITY AT 7
     006474  012637  002542                  MOV     (SP)+,BDVECT      ;GET ADDRESS OF TRAP VECTOR + 4
     006500  012637  002674                  MOV     (SP)+,OLDPS1      ;SAVE PS
     006504  012637  002676                  MOV     (SP)+,OLDPC2      ;SAVE PC OF ADDRESS OF INSTRUCTION CAUSING TRAP
     006510  012637  002700                  MOV     (SP)+,OLDPS2      ;SAVE 2ND PS
     006514  162737  000004  002542          SUB     #4,BDVECT         ;ADJUST TO POINT TO TRAP ADDRESS
     006522  104050                          ERROR   +50               ;UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW
     006524  013746  002700                  MOV     OLDPS2,-(SP)      ;RESTORE PS RETURN ON STACK
     006530  013746  002676                  MOV     OLDPC2,-(SP)      ;RESTORE PC RETURN ON STACK
     006534  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.
                                        ;*
                                        ;;*******************************************************************
006536  005046                          PSTATE: CLR     -(SP)           ;SHOW STATE AS ZERO INITIALLY
006540  033737  002710  002720                  BIT     BITTST,DDW      ;CHECK STATE OF BIT IN DDW USING BIT SET IN BITTST
006546  001401                                  BEQ     1$              ;BRANCH IF NOT SET
006550  005216                                  INC     (SP)            ;SHOW A '1' STATE FOR THAT BIT
006552  104403                          1$:     TYPOS                   ;TYPE THE STATE, LEADING ZEROS SUPPRESSED
006554     001     000                          .BYTE   1,0             ;TYPE 1 CHARACTER, SUPPRESS LEADING ZEROS
006556  000207                                  RTS     PC              ;EXIT
```

```
                                          .SBTTL  SUBROUTINE TO PRINT DEVICE PRIORITY
                                ;;*******************************************************************
                                ;*
                                ;*        THIS SUBROUTINE PRINTS THE DEVICE PRIORITY
                                ;*
                                ;;*******************************************************************
006560  013746  002720          PNTPRI: MOV     DDW,-(SP)          ;PUT DEVICE DESCRIPTOR WORD ON STACK
006564  006216                          ASR     (SP)               ;SHIFT RIGHT STACK LOCATION 5 PLACES
006566  006216                          ASR     (SP)
006570  006216                          ASR     (SP)
006572  006216                          ASR     (SP)
006574  006216                          ASR     (SP)
006576  042716  177770                  BIC     #177770,(SP)       ;MASK TO GET PRIORITY
006602  104403                          TYPOS                      ;TYPE THE DEVICE PRIORITY
006604     001     000                  .BYTE   1,0                ;TYPE 1 CHARACTER, SUPPRESS LEADING ZEROS
006606  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
                                         ;*
                                         ;;*******************************************************************
 006610  011637  001360                  SETTUP: MOV     (SP),$TMPO      ;SAVE RETURN ADDRESS
                                         .SBTTL  INITIALIZE THE COMMON TAGS
                                         ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
 006614  012706  001300                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
 006620  005026                                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
 006622  022706  001340                          CMP     #SWR,R6 ;;DONE?
 006626  001374                                  BNE     .-6             ;;LOOP BACK IF NO
 006630  012706  001300                          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                         ;;INITIALIZE A FEW VECTORS
 006634  012737  031200  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
 006642  012737  000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
 006650  012737  032656  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
 006656  012737  000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
 006664  012737  031112  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
 006672  012737  000340  000036                  MOV     #340,@#TRAPVEC+2;LEVEL 7
 006700  012737  034074  000024                  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
 006706  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
 006714  013737  026102  026074                  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
 006722  005037  001376                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
 006726  112737  000001  001315                  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
 006734  012737  006734  001306                  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
 006742  012737  006742  001310                  MOV     #.,$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.
 006750  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
 006754  012737  007010  000004                  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
 006762  012737  177570  001340                  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
 006770  012737  177570  001342                  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
 006776  022777  177777  172334                  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
 007004  001012                                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                         ;;AND  THE HARDWARE SWR IS NOT = -1
 007006  000403                                  BR      65$             ;;BRANCH IF NO TIMEOUT
 007010  012716  007016                  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
 007014  000002                                  RTI
 007016  012737  000176  001340          65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
 007024  012737  000174  001342                  MOV     #DISPREG,DISPLAY
 007032  012637  000004                  66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
 007036  005037  001416                          CLR     $PASS           ;;CLEAR PASS COUNT
 007042  132737  000200  001431                  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
 007050  001403                                  BEQ     67$             ;;YES,USE NON-APT SWITCH
 007052  012737  001432  001340                  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
 007060                                  67$:
 007060  013746  001360                          MOV     $TMPO,-(SP)     ;PUT RETURN ADDRESS ON STACK AND
 007064  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.
                                        ;*
                                        ;;**********************************************************************
007066  005737  002712                  TSTMM:  TST     MEMGMT          ;TEST TO SEE IF MEMORY MANAGEMENT EXISTS
007072  001440                                  BEQ     4$              ;BRANCH IF NOT
007074  012737  000401  007104                  MOV     #CY+GO,1$       ;SET UP BIT TEST DATA
007102  040227                                  BIC     R2,(PC)+        ;TEST TO SEE IF BOTH THE CYCLE AND GO BITS ARE SET
007104  000401                          1$:     .WORD   CY+GO           ;LOCATION TO STORE THE CYCLE AND GO BITS
007106  001032                                  BNE     4$              ;KICK OUT IF CYCLE AND/OR GO ARE CLEAR
007110  032737  000060  002572                  BIT     #X6+X7,ECSR     ;SEE IF XBA16 OR XBA17 WERE SET IN EXPECTED DATA
007116  001426                                  BEQ     4$              ;BRANCH OUT IF NOT
007120  032737  000040  002572                  BIT     #X7,ECSR        ;SEE IF XBA17 IS SET
007126  001005                                  BNE     2$              ;GO CHECK STATUS OF XBA16 IF SET
007130  132737  000001  002713                  BITB    #BIT0,MEMGMT+1  ;SEE IF 200000+NOCARE WAS FOUND TO EXIST - IF NOT,
007136  001420                                  BEQ     5$              ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
007140  000415                                  BR      4$              ;BRANCH OUT IF LOCATION EXISTS
007142  032737  000020  002572  2$:     BIT     #X6,ECSR        ;SEE IF XBA16 IS SET
007150  001005                                  BNE     3$              ;BRANCH TO CHECK 600000+NOCARE IF SET
007152  132737  000002  002713                  BITB    #BIT1,MEMGMT+1  ;SEE IF 400000+NOCARE WAS FOUND TO EXIST - IF NOT,
007160  001407                                  BEQ     5$              ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
007162  000404                                  BR      4$              ;BRANCH OUT IF LOCATION EXISTS
007164  132737  000004  002713  3$:     BITB    #BIT2,MEMGMT+1  ;SEE IF 600000+NOCARE WAS FOUND TO EXIST - IF NOT,
007172  001402                                  BEQ     5$              ;GO SET EXPECTED ERROR AND NEX BITS AND CHECK FOR ERROR
007174  062716  000002          4$:     ADD     #2,(SP)         ;CORRECT PC RETURN
007200  000207                  5$:     RTS     PC              ;KICK OUT
```

```
4296                                       .SBTTL  BIT PATTERN
4297                               ;;*************************************************************
4298                               ;*
4299                               ;*      THIS IS A BIT PATTERN TABLE THAT CAN BE USED TO CHECK ANY LOCATION FOR
4300                               ;*      ALL COMBINATIONS OF STUCK AND/OR SHORTED BITS.
4301                               ;*
4302                               ;;*************************************************************
4303
4304              000002                   .RADIX  2                  ;THIS ENABLES YOU TO SEE THE PATTERNS IN BINARY
4305 007202       177777          PATRNS: .WORD   1111111111111111   ;ALL SET BITS
4306 007204       000000                  .WORD   0000000000000000   ;ALL CLEAR BITS
4307 007206       052525                  .WORD   0101010101010101   ;EVEN BITS SET, ODD BITS CLEAR
4308 007210       125252                  .WORD   1010101010101010   ;ODD BITS SET, EVEN BITS CLEAR
4309 007212       031463                  .WORD   0011001100110011   ;PAIRS OF BITS SET
4310 007214       007417                  .WORD   0000111100001111   ;GROUPS OF 4 BITS SET
4311 007216       000377                  .WORD   0000000011111111   ;UPPER BYTE CLEAR, LOWER BYTE SET
4312              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.
                                       ;*
                                       ;;******************************************************************

       007220                          MAICLR: ; X=      0    1    2    3      4      5      6      7
       007220  000200  000000  001202          .WORD     0200,0000,1202,1002,122204,122204,123206,123206   ;CSR 00000X EXPECTED
       007240  004210  004010  005212          .WORD     4210,4010,5212,5012,126214,126214,127216,127216   ;CSR 00001X EXPECTED
       007260  000220  000020  001222          .WORD     0220,0020,1222,1022,122224,122224,123226,123226   ;CSR 00002X EXPECTED
       007300  004230  004030  005232          .WORD     4230,4030,5232,5032,126234,126234,127236,127236   ;CSR 00003X EXPECTED
       007320  000240  000040  001242          .WORD     0240,0040,1242,1042,122244,122244,123246,123246   ;CSR 00004X EXPECTED
       007340  004250  004050  005252          .WORD     4250,4050,5252,5052,126254,126254,127256,127256   ;CSR 00005X EXPECTED
       007360  000260  000060  001262          .WORD     0260,0060,1262,1062,122264,122264,123266,123266   ;CSR 00006X EXPECTED
       007400  004270  004070  005272          .WORD     4270,4070,5272,5072,126274,126274,127276,127276   ;CSR 00007X EXPECTED
       007420  000300  000100  001302          .WORD     0300,0100,1302,1102,122304,022104,123306,023106   ;CSR 00010X EXPECTED
       007440  004310  004110  005312          .WORD     4310,4110,5312,5112,126314,026114,127316,027116   ;CSR 00011X EXPECTED
       007460  000320  000120  001322          .WORD     0320,0120,1322,1122,122324,022124,123326,023126   ;CSR 00012X EXPECTED
       007500  004330  004130  005332          .WORD     4330,4130,5332,5132,126334,026134,127336,027136   ;CSR 00013X EXPECTED
       007520  000340  000140  001342          .WORD     0340,0140,1342,1142,122344,022144,123346,023146   ;CSR 00014X EXPECTED
       007540  004350  004150  005352          .WORD     4350,4150,5352,5152,126354,026154,127356,027156   ;CSR 00015X EXPECTED
       007560  000360  000160  001362          .WORD     0360,0160,1362,1162,122364,022164,123366,023166   ;CSR 00016X EXPECTED
       007600  004370  004170  005372          .WORD     4370,4170,5372,5172,126374,026174,127376,027176   ;CSR 00017X EXPECTED
       007620  000600  000200  001602          .WORD     0600,0200,1602,1202,122604,122604,123606,123606   ;CSR 00040X EXPECTED
       007640  004610  004210  005612          .WORD     4610,4210,5612,5212,126614,126614,127616,127616   ;CSR 00041X EXPECTED
       007660  000620  000220  001622          .WORD     0620,0220,1622,1222,122624,122624,123626,123626   ;CSR 00042X EXPECTED
       007700  004630  004230  005632          .WORD     4630,4230,5632,5232,126634,126634,127636,127636   ;CSR 00043X EXPECTED
       007720  000640  000240  001642          .WORD     0640,0240,1642,1242,122644,122644,123646,123646   ;CSR 00044X EXPECTED
       007740  004650  004250  005652          .WORD     4650,4250,5652,5252,126654,126654,127656,127656   ;CSR 00045X EXPECTED
       007760  000660  000260  001662          .WORD     0660,0260,1662,1262,122664,122664,123666,123666   ;CSR 00046X EXPECTED
       010000  004670  004270  005672          .WORD     4670,4270,5672,5272,126674,126674,127676,127676   ;CSR 00047X EXPECTED
       010020  000700  000300  001702          .WORD     0700,0300,1702,1302,122704,022304,123706,023306   ;CSR 00050X EXPECTED
       010040  004710  004310  005712          .WORD     4710,4310,5712,5312,126714,026314,127716,027316   ;CSR 00051X EXPECTED
       010060  000720  000320  001722          .WORD     0720,0320,1722,1322,122724,022324,123726,023326   ;CSR 00052X EXPECTED
       010100  004730  004330  005732          .WORD     4730,4330,5732,5332,126734,026334,127736,027336   ;CSR 00053X EXPECTED
       010120  000740  000340  001742          .WORD     0740,0340,1742,1342,122744,022344,123746,023346   ;CSR 00054X EXPECTED
       010140  004750  004350  005752          .WORD     4750,4350,5752,5352,126754,026354,127756,027356   ;CSR 00055X EXPECTED
       010160  000760  000360  001762          .WORD     0760,0360,1762,1362,122764,022364,123766,023366   ;CSR 00056X EXPECTED
       010200  004770  004370  005772          .WORD     4770,4370,5772,5372,126774,026374,127776,027376   ;CSR 00057X EXPECTED
```

```
  4354                                                   .SBTTL  EXPECTED DATA TABLE FOR CSR CHECK TEST 3
  4355
  4356                                                   ; X=       0     1     2     3     4     5     6     7
  4357 010220  010200  010000  011202  MAISET: .WORD   10200,10000,11202,11002,12204,12004,13206,13006   ;CSR 01000X EXPECTED
  4358 010240  014210  014010  015212          .WORD   14210,14010,15212,15012,16214,16014,17216,17016   ;CSR 01001X EXPECTED
  4359 010260  010220  010020  011222          .WORD   10220,10020,11222,11022,12224,12024,13226,13026   ;CSR 01002X EXPECTED
  4360 010300  014230  014030  015232          .WORD   14230,14030,15232,15032,16234,16034,17236,17036   ;CSR 01003X EXPECTED
  4361 010320  010240  010040  011242          .WORD   10240,10040,11242,11042,12244,12044,13246,13046   ;CSR 01004X EXPECTED
  4362 010340  014250  014050  015252          .WORD   14250,14050,15252,15052,16254,16054,17256,17056   ;CSR 01005X EXPECTED
  4363 010360  010260  010060  011262          .WORD   10260,10060,11262,11062,12264,12064,13266,13066   ;CSR 01006X EXPECTED
  4364 010400  014270  014070  015272          .WORD   14270,14070,15272,15072,16274,16074,17276,17076   ;CSR 01007X EXPECTED
  4365 010420  010300  010100  011302          .WORD   10300,10100,11302,11102,12304,12104,13306,13106   ;CSR 01010X EXPECTED
  4366 010440  014310  014110  015312          .WORD   14310,14110,15312,15112,16314,16114,17316,17116   ;CSR 01011X EXPECTED
  4367 010460  010320  010120  011322          .WORD   10320,10120,11322,11122,12324,12124,13326,13126   ;CSR 01012X EXPECTED
  4368 010500  014330  014130  015332          .WORD   14330,14130,15332,15132,16334,16134,17336,17136   ;CSR 01013X EXPECTED
  4369 010520  010340  010140  011342          .WORD   10340,10140,11342,11142,12344,12144,13346,13146   ;CSR 01014X EXPECTED
  4370 010540  014350  014150  015352          .WORD   14350,14150,15352,15152,16354,16154,17356,17156   ;CSR 01015X EXPECTED
  4371 010560  010360  010160  011362          .WORD   10360,10160,11362,11162,12364,12164,13366,13166   ;CSR 01016X EXPECTED
  4372 010600  014370  014170  015372          .WORD   14370,14170,15372,15172,16374,16174,17376,17176   ;CSR 01017X EXPECTED
  4373 010620  010600  011202  011602          .WORD   10600,11202,11602,12204,12604,13206,13606,14210   ;CSR 01040X EXPECTED
  4374 010640  014610  015212  015612          .WORD   14610,15212,15612,16214,16614,17216,17616,10200   ;CSR 01041X EXPECTED
  4375 010660  010620  011222  011622          .WORD   10620,11222,11622,12224,12624,13226,13626,14230   ;CSR 01042X EXPECTED
  4376 010700  014630  015232  015632          .WORD   14630,15232,15632,16234,16634,17236,17636,10220   ;CSR 01043X EXPECTED
  4377 010720  010640  011242  011642          .WORD   10640,11242,11642,12244,12644,13246,13646,14250   ;CSR 01044X EXPECTED
  4378 010740  014650  015252  015652          .WORD   14650,15252,15652,16254,16654,17256,17656,10240   ;CSR 01045X EXPECTED
  4379 010760  010660  011262  011662          .WORD   10660,11262,11662,12264,12664,13266,13666,14270   ;CSR 01046X EXPECTED
  4380 011000  014670  015272  015672          .WORD   14670,15272,15672,16274,16674,17276,17676,10260   ;CSR 01047X EXPECTED
  4331 011020  010700  011302  011702          .WORD   10700,11302,11702,12304,12704,13306,13706,14310   ;CSR 01050X EXPECTED
  4382 011040  014710  015312  015712          .WORD   14710,15312,15712,16314,16714,17316,17716,10300   ;CSR 01051X EXPECTED
  4383 011060  010720  011322  011722          .WORD   10720,11322,11722,12324,12724,13326,13726,14330   ;CSR 01052X EXPECTED
  4384 011100  014730  015332  015732          .WORD   14730,15332,15732,16334,16734,17336,17736,10320   ;CSR 01053X EXPECTED
  4385 011120  010740  011342  011742          .WORD   10740,11342,11742,12344,12744,13346,13746,14350   ;CSR 01054X EXPECTED
  4386 011140  014750  015352  015752          .WORD   14750,15352,15752,16354,16754,17356,17756,10340   ;CSR 01055X EXPECTED
  4387 011160  010760  011362  011762          .WORD   10760,11362,11762,12364,12764,13366,13766,14370   ;CSR 01056X EXPECTED
  4388 011200  014770  015372  015772          .WORD   14770,15372,15772,16374,16774,17376,17776,10360   ;CSR 01057X EXPECTED
```

```
                                          .SBTTL  FUTURE PATCH AREA
                                  ;;***************************************************************
                                  ;*
                                  ;*      THIS AREA IS RESERVED FOR PERMANENT PATCHES WHICH MAY BE INITIATED IN
                                  ;*      THE FUTURE.
                                  ;*
                                  ;;***************************************************************
011220  000000  000000  000000    PATCHS: .WORD   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
011320  000000  000000  000000            .WORD   0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

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

011420  005037  002670                  START1: CLR     MANSIZE         ;CLE4R THE MANSIZE SO WE WILL AUTOSIZE
011424  005037  001416                  START:  CLR     $PASS           ;CLEAR $PASS
011430  005037  026010                          CLR     PREOP           ;CLEAR THE EOP PRINTING FLAG          ;DPM001
011434  005037  002716                          CLR     $PASS2          ;CLEAR $PASS2
011440  005037  001412                          CLR     $FATAL          ;CLEAR ERROR NO.
011444  005037  001410                          CLR     $MSGTYP         ;CLEAR MESSAGE TYPE
011450  005037  001414                          CLR     $TESTN          ;CLEAR TEST NO.
011454  005037  001420                          CLR     $DEVCT          ;CLEAR DEVICE COUNT
011460  005037  001422                          CLR     $UNIT           ;CLEAR UNIT NUMBER
011464  012737  000006  000004                  MOV     #TOVECT+2,TOVECT;INITIALIZE TIMEOUT VECTORS TO 6
011472  012737  000003  000006                  MOV     #BPT,TMOPSW     ;CATCHER ROUTINE
011500  012706  001300                          MOV     #STACK,SP       ;INITIALIZE THE STACK
011504  004737  006610                          JSR     PC,SETTUP       ;GO TC THE SETUP ROUTINE TO INITIALIZE VECTORS
011510  005037  001422                          CLR     $UNIT           ;CLEAR $UNIT
011514  005037  001420                          CLR     $DEVCT          ;CLEAR $DEVCT
011520  005037  001414                          CLR     $TESTN          ;CLEAR $TESTN
011524  005037  002706                          CLR     EOPLOC          ;CLEAR EOPLOC
011530  132737  000001  001430                  BITB    #BIT0,$ENV      ;CHECK IF ON APT
011536  001404                                  BEQ     1$              ;BR IF NOT APT
011540  132737  000200  001431                  BITB    #BIT7,$ENVM     ;DID APT SIZE
011546  001007                                  BNE     2$              ;BR, IF APT SIZED
011550  022737  177777  002670          1$:     CMP     #-1,MANSIZE     ;WAS CONFIGURATION SET UP IN MULT. BOARD ROUTINE?
011556  001446                                  BEQ     BEGIN           ;IF YES, SKIP SELF-SIZING
011560  004737  005416                          JSR     PC,ASIZE        ;AUTOMATICALLY SIZE FOR BOARD CONFIGURATION
011564  000443                                  BR      BEGIN           ;BRANCH
011566  005037  002414                  2$:     CLR     QTYBRD          ;CLEAR  DEVICE CNT
011572  013702  001466                          MOV     $DEVM,R2        ;MOVE DEVICE MAP TO R2
011576  005702                          3$:     TST     R2              ;TEST MSB OF DEVICE MAP
011600  100002                                  BPL     4$              ;BR, IF MSB IS ZERO
011602  005237  002414                          INC     QTYBRD          ;INCREMENT DEVICE COUNT, IF MSB=1
011606  000241                          4$:     CLC                     ;CLEAR THE CARRY BIT FOR THE ROL
011610  006102                                  ROL     R2              ;SHIFT NEXT BIT INTO MSB POSITION
011612  001371                                  BNE     3$              ;CONTINUE CHECKING $DEVM, IF MORE BITS SET
011614  012702  002416                          MOV     #REGADR,R2      ;POINT R2 TO THE DEVICE ADDRESS TABLE
011620  013700  001464                          MOV     $BASE,R0        ;LOAD BASE DEVICE ADDRESS IN R0
011624  012701  000020                          MOV     #16.,R1         ;MOVE LOOP COUNTER TO R1
011630  010022                          5$:     MOV     R0,(R2)+        ;MOVE DEVICE ADDRESS TO TABLE
011632  062700  000010                          ADD     #10,R0          ;POINT R0 TO NEXT DEVICE ADDRESS
011636  005301                                  DEC     R1              ;DECREMENT THE LOOP COUNTER AND
011640  001373                                  BNE     5$              ;BRANCH IF NOT ALL DONE YET
011642  012702  002456                          MOV     #VECADR,R2      ;GET LOCATION OF VECTOR TABLE
011646  013700  001460                          MOV     $VECT1,R0       ;COPY BASE VECTOR
011652  042700  177400                          BIC     #177400,R0      ;CLEAR UPPER BYTE
011656  012701  000020                          MOV     #16.,R1         ;DO 16 VECTORS
011662  010022                          6$:     MOV     R0,(R2)+        ;PUT VECTOR ADDRESS IN TABLE
011664  062700  000010                          ADD     #10,R0          ;POINT R0 TO NEXT VECTOR ADDRESS
011670  005301                                  DEC     R1              ;DECREMENT LOOP COUNTER
011672  001373                                  BNE     6$              ;BRANCH IF NOT ALL DONE YET
```

```
                                                 .SBTTL  DETERMINE MEM MGMT AND UPPER MEMORY EXISTENCE
011674  005737  001416            BEGIN:  TST     $PASS           ;SEE IF THIS IS THE FIRST PASS
011700  001003                            BNE     1$              ;BRANCH IF NOT
011702  005737  002716                    TST     $PASS2          ;SEE IF UPPER LOCATION HAS BEEN SET
011706  001402                            BEQ     2$              ;BRANCH IF SO
011710  000137  012356            1$:     JMP     BEGIN1          ;JUMP TO BEGIN1
011714  005037  002712            2$:     CLR     MEMGMT          ;CLEAR THE MEMORY MANAGEMENT FLAG
011720  013737  000004  002672            MOV     TOVECT,OLDPC1   ;SAVE TIMEOUT VECTOR
011726  012737  012320  000004            MOV     #13$,TOVECT     ;TIMEOUT VECTOR TO 13$
011734  013737  000006  002674            MOV     TMOPSW,OLDPS1   ;SAVE TIMEOUT PS
011742  012737  000340  000006            MOV     #LEVEL7,TMOPSW  ;PS TIMEOUT TO PRIORITY 7
011750  005037  177572                    CLR     MMR0            ;TEST FOR MEMORY MANAGEMENT & TURN IT OFF
011754  105237  002712                    INCB    MEMGMT          ;INCREMENT FLAG SHOWING MEMORY MANAGEMENT EXISTS
011760  012700  172300                    MOV     #KIPDR0,R0      ;MOVE ADDRESS OF 1ST MM REGISTER TO R0
011764  012701  000020                    MOV     #16.,R1         ;DO ALL 16 PDR'S
011770  012737  012010  000004            MOV     #4$,TOVECT      ;TIMEOUTS TO 4$
011776  012720  077406            3$:     MOV     #77406,(R0)+    ;ENABLE THE PDR PAGE
012002  005301                            DEC     R1              ;DECREMENT LOOP COUNTER AND
012004  001374                            BNE     3$              ;BRANCH BACK IF NOT DONE
012006  000403                            BR      5$              ;BRANCH OVER STACK CORRECTION
012010  022626                    4$:     CMP     (SP)+,(SP)+     ;CLEAN STACK AFTER INTERRUPT
012012  012700  172340                    MOV     #KIPAR0,R0      ;POINT R0 TO THE 1ST PAR
012016  012703  000002            5$:     MOV     #2,R3           ;DO 2 SETS OF PAR'S
012022  012737  012062  000004            MOV     #8$,4           ;TIMEOUTS TO 8$
012030  005002                    6$:     CLR     R2              ;START WITH LOAD OF ZERO
012032  012701  000007                    MOV     #7,R1           ;DO 7 REGISTERS
012036  010220                    7$:     MOV     R2,(R0)+        ;LOAD THE PAR
012040  062702  000200                    ADD     #200,R2         ;PUT R2 AT NEXT VALUE
012044  005301                            DEC     R1              ;DECREMENT AND
012046  001373                            BNE     7$              ;BRANCH BACK IF NOT DONE
012050  012720  177600                    MOV     #177600,(R0)+   ;SETUP PAR7
012054  005303                            DEC     R3              ;DECREMENT AND
012056  001364                            BNE     6$              ;BRANCH BACK IF KDPAR'S NOT LOADED
012060  000401                            BR      9$              ;BRANCH OVER STACK CORRECTION
012062  022626                    8$:     CMP     (SP)+,(SP)+     ;CLEAN STACK AFTER TIMEOUT
012064  012737  012232  000004    9$:     MOV     #10$,TOVECT     ;TIMEOUT VECTOR TO 10$                  ;DPM001
012072  013737  000250  002676            MOV     MMVECT,OLDPC2   ;SAVE MEMORY MANAGEMENT VECTOR
012100  012737  012232  000250            MOV     #10$,MMVECT     ;MEMORY MANAGEMENT VECTOR TO 10$
012106  013737  000252  002700            MOV     MMPS,OLDPS2     ;SAVE MEMORY MANAGEMENT PS
012114  012737  000340  000252            MOV     #LEVEL7,MMPS    ;MEMORY MANAGEMENT PS TO PRIORITY 7
012122  005237  177572                    INC     MMR0            ;TURN ON MEMORY MANAGEMENT
012126  012737  002400  172344            MOV     #2400,KIPAR2    ;SET UP KIPAR2 TO ACCESS LOCATION 240000+BITS 12-0 OF NOCARE
012134  012737  002400  172364            MOV     #2400,KDPAR2    ;SET UP KDPAR2 TO ACCESS LOCATION 240000+BITS 12-0 OF NOCARE
012142  005737  056104                    TST     NOCARE          ;SEE IF BITS 12-0 OF NOCARE ADRS +240000 EXISTS
012146  152737  000001  002713            BISB    #BIT0,MEMGMT+1  ;SET BIT 0 OF UPPER BYTE OF MEMGMT IF IT DOES
012154  012737  004400  172344            MOV     #4400,KIPAR2    ;SET UP KIPAR2 TO ACCESS LOCATION 440000+BITS 12-0 OF NOCARE
012162  012737  004400  172364            MOV     #4400,KDPAR2    ;SET UP KDPAR2 TO ACCESS LOCATION 440000+BITS 12-0 OF NOCARE
012170  005737  056104                    TST     NOCARE          ;SEE IF BITS 12-0 OF NOCARE ADRS +440000 EXISTS
012174  152737  000002  002713            BISB    #BIT1,MEMGMT+1  ;SET BIT 1 OF UPPER BYTE OF MEMGMT IF IT DOES
012202  012737  006400  172344            MOV     #6400,KIPAR2    ;SET UP KIPAR2 TO ACCESS LOCATION 640000+BITS 12-0 OF NOCARE
012210  012737  006400  172364            MOV     #6400,KDPAR2    ;SET UP KDPAR2 TO ACCESS LOCATION 640000+BITS 12-0 OF NOCARE
012216  005737  056104                    TST     NOCARE          ;SEE IF BITS 12-0 OF NOCARE ADRS +640000 EXISTS
012222  152737  000004  002713            BISB    #BIT2,MEMGMT+1  ;SET BIT 2 OF UPPER BYTE OF MEMGMT IF IT DOES
012230  000407                            BR      12$             ;BRANCH OVER STACK CORRECTION
012232  027627  000000            10$:    CMP     @0(SP),(PC)+    ;COMPARE NEXT INSTRUCTION WITH A
012236  005737                            TST     @(PC)+          ;TEST MODE 3 INSTRUCTION (THIS IS NOT EXECUTED)
012240  001402                            BEQ     11$             ;BRANCH TO RETURN IF SO
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012242  012716  012250                   MOV     #12$,(SP)         ;FUDGE RETURN TO EXIT IF NOT
012246  000002                   11$:    RTI                       ;RETURN
012250  005037  177572           12$:    CLR     MMR0              ;TURN OFF MEMORY MANAGEMENT
012254  012737  012300  000004           MOV     #125$,TOVECT      ;TIMEOUT TO 125$                  ;DPM001
012262  012737  000400  172344           MOV     #400,KIPAR2       ;RESTORE PAGE 2                   ;DPM001
012270  012737  000400  172364           MOV     #400,KDPAR2       ;RESTORE PAGE 2                   ;DPM001
012276  000401                           BR      126$              ;BRANCH OVER STACK CLEANUP        ;DPM001
012300  022626                   125$:   CMP     (SP)+,(SP)+       ;CLEANUP THE STACK                ;DPM001
012302  013737  002700  000252   126$:   MOV     OLDPS2,MMPS       ;RESTORE MEMORY MANAGEMENT PS
012310  013737  002676  000250           MOV     OLDPC2,MMVECT     ;RESTORE MEMORY MANAGEMENT VECTOR
012316  000402                           BR      14$               ;BRANCH OVER STACK CORRECTION
012320  062706  000004           13$:    ADD     #4,SP             ;CORRECT STACK AFTER TIMEOUT
012324  013737  002674  000006   14$:    MOV     OLDPS1,TMOPSW     ;RESTORE TIMEOUT PS
012332  013737  002672  000004           MOV     OLDPC1,TOVECT     ;RESTORE TIMEOUT VECTOR
012340  104401  041302                   TYPE    ,M1               ;TYPE:  '(^X) INHIBITS EOP'S, (^Y) FOR ERROR SUMMARY'
                                                                   ;       'UNIBUS HANG?  RESTART AT ADDRESS '
012344  012746  056016                   MOV     #UBHANG,-(SP)     ;MOVE ADDRESS OF HANG ROUTINE TO STACK
012350  104402                           TYPOC                     ;GO TYPE THE ADDRESS IN OCTAL
012352  104401  041421                   TYPE    ,M1A              ;       'CZDRLDO DR11 GEN NPR INTFC LOGIC TEST'
                                                                   ;       'EOP MSG WILL PRINT EVERY         ;DPM001
                                                                   ;       20 SECONDS APPROXIMATELY'         ;DPMC01
                                         .SBTTL  PREPARE ADDRESSES AND VECTORS FOR UUT
012356  012737  000001  002544   BEGIN1: MOV     #BIT0,DEVMSK      ;SET UP BIT MASK TO TEST $DEVM FOR DEVICES
012364  005037  002546                   CLR     TABINX            ;CLEAR LOCATION TO STORE TABLE OFFSETS
012370  033737  002544  001466   TSTDEV: BIT     DEVMSK,$DEVM      ;CHECK TO SEE IF DEVICE IS TO BE TESTED
012376  001026                           BNE     2$                ;BR, IF YES
012400  005737  002544                   TST     DEVMSK            ;SEE IF BIT 15 IS SET
012404  100013                           BPL     1$                ;BRANCH TO CONTINUE IF NOT SET
012406  005737  001416                   TST     $PASS             ;SEE IF THIS IS THE FIRST PASS
012412  001361                           BNE     BEGIN1            ;BRANCH TO REINITIALIZE THE DEVMSK LOCATION IF NOT
012414  005737  002716                   TST     $PASS2            ;SEE IF THIS IS THE FIRST PASS
012420  001356                           BNE     BEGIN1            ;BRANCH TO REINITIALIZE THE DEVMSK LOCATION IF NOT
012422  104401  041151                   TYPE    ,NODVPR           ;TYPE:  'NO DEVICES RECOGNIZED - DIAGNOSTIC CANNOT BE RUN'
                                                                   ;       'RESTART AT 204 IF A DEVICE IS PRESENT'
012426  000000                           HALT                      ;FATAL ERROR - HALT HERE
012430  000137  011420                   JMP     START1            ;JUMP TO START1 TO CHECK AGAIN FOR A MODULE
012434  006337  002544           1$:     ASL     DEVMSK            ;SHIFT MASK TO CHECK NEXT $DEVM BIT
012440  062737  000002  002546           ADD     #2,TABINX         ;INCREMENT TABLE INDEX
012446  005237  001422                   INC     $UNIT             ;INCREMENT UNIT NUMBER
012452  000746                           BR      TSTDEV            ;GO TEST NEXT BIT OF DEVICE MAP

012454  006337  002544           2$:     ASL     DEVMSK            ;UPDATE DEVICE MAP TEST MASK
012460  013702  002546                   MOV     TABINX,R2         ;MOVE TABLE OFFSET TO R2
012464  062737  000002  002546           ADD     #2,TABINX         ;UPDATE TABLE OFFSET FOR NEXT DEVICE
012472  016200  002416                   MOV     REGADR(R2),R0     ;PUT UUT ADDRESS INTO R0
012476  012701  002516                   MOV     #WCR,R1           ;POINT R1 TO STORAGE AREA FOR UUT ADDRESSES
012502  012703  000004                   MOV     #4,R3             ;MOVE 4 ADDRESSES
012506  010021                   3$:     MOV     R0,(R1)+          ;TRANSFER UUT ADDRESS
012510  062700  000002                   ADD     #2,R0             ;POINT TO NEXT UUT REGISTER
012514  005303                           DEC     R3                ;DECREMENT THE LOOP COUNTER AND
012516  001373                           BNE     3$                ;BRANCH IF NOT DONE TRANSFERING
012520  016200  002456                   MOV     VECADR(R2),R0     ;PUT UUT VECTOR INTO R0
012524  010021                           MOV     R0,(R1)+          ;TRANSFER UUT VECTORS TO ACTIVE TABLE AREA
012526  062700  000002                   ADD     #2,R0             ;POINT TO NEXT VECTOR
012532  010011                           MOV     R0,(R1)           ;TRANSFER VECTOR TO TABLE AREA
012534  016237  001474  002720           MOV     $DDW0(R2),DDW     ;SET UP DDW TO PROPER DEVICE DESCRIPTOR WORD
012542  013737  002720  002552           MOV     DDW,DRLEV         ;MOVE THE WORD TO THE DRLEV LOCATION
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012550  042737  177437  002552            BIC     #177437,DRLEV   ;STRIP ALL BITS EXCEPT BR LEVEL
012556  105037  032555           REINIT:  CLRB    CHARCT          ;CLEAR THE CHARACTER LOCATION OF ANY CHARACTER
012562  004737  004154                    JSR     PC,BPINIT       ;GO RESET THE ".+2" AND "BPT" LOCATIONS
012566  004737  003646                    JSR     PC,CLENUP       ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
012572  105737  002706                    TSTB    EOPLOC          ;SEE IF ^X IS ENABLED (IS THE PRINTER DISABLED)
012576  001003                            BNE     TST1            ;GO DO TEST IF NOT
                                 ;;***************************************************************
                                 ;*       *DO*NOT*REMOVE*THE*WAIT*LOOP*ROUTINE*BELOW*.  BECAUSE OF THE SPEED OF THIS DIAG-
                                 ;*       NOSTIC (.125 SECOND FOR 1 PASS, NO ERRORS), SOME VIDEO TERMINALS PRINT ERRONEOUS
                                 ;*       CHARACTER(S) WITH THE EOP MESSAGE DUE TO THE RESET EXECUTED IN TEST 4.  THIS WAIT
                                 ;*       LOOP ENABLES THOSE TERMINALS TO 'CATCH UP' BEFORE ITS EXECUTION.
                                 ;;***************************************************************
012600  005327  000000           1$:      DEC     #0              ;DECREMENT A LOCATION TO KILL TIME
012604  001375                            BNE     1$              ;BRANCH BACK UNTIL ZERO AGAIN
                                 ;;***************************************************************
                                 ;
                                 ;MAIN PROGRAM - DEVICE TESTS
                                 ;
                                 ;;***************************************************************
```

```
                                          .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.
                                          ;*
                                          ;;*********************************************************************
012606                                    TST1:
012606  000004                                    SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
012610  012737  012644  001310                    MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
012616  032777  004000  166514                    BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
012624  001407                                    BEQ     1001$                   ;&& BRANCH IF NOT
012626  104401  012634                            TYPE    ,1000$                  ;&& TYPE: "T # 1"
012632  000404                                    BR      1001$                   ;&& GET OVER ASCII
012634     124     040     043            1000$:  .ASCIZ  /T # 1/<CRLF>           ;&& THE ASCII MESSAGE
                                                  .EVEN
012644                                    1001$:
012644  005037  001312                    999$:   CLR     $ERTTL                  ;CLEAR THE ERROR TOTAL - NEW PASS
012650  012737  012752  000004                    MOV     #1$,BUSERR              ;CPU ERROR VECTOR TO 1$
012656  013737  002516  002550                    MOV     WCR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
012664  005777  167626                            TST     @WCR                    ;ACCESS REGISTER
012670  013737  002520  002550                    MOV     BAR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
012676  005777  167616                            TST     @BAR                    ;ACCESS REGISTER
012702  013737  002522  002550                    MOV     CSR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
012710  005777  167606                            TST     @CSR                    ;ACCESS REGISTER
012714  013737  002524  002550                    MOV     BDR,DREG                ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
012722  005777  167576                            TST     @BDR                    ;ACCESS REGISTER
012726  013737  002526  002550                    MOV     DRINV,DREG              ;SAVE ADDRESS FOR POSSIBLE ERROR TYPING
012734  005777  167566                            TST     @DRINV                  ;ACCESS REGISTER
012740  005737  001312                            TST     $ERTTL                  ;SEE IF THERE WERE ANY ERRORS
012744  001414                                    BEQ     2$                      ;BRANCH TO CONTINUE IF NONE
012746  000137  025622                            JMP     ENDEV                   ;GO TO END OF DEVICE ROUTINE - FATAL ERRORS
012752  012637  002672                    1$:     MOV     (SP)+,OLDPC1            ;SAVE PC OF TRAP FOR ERROR PRINTOUT
012756  012637  002674                            MOV     (SP)+,OLDPS1            ;SAVE PS FOR RESTORATION AFTER ERROR CALL
012762  104001                                    ERROR   +1                      ;CANNOT ACCESS DR11 REGISTER
012764  013746  002674                            MOV     OLDPS1,-(SP)            ;PUT PS BACK ON STACK
012770  013746  002672                            MOV     OLDPC1,-(SP)            ;PUT PC BACK ON STACK
012774  000002                                    RTI                             ;RETURN TO PROGRAM
012776  012737  000006  000004            2$:     MOV     #6,BUSERR               ;RESTORE #6 TO BUS ERROR
```

```
   4622                                                 .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.
                                                        ;*
                                                        ;;*********************************************************************
        013004                                          TST2:
        013004  000004                                          SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
        013006  012737  013042  001310                          MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
        013014  032777  004000  166316                          BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
        013022  001407                                          BEQ     1001$                   ;&& BRANCH IF NOT
        013024  104401  013032                                  TYPE    ,1000$                  ;&& TYPE: "T # 2"
        013030  000404                                          BR      1001$                   ;&& GET OVER ASCII
        013032     124     040     043                  1000$:  .ASCIZ  /T # 2/<CRLF>           ;&& THE ASCII MESSAGE
                                                                .EVEN
        013042                                          1001$:
   4623 013042  005077  167454                          999$:   CLR     @CSR                    ;GO TO CSR
   4624 013046  012777  100000  167446                          MOV     #EIR,@CSR               ;FORCE TO BE EIR
   4625 013054  017737  167442  002610                          MOV     @CSR,BORW               ;ATTEMPT EIR READ
   4626 013062  042737  177776  002610                          BIC     #CBIT0,BORW             ;MASK OFF ALL BITS EXCEPT BIT 0
   4627 013070  013737  002720  001362                          MOV     DDW,$TMP1               ;GET DEVICE DESCRIPTOR WORD
   4628 013076  042737  177776  001362                          BIC     #CBIT0,$TMP1            ;MASK OFF ALL BUT B OR W BIT
   4629 013104  001403                                          BEQ     1$                      ;BRANCH IF IT IS CLEAR
   4630 013106  005037  001362                                  CLR     $TMP1                   ;CLEAR THE BIT
   4631 013112  000403                                          BR      2$                      ;GO TEST THE BIT
   4632 013114  012737  000001  001362          1$:             MOV     #1,$TMP1                ;SET THE BIT
   4633 013122  023737  002610  001362          2$:             CMP     BORW,$TMP1              ;B OR W STATE AS EXPECTED?
   4634 013130  001401                                          BEQ     TST3                    ;BRANCH IF OK
   4635 013132  104002                                          ERROR   +2                      ;DR11-B OR W MODE INCORRECT (0=B, 1=W)
```

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  4643                                                  .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.
                                                        ;*
                                                        ;;*****************************************************************
       013134                                           TST3:
       013134  000004                                           SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       013136  012737  013246  001310                           MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
       013144  032777  004000  166166                           BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       013152  001407                                           BEQ     1001$                   ;&& BRANCH IF NOT
       013154  104401  013162                                   TYPE    ,1000$                  ;&& TYPE: ''T # 3''
       013160  000404                                           BR      1001$                   ;&& GET OVER ASCII
       013162     124     040     043           1000$:  .ASCIZ  /T # 3/<CRLF>           ;&& THE ASCII MESSAGE
                                                                .EVEN
       013172                                           1001$:
  4644 013172  004737  003646                                   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  4645 013176  012737  000200  001362                           MOV     #RY,$TMP1               ;MOVE READY BIT TO $TMP1
  4646 013204  032737  000004  002720                           BIT     #BIT2,DDW               ;TEST TO SEE IF CABLE IS IN
  4647 013212  001003                                           BNE     1$                      ;BRANCH AROUND NON-CABLE SETUP IF IN
  4648 013214  052737  127000  001362                           BIS     #127000,$TMP1           ;SET THE BITS TO BE EXPECTED IN $TMP1
  4649 013222  012701  010220                   1$:     MOV     #MAISET,R1              ;MOVE ADDRESS OF EXPECTED PATTERNS TO R1
  4650 013226  012702  010000                           MOV     #MA,R2                  ;START WITH JUST THE MAINTENANCE BIT
  4651 013232  005037  002714                           CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +202
  4652 013236  012700  000002                           MOV     #2,R0                   ;DO 2 SETS OF 200 PATTERNS
  4653 013242  012703  000200                   2$:     MOV     #200,R3                 ;MOVE 200 TO THE LOOP COUNTER
  4654 013246  052777  010000  167246           999$:   BIS     #MA,@CSR                ;SET MAINTENANCE AND
  4655 013254  005077  167242                           CLR     @CSR                    ;CLEAR TO DO AN INIT
  4656 013260  017737  167236  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
  4657 013266  023737  001362  002560                   CMP     $TMP1,RCSR              ;MAKE SURE EXPECTED DATA CAME UP
  4658 013274  001404                                   BEQ     3$                      ;BRANCH IF SO
  4659 013276  013737  001362  002572                   MOV     $TMP1,ECSR              ;MOVE EXPECTED DATA TO ECSR
  4660 013304  104032                                   ERROR   +32                     ;CSR IS WRONG
  4661 013306  012777  177777  167202           3$:     MOV     #-1,@WCR                ;MOVE 1 WORD COUNT TO WCR IN CASE OF IE ENABLED
  4662 013314  012777  056104  167176                   MOV     #NOCARE,@BAR            ;MOVE A NOT-CARE ADDRESS TO BAR FOR SAME REASON
  4663 013322  010277  167174                           MOV     R2,@CSR                 ;SET THE PARTICULAR FUNCTION BITS IN CSR
  4664 013326  017737  167170  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
  4665 013334  011137  002572                           MOV     (R1),ECSR               ;MOVE EXPECTED DATA TO ECSR
  4666 013340  023737  002572  002560                   CMP     ECSR,RCSR               ;COMPARE EXPECTED WITH RECEIVED
  4667 013346  001425                                   BEQ     7$                      ;BRANCH IF OK
  4668 013350  012737  000401  013360                   MOV     #CY+GO,4$               ;REESTABLISH TEST PATTERN
  4669 013356  040227                                   BIC     R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
  4670 013360  000401                           4$:     .WORD   CY+GO                   ;LOCATION TO HOLD BOTH CYCLE AND GO BITS
  4671 013362  001013                                   BNE     6$                      ;BRANCH TO ERROR ONLY IF CYCLE AND GO WERE SET
  4672 013364  032737  000060  002572                   BIT     #X6+X7,ECSR             ;SEE IF EITHER XBA16 OR XBA17 ARE SET
  4673 013372  001407                                   BEQ     6$                      ;BRANCH TO ERROR IF BOTH ARE CLEAR
  4674 013374  052737  140000  002572           5$:     BIS     #ER+NX,ECSR             ;SET THE ERROR AND NEX BITS - EXPECT THEM TO SET
  4675 013402  023737  002560  002572                   CMP     RCSR,ECSR               ;NOW SEE IF DATA MATCHES
  4676 013410  001415                                   BEQ     10$                     ;BRANCH AROUND ERROR IF IT DOES
  4677 013412  010237  002536                   6$:     MOV     R2,BUT                  ;MOVE THE BITS SET INTO CSR TO THE BUT LOCATION
  4678 013416  104202                                   ERROR   +202                    ;CSR PATTERN NOT CORRECT
  4679 013420  000411                                   BR      10$                     ;BRANCH AROUND MM TESTS
  4680 013422  012737  000401  013432           7$:     MOV     #CY+GO,8$               ;REESTABLISH TEST PATTERN
  4681 013430  040227                                   BIC     R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
```

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013432  000401                    8$:     .WORD   CY+GO           ;LOCATION TO HOLD BOTH CYCLE AND GO B!TS
013434  001003                            BNE     10$             ;BRANCH AROUND MEM MGMT TEST IF EITHER OR BOTH WERE CLEAR
013436  004737  007066            9$:     JSR     PC,TSTMM        ;GO CHECK FOR MEMORY MANAGEMENT EXISTENCE
013442  000754                            BR      5$              ;IF RETURN IS HERE, GO BACK TO SET EXPECTED DATA
013444  062701  000002            10$:    ADD     #2,R1           ;INCREMENT R1 TO NEXT EXPECTED PATTERN
013450  005202                            INC     R2              ;INCREMENT THE PATTERN
013452  005303                            DEC     R3              ;DECREMENT THE LOOP COUNTER
013454  001274                            BNE     999$            ;BRANCH BACK IF NOT DONE
013456  062702  000200                    ADD     #200,R2         ;ADD 200 TO PATTERN LOCATION
013462  005300                            DEC     R0              ;DECREMENT THE LOOP COUNTER AND
013464  001266                            BNE     2$              ;BRANCH BACK IF 2ND OCTAL GROUP NOT DONE
```

```
                                              .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.
                                              ;*
                                              ;;*****************************************************************
013466                                        TST4:
013466  000004                                         SCOPE                          ;PROCESS LOOPING AND TEST NUMBER INCREMENT
013470  012737  013524  001310                         MOV     #999$,$LPERR           ;SET LOOP ON ERROR TO 999$
013476  032777  004000  165634                         BIT     #BIT11,@SWR            ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
013504  001407                                         BEQ     1001$                  ;&& BRANCH IF NOT
013506  104401  013514                                 TYPE    ,1000$                 ;&& TYPE: "T # 4"
013512  000404                                         BR      1001$                  ;&& GET OVER ASCII
013514     124     040     043        1000$:   .ASCIZ  /T # 4/<CRLF>          ;&& THE ASCII MESSAGE
                                                       .EVEN
013524                                        1001$:
013524  012777  010000  166770        999$:    MOV     #MA,@CSR               ;SET THE MAINTENANCE BIT AND
013532  005077  166764                                 CLR     @CSR                   ;CLEAR TO DO AN INIT
013536  012777  010000  166756                         MOV     #MA,@CSR               ;DO THIS TEST IN MAINTENANCE MODE       ;DPM001
013544  012777  177777  166744                         MOV     #-1,@WCR               ;ALL ONES TO WCR
013552  017737  166740  002570                         MOV     @WCR,RWCR              ;MOVE RECEIVED DATA TO RWCR
013560  022737  177777  002570                         CMP     #-1,RWCR               ;SEE IF DATA WAS LOADED PROPERLY
013566  001423                                         BEQ     4$                     ;BRANCH IF OK
013570  012737  013600  001310                         MOV     #1$,$LPERR             ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
013576  000412                                         BR      2$                     ;BRANCH OVER LOOP SETUP
013600  012777  177777  166710        1$:      MOV     #-1,@WCR               ;ALL ONES TO WCR
013606  017737  166704  002570                         MOV     @WCR,RWCR              ;MOVE RECEIVED DATA TO RWCR
013614  022737  177777  002570                         CMP     #-1,RWCR               ;SEE IF DATA WAS LOADED PROPERLY
013622  001401                                         BEQ     3$                     ;BRANCH IF OK
013624  104010                        2$:      ERROR   +10                    ;ATTEMPT TO SET ALL WCR BITS FAILED
013626  032777  001000  165504        3$:      BIT     #BIT9,@SWR             ;SEE IF WE SHOULD LOOP BACK
013634  001361                                         BNE     1$                     ;BRANCH BACK IF SO
013636  052777  000001  166656        4$:      BIS     #GO,@CSR               ;SET GO TO CLEAR READY TO PREPARE TO SET BAR BIT 0
013644  017737  166652  002560                         MOV     @CSR,RCSR              ;READ CSR TO SET BIT 0 OF BAR            ;DPM001
013652  012777  177777  166640                         MOV     #-1,@BAR               ;ALL ONES TO BAR
013660  017737  166634  002566                         MOV     @BAR,RBAR              ;MOVE RECEIVED DATA TO RBAR
013666  022737  177777  002566                         CMP     #-1,RBAR               ;SEE IF ALL BITS WERE SET
013674  001431                                         BEQ     8$                     ;BRANCH IF OK
013676  012737  013714  001310                         MOV     #5$,$LPERR             ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
013704  012737  177777  002600                         MOV     #-1,EBAR               ;MOVE EXPECTED DATA TO EBAR
013712  000415                                         BR      6$                     ;BRANCH OVER LOOP SETUP
013714  017737  166602  002560        5$:      MOV     @CSR,RCSR              ;ACCESS CSR TO SET BIT 0 OF BAR
013722  012777  177777  166570                         MOV     #-1,@BAR               ;ALL ONES TO BAR
013730  017737  166564  002566                         MOV     @BAR,RBAR              ;MOVE RECEIVED DATA TO RBAR
013736  022737  177777  002566                         CMP     #-1,RBAR               ;SEE IF ALL BITS WERE SET
013744  001401                                         BEQ     7$                     ;BRANCH IF OK
013746  104012                        6$:      ERROR   +12                    ;ATTEMPT TO SET ALL BAR BITS TO 1 FAILED
013750  032777  001000  165362        7$:      BIT     #BIT9,@SWR             ;SEE IF WE SHOULD LOOP BACK
013756  001356                                         BNE     5$                     ;BRANCH BACK IF SO
013760  012777  177777  166536        8$:      MOV     #-1,@BDR               ;ALL ONES TO BDR
013766  017737  166532  002564                         MOV     @BDR,RBDR              ;MOVE RECEIVED DATA TO RBDR
013774  022737  177777  002564                         CMP     #-1,RBDR               ;SEE IF DATA WAS LOADED PROPERLY
014002  001423                                         BEQ     12$                    ;BRANCH IF OK
014004  012737  014102  001310                         MOV     #13$,$LPERR            ;MOVE NEW LOOP ON ERROR LOCATION TO $LPERR
014012  000412                                         BR      10$                    ;BRANCH OVER LOOP SETUP
```

```
   4739 014014  012777  177777  166502  9$:     MOV     #-1,@BDR         ;ALL ONES TO BDR
   4740 014022  017737  166476  002564          MOV     @BDR,RBDR        ;MOVE RECEIVED DATA TO RBDR
   4741 014030  022737  177777  002564          CMP     #-1,RBDR         ;SEE IF DATA WAS LOADED PROPERLY
   4742 014036  001401                          BEQ     11$              ;BRANCH IF OK
   4743 014040  104027                  10$:    ERROR   +27              ;ALL BDR BITS ARE NOT SET
   4744 014042  032777  001000  165270  11$:    BIT     #BIT9,@SWR       ;SEE IF WE SHOULD LOOP BACK
   4745 014050  001361                          BNE     9$               ;BRANCH BACK IF SO
   4746 014052  012777  010576  166442  12$:    MOV     #10576,@CSR      ;SET ALL CSR WRITEABLE BITS
   4747 014060  000005                          RESET                    ;RESET THE WORLD OF ITS TROUBLES - HOPEFULLY
   4748 014062  012737  013524  001310          MOV     #999$,$LPERR     ;RESET THE LOOP ON ERROR LOCATION
   4749 014070  017737  166422  002570          MOV     @WCR,RWCR        ;WAS WCR CLEARED?
   4750 014076  001401                          BEQ     13$              ;BRANCH IF WCR WAS CLEARED
   4751 014100  104007                          ERROR   +7               ;RESET FAILED TO CLEAR WCR
   4752 014102  017737  166412  002566  13$:    MOV     @BAR,RBAR        ;MOVE RECEIVED DATA TO RBAR
   4753 014110  001403                          BEQ     14$              ;BRANCH IF BAR WAS CLEARED
   4754 014112  005037  002600                  CLR     EBAR             ;CLEAR EXPECTED LOCATION
   4755 014116  104011                          ERROR   +11              ;RESET FAILED TO CLEAR BAR
   4756 014120  017737  166376  002560  14$:    MOV     @CSR,RCSR        ;MOVE RECEIVED DATA TO RCSR
   4757 014126  012737  000200  002572          MOV     #RY,ECSR         ;MOVE EXPECTED DATA TO ECSR
   4758 014134  004737  003670                  JSR     PC,CHKCAB        ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
   4759 014140  023737  002572  002560          CMP     ECSR,RCSR        ;SEE IF EXPECTED DATA WAS RECEIVED
   4760 014146  001401                          BEQ     15$              ;BRANCH IF IT WAS
   4761 014150  104032                          ERROR   +32              ;READY IS NOT THE ONLY BIT SET
   4762 014152  052777  010000  166342  15$:    BIS     #MA,@CSR         ;MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
   4763 014160  017737  166340  002564          MOV     @BDR,RBDR        ;MOVE CONTENTS OF BDR TO RBDR
   4764 014166  001401                          BEQ     TST5             ;BRANCH IF IT CORRECTLY REMAINS ZERO
   4765 014170  104026                          ERROR   +26              ;BDR IS NOT CLEAR
```

```
  4771                                  .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.
                                        ;*
                                        ;;*****************************************************************
       014172  000004                   TST5:   SCOPE
       014174  032777  004000  165136           BIT     #BIT11,@SWR      ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       014202  001407                           BEQ     1001$            ;&& BRANCH IF NOT
       014204  104401  014212                   1YPE    ,1000$           ;&& TYPE: "T # 5"
       014210  000404                           BR      1001$            ;&& GET OVER ASCII
       014212     124     040     043   1000$:  .ASCIZ  /T # 5/<CRLF>    ;&& THE ASCII MESSAGE
                                                .EVEN
       014222                           1001$:
  4772 014222  005077  166274           999$:   CLR     @CSR             ;FORCE ACCESS TO CSR
  4773 014226  012777  177777  166262           MOV     #-1,@WCR         ;ALL ONES TO WCR
  4774 014234  012777  177777  166262           MOV     #-1,@BDR         ;ALL ONES TO BDR
  4775 014242  012777  177777  166250           MOV     #-1,@BAR         ;ALL ONES TO BAR
  4776 014250  012777  010576  166244           MOV     #10576,@CSR      ;SET ALL WRITEABLE BITS IN THE CSR
  4777 014256  042777  010000  166236           BIC     #MA,@CSR         ;CLEAR THE MAINT BIT TO DO AN INIT
  4778 014264  017737  166226  002570           MOV     @WCR,RWCR        ;MOVE RECEIVED CONTENTS TO RWCR
  4779 014272  001401                           BEQ     1$               ;BRANCH IF WCR WAS CLEARED
  4780 014274  104003                           ERROR   +3               ;INIT FAILED TO CLEAR WCR
  4781 014276  017737  166216  002566   1$:     MOV     @BAR,RBAR        ;MOVE RECEIVED CONTENTS TO RBAR
  4782 014304  001403                           BEQ     2$               ;BRANCH IF BAR WAS CLEARED
  4783 014306  005037  002600                   CLR     EBAR             ;CLEAR EXPECTED LOCATION
  4784 014312  104004                           ERROR   +4               ;INIT FAILED TO CLEAR BAR
  4785 014314  017737  166202  002560   2$:     MOV     @CSR,RCSR        ;MOVE RECEIVED DATA TO RCSR
  4786 014322  012737  000200  002572           MOV     #RY,ECSR         ;EXPECT READY BIT ONLY TO BE SET
  4787 014330  004737  003670                   JSR     PC,CHKCAB        ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
  4788 014334  023737  002572  002560           CMP     ECSR,RCSR        ;SEE IF EXPECTED DATA WAS RECEIVED
  4789 014342  001401                           BEQ     3$               ;BRANCH IF THEY WERE ALL CLEAR
  4790 014344  104006                           ERROR   +6               ;INIT FAILED TO CLEAR ALL CSR R-W BITS
  4791 014346  012777  010000  166146   3$:     MOV     #MA,@CSR         ;GO BACK INTO MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
  4792 014354  017737  166144  002564           MOV     @BDR,RBDR        ;MOVE RECEIVED CONTENTS TO RBDR
  4793 014362  001401                           BEQ     TST6             ;BRANCH IF IT WAS CLEARED
  4794 014364  104005                           ERROR   +5               ;INIT FAILED TO CLEAR BDR
  4804                                          .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 $LPERR IS INITIALIZED TO A ROUTINE SPECIFI-
                                                ;*       CALLY WRITTEN FOR THAT PARTICULAR ERROR TO CREATE A VERY TIGHT LOOP.
                                                ;*
                                                ;;*********************************************************************
       014366  000004                           TST6:   SCOPE
       014370  032777  004000  164742                   BIT     #BIT11,@SWR     ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       014376  001407                                   BEQ     1001$           ;&& BRANCH IF NOT
       014400  104401  014406                           TYPE    ,1000$          ;&& TYPE: "T # 6"
       014404  000404                                   BR      1001$           ;&& GET OVER ASCII
       014406     124     040     043           1000$:  .ASCIZ  /T # 6/<CRLF>   ;&& THE ASCII MESSAGE
                                                        .EVEN
       014416                                   1001$:
  4805 014416  004737  003646                           JSR     PC,CLENUP       ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  4806 014422  005037  002714                           CLR     ERRCNT          ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +204
  4807 014426  012701  007202                           MOV     #PATRNS,R1      ;MOVE ADDRESS OF BIT PATTERNS TO R1
  4808 014432  012702  000007                           MOV     #7,R2           ;DO 7 PATTERNS
  4809 014436  012777  010000  166056           1$:     MOV     #MA,@CSR        ;GO TO MAINTENANCE MODE & SET GO TO DISABLE BAR BIT 0
  4810 014444  011177  166054                           MOV     (R1),@BDR       ;MOVE THE DATA TO BDR
  4811 014450  017737  166050  002564                   MOV     @BDR,RBDR       ;MOVE RECEIVED DATA TO RBDR
  4812 014456  021137  002564                           CMP     (R1),RBDR       ;SEE IF EXPECTED DATA WAS RECEIVED
  4813 014462  001423                                   BEQ     5$              ;BRANCH IF SO
  4814 014464  012737  014500  001310                   MOV     #2$,$LPERR      ;SET UP LOOP ON ERROR LOCATION
  4815 014472  011137  002576                           MOV     (R1),EBDR       ;MOVE EXPECTED DATA TO EBDR
  4816 014476  000410                                   BR      3$              ;SKIP OVER LOOP ON ERROR SETUP
  4817 014500  011177  166020                   2$:     MOV     (R1),@BDR       ;LOAD BIT PATTERN TO BDR
  4818 014504  017737  166014  002564                   MOV     @BDR,RBDR       ;MOVE RECEIVED DATA TO RBDR
  4819 014512  021137  002564                           CMP     (R1),RBDR       ;SEE IF DATA IS OK NOW
  4820 014516  001401                                   BEQ     4$              ;BRANCH OUT IF SO - OK NOW
  4821 014520  104205                           3$:     ERROR   +205            ;BDR PATTERN NOT CORRECT
  4822 014522  032777  001000  164610           4$:     BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
  4823 014530  001363                                   BNE     2$              ;BRANCH BACK IF SO
  4824 014532  005077  165764                   5$:     CLR     @CSR            ;CLEAR CSR TO DO AN INIT - WCR & BAR DON'T NEED MAINT MODE
  4825 014536  011177  165754                           MOV     (R1),@WCR       ;MOVE THE DATA TO WCR
  4826 014542  017737  165750  002570                   MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
  4827 014550  021137  002570                           CMP     (R1),RWCR       ;SEE IF EXPECTED DATA WAS RECEIVED
  4828 014554  001423                                   BEQ     9$              ;BRANCH IF SO
  4829 014556  012737  014572  001310                   MOV     #6$,$LPERR      ;SET UP LOOP ON ERROR LOCATION
  4830 014564  011137  002602                           MOV     (R1),EWCR       ;MOVE EXPECTED DATA TO EWCR
  4831 014570  000410                                   BR      7$              ;SKIP OVER LOOP ON ERROR SETUP
  4832 014572  011177  165720                   6$:     MOV     (R1),@WCR       ;LOAD BIT PATTERN TO WCR
  4833 014576  017737  165714  002570                   MOV     @WCR,RWCR       ;MOVE RECEIVED DATA TO RWCR
  4834 014604  021137  002570                           CMP     (R1),RWCR       ;SEE IF DATA IS OK NOW
  4835 014610  001401                                   BEQ     8$              ;BRANCH OUT IF SO - OK NOW
  4836 014612  104204                           7$:     ERROR   +204            ;WCR DATA PATTERN NOT CORRECT
  4837 014614  032777  001000  164516           8$:     BIT     #BIT9,@SWR      ;SEE IF WE SHOULD LOOP BACK
  4838 014622  001363                                   BNE     6$              ;BRANCH BACK IF SO
  4839 014624  011177  165670                   9$:     MOV     (R1),@BAR       ;MOVE THE DATA TO BAR
  4840 014630  017737  165664  002566                   MOV     @BAR,RBAR       ;MOVE RECEIVED DATA TO RBAR
  4841 014636  011137  002600                           MOV     (R1),EBAR       ;MOVE EXPECTED DATA TO EBAR
  4842 014642  042737  000001  002600                   BIC     #BIT0,EBAR      ;DO NOT EXPECT BIT 0 TO BE READ
  4843 014650  023737  002600  002566              CMP     EBAR,RBAR         ;SEE IF EXPECTED DATA WAS RECEIVED
  4844 014656  001421                                BEQ     13$               ;BRANCH IF SO
  4845 014660  012737  014670  001310              MOV     #10$,$LPERR       ;SET UP LOOP ON ERROR LOCATION
  4846 014666  000410                                BR      11$               ;SKIP OVER LOOP ON ERROR SETUP
  4847 014670  011177  165624          10$:          MOV     (R1),@BAR         ;LOAD BIT PATTERN TO BAR
  4848 014674  017737  165620  002566              MOV     @BAR,RBAR         ;MOVE RECEIVED DATA TO RBAR
  4849 014702  021137  002566                        CMP     (R1),RBAR         ;SEE IF DATA IS OK NOW
  4850 014706  001401                                BEQ     12$               ;BRANCH OUT IF SO - OK NOW
  4851 014710  104203                  11$:          ERROR   +203              ;BAR DATA PATTERN NOT CORRECT
  4852 014712  032777  001000  164420  12$:          BIT     #BIT9,@SWR        ;SEE IF WE SHOULD LOOP BACK
  4853 014720  001363                                BNE     10$               ;BRANCH BACK IF SO
  4854 014722  005721                  13$:          TST     (R1)+             ;GO TO NEXT PATTERN
  4855 014724  005302                                DEC     R2                ;DECREMENT THE LOOP COUNTER AND
  4856 014726  001243                                BNE     1$                ;BRANCH BACK IF NOT DONE
  4857 014730  004737  003646                        JSR     PC,CLENUP         ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
```

```
 4864                                           .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).
                                                ;*
                                                ;;*****************************************************************
      014734                                    TST7:
      014734  000004                                    SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      014736  012737  014772  001310                    MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
      014744  032777  004000  164366                    BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      014752  001407                                    BEQ     1001$                   ;&& BRANCH IF NOT
      014754  104401  014762                            TYPE    ,1000$                  ;&& TYPE: "T # 7"
      014760  000404                                    BR      1001$                   ;&& GET OVER ASCII
      014762     124     040     043    1000$:  .ASCIZ  /T # 7/<CRLF>           ;&& THE ASCII MESSAGE
                                                        .EVEN
      014772                                    1001$:
 4855 014772  032737  000001  002610    999$:   BIT     #BIT0,BORW              ;TEST TO SEE IF WE ARE TESTING A DR11-W
 4866 015000  001444                                    BEQ     TST10                   ;BRANCH TO NEXT TEST IF A DR11-B
 4867 015002  005077  165514                            CLR     @CSR                    ;FORCE ACCESS TO CSR
 4868 015006  012737  000001  002536                    MOV     #BIT0,BUT               ;MOVE BIT 0 INDICATOR TO BIT UNDER TEST LOCATION
 4869 015014  017737  165502  002560                    MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
 4870 015022  032737  000001  002560                    BIT     #BIT0,RCSR              ;CLEAR ALL BUT BIT 0
 4871 015030  001407                                    BEQ     1$                      ;BRANCH IF A ZERO
 4872 015032  013737  002560  002572                    MOV     RCSR,ECSR               ;MOVE CSR TO EXPECTED DATA, ECSR AND
 4873 015040  042737  000001  002572                    BIC     #BIT0,ECSR              ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
 4874 015046  104014                                    ERROR   +14                     ;CSR BIT TEST FAILED
 4875 015050  012777  100000  165444    1$:     MOV     #EIR,@CSR               ;GO TO EIR MODE
 4876 015056  017737  165440  002562                    MOV     @CSR,REIR               ;MOVE CSR CONTENTS TO RCSR
 4877 015064  032737  000001  002562                    BIT     #BIT0,REIR              ;CLEAR ALL BUT BIT 0
 4878 015072  001007                                    BNE     TST10                   ;BRANCH IF NOT A ZERO
 4879 015074  013737  002562  002574                    MOV     REIR,EEIR               ;MOVE CONTENTS TO ECSR ALSO AND
 4880 015102  052737  000001  002574                    BIS     #BIT0,EEIR              ;SET THE 0 BIT - EXPECTED IT TO BE 1
 4881 015110  104015                                    ERROR   +15                     ;EIR BIT TEST FAILED
```

```
   4888                                          .SBTTL  TEST #10 - ATTN CAN BE SET VIA FNCT2 & ERROR 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.
                                                 ;*
                                                 ;;*******************************************************************
        015112                                   TST10:
        015112  000004                                   SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
        015114  012737  015160  001310                   MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
        015122  032777  004000  164210                   BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
        015130  001407                                   BEQ     1001$                   ;&& BRANCH IF NOT
        015132  104401  015140                           TYPE    ,1000$                  ;&& TYPE: "T # 10"
        015136  000404                                   BR      1001$                   ;&& GET OVER ASCII
        015140     124     040     043   1000$:  .ASCIZ  /T # 10/<CRLF>          ;&& THE ASCII MESSAGE
                                                         .EVEN
        015150                                   1001$:
   4889 015150  032737  000001  002720                   BIT     #BIT0,DDW               ;TEST TO SEE IF WE ARE TESTING A DR11-W
   4890 015156  001073                                   BNE     TST11                   ;BRANCH TO NEXT TEST IF A DR11-B
   4891 015160  005077  165336           999$:   CLR     @CSR                    ;FORCE ACCESS TO CSR
   4892 015164  012777  010000  165330                   MOV     #MA,@CSR                ;MAINT
   4893 015172  017737  165324  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
   4894 015200  022737  010200  002560                   CMP     #MA+RY,RCSR             ;SEE IF EXPECTED DATA WAS RECEIVED
   4895 015206  001404                                   BEQ     1$                      ;BRANCH IF THEY ARE
   4896 015210  012737  010200  002572                   MOV     #MA+RY,ECSR             ;MOVE EXPECTED DATA TO ECSR
   4897 015216  104016                                   ERROR   +16                     ;READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR
   4898 015220  112777  000004  165274   1$:     MOVB    #F2,@CSR                ;SET FNCT2
   4899 015226  017737  165270  002560                   MOV     @CSR,RCSR               ;MOVE THE CONTENTS TO RCSR
   4900 015234  013701  002560                           MOV     RCSR,R1                 ;MOVE CONTENTS TO R1 FOR BIT TEST
   4901 015240  042701  057777                           BIC     #CB1513,R1              ;CLEAR ALL BUT BITS ERROR & ATTN FOR TEST
   4902 015244  022701  120000                           CMP     #ER+AT,R1               ;TEST TO SEE IF ERROR AND ATTN ARE SET
   4903 015250  001411                                   BEQ     2$                      ;BRANCH IF IT IS PROPERLY SET
   4904 015252  013737  002560  002572                   MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
   4905 015260  004737  003670                           JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
   4906 015264  052737  120000  002572                   BIS     #ER+AT,ECSR             ;SET THE BITS THAT SHOULD HAVE BEEN SET
   4907 015272  104017                                   ERROR   +17                     ;ATTN AND ERROR FAILED TO SET PROPERLY
   4908 015274  042777  020004  165220   2$:     BIC     #AT+F2,@CSR             ;CLEAR ATTN & FNCT2
   4909 015302  017737  165214  002560                   MOV     @CSR,RCSR               ;MOVE CSR DATA TO RCSR
   4910 015310  032737  120000  002560                   BIT     #ER+AT,RCSR             ;BIT TEST ATTN AND ERROR BITS TU SEE IF THEY ARE CLEAR
   4911 015316  001411                                   BEQ     3$                      ;BRANCH IF ATTN IS CLEAR
   4912 015320  013737  002560  002572                   MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
   4913 015326  042737  120000  002572                   BIC     #ER+AT,ECSR             ;CLEAR THE BITS THAT WERE SUPPOSED TO BE CLEAR
   4914 015334  004737  003670                           JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
   4915 015340  104020                                   ERROR   +20                     ;ATTN AND ERROR FAILED TO CLEAR PROPERLY
   4916 015342  005077  165154           3$:     CLR     @CSR                    ;RETURN TO CSR
```

```
 4922                                          .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.
                                               ;*
                                               ;;*****************************************************************
      015346                                   TST11:
      015346  000004                                   SCOPE                            ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      015350  012737  015404  001310                   MOV     #999$,$LPERR             ;SET LOOP ON ERROR TO 999$
      015356  032777  004000  163754                   BIT     #BIT11,@SWR              ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      015364  001407                                   BEQ     1001$                    ;&& BRANCH IF NOT
      015366  104401  015374                           TYPE    ,1000$                   ;&& TYPE: "T # 11"
      015372  000404                                   BR      1001$                    ;&& GET OVER ASCII
      015374     124     040     043           1000$:  .ASCIZ  /T # 11/<CRLF>           ;&& THE ASCII MESSAGE
                                                       .EVEN
      015404                                   1001$:
 4923 015404  005077  165112                   999$:   CLR     @CSR                     ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
 4924 015410  012777  010000  165104                   MOV     #MA,@CSR                 ;MAINT MODE
 4925 015416  017737  165100  002560                   MOV     @CSR,RCSR                ;MOVE CONTENTS OF CSR TO RCSR
 4926 015424  013737  002560  002572                   MOV     RCSR,ECSR                ;MOVE EXPECTED TO ECSR
 4927 015432  013701  002572                           MOV     ECSR,R1                  ;MOVE CONTENTS TO R1 FOR TESTING
 4928 015436  042701  177761                           BIC     #CFNC,R1                 ;CLEAR ALL BUT THE FNCT BITS
 4929 015442  001404                                   BEQ     1$                       ;BRANCH IF THE FUNCTION BITS ARE CLEAR
 4930 015444  042737  000016  002572                   BIC     #FNC,ECSR                ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
 4931 015452  104024                                   ERROR   +24                      ;FUNCTION BIT(S) ARE NOT CLEAR
 4932 015454  052777  000002  165040           1$:     BIS     #F1,@CSR                 ;SET FNCT1
 4933 015462  017737  165034  002560                   MOV     @CSR,RCSR                ;MOVE CONTENTS OF CSR TO RCSR
 4934 015470  013737  002560  002572                   MOV     RCSR,ECSR                ;MOVE EXPECTED DATA TO ECSR
 4935 015476  013701  002572                           MOV     ECSR,R1                  ;MOVE CONTENTS TO R1 FOR TEST
 4936 015502  042701  170777                           BIC     #CDST,R1                 ;CLEAR ALL BUT BITS 9, 10 & 11
 4937 015506  022701  001000                           CMP     #DSC,R1                  ;SEE IF DSTAT A AND B ARE CLEAR & C IS SET
 4938 015512  001407                                   BEQ     TST12                    ;BRANCH TO NEXT TEST IF ALL CLEAR
 4939 015514  042737  006000  002572                   BIC     #DAB,ECSR                ;CLEAR THE DSTAT A & B BITS THAT SHOULD HAVE BEEN CLEAR
 4940 015522  052737  001000  002572                   BIS     #DSC,ECSR                ;SET THE DSTAT C BIT THAT SHOULD HAVE BEEN SET
 4941 015530  104025                                   ERROR   +25                      ;DSTAT A, B OR C ARE NOT AS EXPECTED
 4947                                        .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.
                                             ;*
                                             ;;*************************************************************
      015532                                 TST12:
      015532  000004                                 SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      015534  012737  015570  001310                 MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
      015542  032777  004000  163570                 BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      015550  001407                                 BEQ     1001$                   ;&& BRANCH IF NOT
      015552  104401  015560                         TYPE    ,1000$                  ;&& TYPE: "T # 12"
      015556  000404                                 BR      1001$                   ;&& GET OVER ASCII
      015560     124     040     043         1000$:  .ASCIZ  /T # 12/<CRLF>          ;&& THE ASCII MESSAGE
                                                     .EVEN
      015570                                 1001$:
 4948 015570  005077  164726                 999$:   CLR     @CSR                    ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
 4949 015574  012777  010000  164720                 MOV     #MA,@CSR                ;MAINT MODE
 4950 015602  017737  164714  002560                 MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
 4951 015610  013737  002560  002572                 MOV     RCSR,ECSR               ;MOVE EXPECTED TO ECSR
 4952 015616  013701  002572                         MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TESTING
 4953 015622  042701  177761                         BIC     #CFNC,R1                ;CLEAR ALL BUT THE FNCT BITS
 4954 015626  001404                                 BEQ     1$                      ;BRANCH IF THE FUNCTION BITS ARE CLEAR
 4955 015630  042737  000016  002572                 BIC     #FNC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
 4956 015636  104024                                 ERROR   +24                     ;FUNCTION BIT(S) ARE NOT CLEAR
 4957 015640  052777  000004  164654         1$:     BIS     #F2,@CSR                ;SET FNCT2
 4958 015646  017737  164650  002560                 MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
 4959 015654  013737  002560  002572                 MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
 4960 015662  013701  002572                         MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TEST
 4961 015666  042701  170777                         BIC     #CDST,R1                ;CLEAR ALL BUT THE DSTAT BITS
 4962 015672  022701  002000                         CMP     #DSB,R1                 ;IF DSTAT A AND C ARE CLEAR & B IS SET
 4963 015676  001407                                 BEQ     TST13                   ;BRANCH TO NEXT TEST IF AS EXPECTED
 4964 015700  042737  005000  002572                 BIC     #DAC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
 4965 015706  052737  002000  002572                 BIS     #DSB,ECSR               ;SET THE BIT THAT SHOULD HAVE BEEN SET
 4966 015714  104025                                 ERROR   +25                     ;DSTAT A, B OR C ARE NOT AS EXPECTED
```

```
  4972                                           .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.
                                         ;*
                                         ;;****************************************************************
       015716                            TST13:
       015716  000004                            SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       015720  012737  015754  001310            MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
       015726  032777  004000  163404            BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       015734  001407                            BEQ     1001$                   ;&& BRANCH IF NOT
       015736  104401  015744                    TYPE    ,1000$                  ;&& TYPE: "T # 13"
       015742  000404                            BR      1001$                   ;&& GET OVER ASCII
       015744     124     040     043    1000$:  .ASCIZ  /T # 13/<CRLF>          ;&& THE ASCII MESSAGE
                                                 .EVEN
       015754                            1001$:
  4973 015754  005077  164542            999$:   CLR     @CSR                    ;CLR FUNCT BITS AND FORCE ACCESS TO CSR
  4974 015760  012777  010000  164534            MOV     #MA,@CSR                ;MAINT MODE
  4975 015766  017737  164530  002560            MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
  4976 015774  013737  002560  002572            MOV     RCSR,ECSR               ;MOVE EXPECTED TO ECSR
  4977 016002  013701  002572                    MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TESTING
  4978 016006  042701  177761                    BIC     #CFNC,R1                ;CLEAR ALL BUT THE FNCT BITS
  4979 016012  001404                            BEQ     1$                      ;BRANCH IF THE FUNCTION BITS ARE CLEAR
  4980 016014  042737  000016  002572            BIC     #FNC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
  4981 016022  104024                            ERROR   +24                     ;FUNCTION BIT(S) ARE NOT CLEAR
  4982 016024  052777  000010  164470    1$:     BIS     #F3,@CSR                ;SET FNCT3
  4983 016032  017737  164464  002560            MOV     @CSR,RCSR               ;MOVE CONTENTS OF CSR TO RCSR
  4984 016040  013737  002560  002572            MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
  4985 016046  013701  002572                    MOV     ECSR,R1                 ;MOVE CONTENTS TO R1 FOR TEST
  4986 016052  042701  170777                    BIC     #CDST,R1                ;CLEAR ALL BUT DSTAT BITS
  4987 016056  022701  004000                    CMP     #DSA,R1                 ;SEE IF DSTAT B AND C ARE CLEAR & A IS SET
  4988 016062  001407                            BEQ     TST14                   ;BRANCH TO NEXT TEST IF DATA OK
  4989 016064  042737  003000  002572            BIC     #DBC,ECSR               ;CLEAR THE BITS THAT SHOULD HAVE BEEN CLEAR
  4990 016072  052737  004000  002572            BIS     #DSA,ECSR               ;SET THE BIT THAT SHOULD HAVE BEEN SET
  4991 016100  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).
                                  ;*
                                  ;;*******************************************************************
 016102                           TST14:
 016102 000004                            SCOPE                      ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 016104 012737  016150  001310            MOV     #999$,$LPERR       ;SET LOOP ON ERROR TO 999$
 016112 032777  004000  163220            BIT     #BIT11,@SWR        ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 016120 001407                            BEQ     1001$              ;&& BRANCH IF NOT
 016122 104401  016130                    TYPE    ,1000$             ;&& TYPE: "T # 14"
 016126 000404                            BR      1001$              ;&& GET OVER ASCII
 016130    124     040     043    1000$:  .ASCIZ  /T # 14/<CRLF>     ;&& THE ASCII MESSAGE
                                          .EVEN
 016140                           1001$:
 016140 032737  000001  002610            BIT     #BIT0,BORW         ;TEST TO SEE IF WE ARE TESTING A DR11-W
 016146 001451                            BEQ     TST15              ;BRANCH TO NEXT TEST IF A DR11-B
 016150 005077  164346            999$:   CLR     @CSR               ;FORCE ACCESS TO CSR
 016154 012777  010000  164340            MOV     #MA,@CSR           ;SET MAINT MODE (SO THAT IDR GETS ODR CONTENTS)
 016162 012777  052525  164334            MOV     #52525,@BDR        ;SET ALT 0'S AND 1'S TO BDR
 016170 017737  164330  002564            MOV     @BDR,RBDR          ;MOVE RECEIVED DATA TO RBDR
 016176 022737  052525  002564            CMP     #52525,RBDR        ;SEE IF DATA WAS LOADED PROPERLY
 016204 001404                            BEQ     1$                 ;BRANCH IF IT WAS
 016206 012737  052525  002576            MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 016214 104031                            ERROR   +31                ;BDR PATTERN NOT CORRECT
 016216 052777  100000  164276    1$:     BIS     #EIR,@CSR          ;GO TO EIR
 016224 012737  052525  002576            MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 016232 012777  125252  164264            MOV     #125252,@BDR       ;SET ALT 1'S AND 0'S TO BDR
 016240 017737  164260  002564            MOV     @BDR,RBDR          ;MOVE RECEIVED DATA TO RBDR
 016246 022737  052525  002564            CMP     #52525,RBDR        ;TEST FOR OLD PATTERN
 016254 001404                            BEQ     2$                 ;BRANCH IF ORIGINAL PATTERN STILL THERE
 016256 012737  052525  002576            MOV     #52525,EBDR        ;MOVE EXPECTED DATA TO EBDR
 016264 104030                            ERROR   +30                ;BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN
 016266 004737  003646            2$:     JSR     PC,CLENUP          ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
```

```
  5025                                          .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.
                                                ;*
                                                ;;*******************************************************************
       016272                                   TST15:
       016272  000004                                   SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       016274  012737  016330  001310                   MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
       016302  032777  004000  163030                   BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       016310  001407                                   BEQ     1001$                   ;&& BRANCH IF NOT
       016312  104401  016320                           TYPE    ,1000$                  ;&& TYPE: ''T # 15''
       016316  000404                                   BR      1001$                   ;&& GET OVER ASCII
       016320     124     040     043   1000$:          .ASCIZ  /T # 15/<CRLF>          ;&& THE ASCII MESSAGE
                                                        .EVEN
       016330                                   1001$:
  5026 016330  012777  010000  164164   999$:   MOV     #MA,@CSR                ;SET MAINTENANCE BIT AND
  5027 016336  005077  164160                           CLR     @CSR                    ;CLEAR CSR TO DO AN INIT
  5028 016342  012737  000140  177776                   MOV     #LEVEL3,PSW             ;STATUS AT LEVEL 3
  5029 016350  017737  164146  002560                   MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
  5030 016356  105737  002560                           TSTB    RCSR                    ;SEE IF READY BIT (BIT 7) IS SET
  5031 016362  100406                                   BMI     1$                      ;BRANCH IF IT IS
  5032 016364  012737  000200  002572                   MOV     #RY,ECSR                ;SET THE BIT THAT SHOULD HAVE BEEN SET
  5033 016372  004737  003670                           JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
  5034 016376  104022                                   ERROR   +22                     ;READY OF CSR WAS NOT SET
  5035 016400  017737  164122  002532   1$:             MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  5036 016406  017737  164116  002534                   MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  5037 016414  012777  016504  164104                   MOV     #3$,@DRINV              ;SET UP INTERRUPT VECTOR
  5038 016422  012777  010000  164072                   MOV     #MA,@CSR                ;MAINT MODE
  5039 016430  012737  001000  002660                   MOV     #1000,TIME              ;SET THE TIME COUNTER
  5040 016436  052777  000105  164056                   BIS     #IE+F2+GO,@CSR          ;IE, FNCT2 AND GO
  5041 016444  005337  002660                   2$:     DEC     TIME                    ;DECREMENT DOWN TO ZERO
  5042 016450  001375                                   BNE     2$                      ;BRANCH IF NOT THERE YET
  5043 016452  017737  164044  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
  5044 016460  013777  002532  164040                   MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  5045 016466  013777  002534  164034                   MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
  5046 016474  104035                                   ERROR   +35                     ;DR11 FAILED TO INTERRUPT
  5047 016476  005077  164020                           CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
  5048 016502  000410                                   BR      TST16                   ;BRANCH TO THE NEXT TEST
  5049 016504  062706  000004           3$:             ADD     #4,SP                   ;CLEAN THE STACK AFTER THE INTERRUPT
  5050 016510  013777  002532  164010                   MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  5051 016516  013777  002534  164004                   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.
                                             ;*
                                             ;;*****************************************************************
      016524                                 TST16:
      016524  000004                                 SCOPE                        ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      016526  012737  016562  001310                 MOV     #999$.$LPERR         ;SET LOOP ON ERROR TO 999$
      016534  032777  004000  162576                 BIT     #BIT11,@SWR          ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      016542  001407                                 BEQ     1001$                ;&& BRANCH IF NOT
      016544  104401  016552                         TYPE    ,1000$               ;&& TYPE: ''T # 16''
      016550  000404                                 BR      1001$                ;&& GET OVER ASCII
      016552     124     040     043         1000$:  .ASCIZ  /T # 16/<CRLF>       ;&& THE ASCII MESSAGE
                                                     .EVEN
      016562                                 1001$:
      016562  004737  003646                 999$:   JSR     PC,CLENUP            ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
      016566  017737  163730  002560                 MOV     @CSR,RCSR            ;MOVE CSR DATA TO RCSR
      016574  105737  002560                         TSTB    RCSR                 ;CLEAR ALL BUT THE READY BIT (BIT 7)
      016600  100411                                 BMI     1$                   ;BRANCH IF IT IS SET
      016602  012737  000200  002572                 MOV     #RY,ECSR             ;MOVE EXPECTED DATA TO ECSR
      016610  004737  003670                         JSR     PC,CHKCAB            ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
      016614  052737  000200  002572                 BIS     #RY,ECSR             ;SET THE BIT THAT SHOULD HAVE BEEN SET
      016622  104022                                 ERROR   +22                  ;READY OF CSR WAS NOT SET
      016624  017737  163676  002532         1$:     MOV     @DRINV,SDRINV        ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
      016632  017737  163672  002534                 MOV     @DRVS,SDRVS          ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
      016640  012777  016726  163660                 MOV     #3$,@DRINV           ;SET UP INT VECTOR
      016646  012777  000340  163654                 MOV     #LEVEL7,@DRVS
      016654  012737  001000  002660                 MOV     #1000,TIME           ;SET TIME DELAY COUNTER
      016662  012777  010000  163632                 MOV     #MA,@CSR             ;MAINT MODE
      016670  052777  000105  163624                 BIS     #IE+F2+GO,@CSR       ;IE, FNCT2 AND GO
      016676  005337  002660                 2$:     DEC     TIME                 ;DECREMENT UNTIL WE GET TO ZERO
      016702  001375                                 BNE     2$                   ;BRANCH BACK IF NOT ZERO YET
      016704  005077  163612                         CLR     @CSR                 ;CLEAR THE CSR TO DO AN INIT
      016710  013777  002532  163610                 MOV     SDRINV,@DRINV        ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
      016716  013777  002534  163604                 MOV     SDRVS,@DRVS          ;RESTORE LOCATION USED AS THE INTERRUPT PS
      016724  000416                                 BR      TST17                ;BRANCH TO THE NEXT TEST
      016726  062706  000004                 3$:     ADD     #4,SP                ;RESTORE STACK
      016732  017737  163564  002560                 MOV     @CSR,RCSR            ;MOVE RECEIVED DATA TO RCSR
      016740  005077  163556                         CLR     @CSR                 ;CLEAR IE
      016744  013777  002532  163554                 MOV     SDRINV,@DRINV        ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
      016752  013777  002534  163550                 MOV     SDRVS,@DRVS          ;RESTORE LOCATION USED AS THE INTERRUPT PS
      016760  104036                                 ERROR   +36                  ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
```

```
                                      .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.
                                      ;;*
                                      ;;*****************************************************************
016762                                TST17:
016762  000004                                SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
016764  012737  017074  001310                MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
016772  032777  004000  162340                BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
017000  001407                                BEQ     1001$                   ;&& BRANCH IF NOT
017002  104401  017010                        TYPE    ,1000$                  ;&& TYPE: "T # 17"
017006  000404                                BR      1001$                   ;&& GET OVER ASCII
017010     124     040     043        1000$:  .ASCIZ  /T # 17/<CRLF>          ;&& THE ASCII MESSAGE
                                              .EVEN
017020                                1001$:
017020  004737  003646                        JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
017024  013737  002720  001362                MOV     DDW,$TMP1               ;MOVE DEVICE DESCRIPTOR WORD TO $TMP1
017032  006237  001362                        ASR     $TMP1                   ;SHIFT THE LEVEL TO THE RIGHT 5 PLACES
017036  006237  001362                        ASR     $TMP1
017042  006237  001362                        ASR     $TMP1
017046  006237  001362                        ASR     $TMP1
017052  006237  001362                        ASR     $TMP1
017056  042737  177770  001362                BIC     #177770,$TMP1           ;CLEAR ALL BUT THE PRIORITY
017064  012700  000003                1$:     MOV     #3,R0                   ;DO 3 PRIORITY LEVELS
017070  012701  004732                        MOV     #LEVELS,R1              ;MOVE ADDRESS OF CPU PRIORITIES TO R1
017074  012777  010000  163420        999$:   MOV     #MA,@CSR                ;SET THE MAINTENANCE BIT AND
017102  005077  163414                        CLR     @CSR                    ;CLEAR TO DO AN INIT
017106  011137  177776                        MOV     (R1),PSW                ;PUT PRIORITY INTO PSW
017112  017737  163404  002560                MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
017120  012737  000200  002572                MOV     #RY,ECSR                ;MOVE READY BIT TO ECSR
017126  004737  003670                        JSR     PC,CHKCAB               ;GO CHECK CABLE STATUS AND ALTER EXPECTED IF NECESSARY
017132  023737  002560  002572                CMP     RCSR,ECSR               ;SEE IF RECEIVED DATA MATCHES EXPECTED
017140  001412                                BEQ     2$                      ;BRANCH IF OK
017142  012737  017064  001310                MOV     #1$,$LPERR              ;SET UP FOR POSSIBLE LOOP ON ERROR FOR THIS ERROR ONLY
017150  012737  000200  002572                MOV     #RY,ECSR                ;MOVE EXPECTED DATA TO ECSR
017156  104022                                ERROR   +22                     ;READY OF CSR WAS NOT SET
017160  012737  017074  001310                MOV     #999$,$LPERR            ;RETURN ORIGINAL LOOP ON ERROR ADDRESS - DID NOT LOOP
017166  017737  163334  002532        2$:     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
017174  017737  163330  002534                MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
017202  012777  017314  163316                MOV     #4$,@DRINV              ;SET UP INTERRUPT VECTOR
017210  012777  000340  163312                MOV     #LEVEL7,@DRVS           ;SET UP INTERRUPT PS
017216  012777  010000  163276                MOV     #MA,@CSR                ;MAINT MODE
017224  012737  000400  002660                MOV     #400,TIME               ;SET DELAY COUNTER
017232  052777  000105  163262                BIS     #IE+F2+GO,@CSR          ;IE, FNCT2 AND GO
017240  005337  002660                3$:     DEC     TIME                    ;DECREMENT UNTIL WE GET TO ZERO
017244  001375                                BNE     3$                      ;BRANCH BACK IF NOT ZERO YET
017246  005077  163250                        CLR     @CSR                    ;CLEAR CSR TO DO AN INIT
017252  013777  002532  163246                MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
017260  013777  002534  163242                MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
017266  013737  177776  002540                MOV     PSW,LEVEL               ;SAVE OLD STATUS LEVEL
017274  005721                                TST     (R1)+                   ;INCREMENT R1 TO POINT TO NEXT PRIORITY LEVEL
017276  005300                                DEC     R0                      ;DECREMENT LOOP COUNTER AND
017300  001275                                BNE     999$                    ;BRANCH BACK FOR ANOTHER TRY IF NOT DONE
017302  104053                                ERROR   +53                     ;DR11 FAILED TO INTERRUPT
```

```
 5132 017304  013737  002552  002540          MOV     DRLEV,LEVEL       ;SET LEVEL TO CONTAIN THE ANTICIPATED LEVEL
 5133 017312  000422                          BR      TST20             ;BRANCH TO THE NEXT TEST
 5134 017314  062706  000004          4$:     ADD     #4,SP             ;RESTORE STACK
 5135 017320  005077  163176                  CLR     @CSR              ;CLEAR IE
 5136 017324  013777  002532  163174          MOV     SDRINV,@DRINV     ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5137 017332  013777  002534  163170          MOV     SDRVS,@DRVS       ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5138 017340  042737  177437  002540          BIC     #177437,LEVEL     ;CLEAR ALL BITS BUT THE BR LEVEL
 5139 017346  023737  002540  002552          CMP     LEVEL,DRLEV       ;SEE IF LEVEL INTERRUPTED MATCHES EXPECTED
 5140 017354  001401                          BEQ     TST20             ;BRANCH AROUND ERROR CALL IF IT IS AS EXPECTED
 5141 017356  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.
                                        ;*
                                        ;;*********************************************************************
 017360                                 TST20:
 017360  000004                                 SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 017362  012737  017416  001310                 MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 017370  032777  004000  16:742                 BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 017376  001407                                 BEQ     1001$                   ;&& BRANCH IF NOT
 017400  104401  017406                         TYPE    ,1000$                  ;&& TYPE: 'T # 20''
 017404  000404                                 BR      1001$                   ;&& GET OVER ASCII
 017406     124     C40     043         1000$:  .ASCIZ  /T # 20/<CRLF>          ;&& THE ASCII MESSAGE
                                                .EVEN
 017416                                 1001$:
 017416  004737  003646                 999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICF REGISTERS & SET CPU PRI TO 7
 017422  017737  163100  002532                 MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 017430  017737  163074  002534                 MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 017436  012777  017540  163062                 MOV     #2$,@DRINV              ;INTERRUPT VECTOR TO 3$
 017444  012777  000140  163056                 MOV     #LEVEL3,@DRVS           ;IN'ERRUPT STATUS TO LEVEL 3
 017452  005037  177776                         CLR     PSW                     ;LET THE DR11 INTERRUPT
 017456  012737  001000  002660                 MOV     #1000,TIME              ;MOVE DELAY COUNTER TO LOCATION
 017464  012777  010101  163030                 MOV     #MA+IE+GO,@CSR          ;SET MAINT, IE AND GO
 017472  052777  020004  163022                 BIS     #AT+F2,@CSR             ;SET ATTN AND FNCT2
 017500  005337  002660                 1$:     DEC     TIME                    ;DECREMENT UNTIL WE REACH ZERO
 017504  001375                                 BNE     1$                      ;BRANCH IF NOT ZERO YET
 017506  013777  002532  163012                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 017514  013777  002534  163006                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 017522  017737  162774  002560                 MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 017530  104035                                 ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 017532  005077  162764                         CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 017536  000512                                 BR      TST21                   ;BRANCH TO THE NEXT TEST
 017540  062706  000004                 2$:     ADD     #4,SP                   ;READJUST STACK AFTER THE INTERRUPT
 017544  C13777  002532  162754                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 017552  013777  002534  162750                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 017560  017737  162736  002560                 MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 017566  100407                                 BMI     3$                      ;BRANCH IF ERROR IS SET
 017570  013737  002560  002572                 MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
 017576  052737  100000  002572                 BIS     #ER,ECSR                ;SET THE BIT THAT SHOULD HAVE BEEN SET
 017604  104037                                 ERROR   +37                     ;ERROR BIT SHOULD NOT BE CLEAR
 017606  017737  162714  002532         3$:     MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 017614  017737  162710  002534                 MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 017622  012777  017716  162676                 MOV     #5$,@DRINV              ;INTERRUPT VECTOR TO 6$
 017630  005077  162664                         CLR     @BAR                    ;PREVENT CAUSING ANOTHER ERROR
 017634  012777  177777  162654                 MOV     #-1,@WCR                ;SET-UP WCR
 017642  012737  001000  002660                 MOV     #1000,TIME              ;LOAD 1000 IN LOCATION TIME FOR WAIT LOOP
 017650  052777  000001  162644                 BIS     #GO,@CSR                ;SET 'GO' IN CSR
 017656  005237  002660                 4$:     INC     TIME                    ;DELAY - WAIT FOR INTERRUPT
 017662  001375                                 BNE     4$                      ;BRANCH BACK IF NOT ZERO
 017664  013777  002532  162634                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 017672  013777  002534  162630                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 017700  017737  162616  002560                 MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 017706  104035                                 ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 017710  005077  162606                         CLR     @CSR                    ;CLEAR CSR TO DO AN INIT
```

```
   5188 017714  000423                          BR      TST21           ;BRANCH TO THE NEXT TEST
   5189 017716  062706  000004          5$:     ADD     #4,SP           ;CLEAN UP STACK AFTER INTERRUPT
   5190 017722  013777  002532  162576          MOV     SDRINV,@DRINV   ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
   5191 017730  013777  002534  162572          MOV     SDRVS,@DRVS     ;RESTORE LOCATION USED AS THE INTERRUPT PS
   5192 017736  017737  162560  002560          MOV     @CSR,RCSR       ;MOVE RECEIVED DATA TO RCSR - IS ERROR CLEAR
   5193 017744  100007                          BPL     TST21           ;BRANCH TO NEXT TEST IF IT IS
   5194 017746  013737  002560  002572          MOV     RCSR,ECSR       ;MOVE EXPECTED DATA TO ECSR
   5195 017754  042737  100000  002572          BIC     #ER,ECSR        ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
   5196 017762  104021                          ERROR   +21             ;ERROR BIT SHOULD HAVE BEEN CLEAR
```

```
 5203                                          .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.
                                               ;*
                                               ;;*******************************************************************
      017764                                   TST21:
      017764  000004                                   SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      017766  012737  020036  001310                   MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
      017774  032777  004000  161336                   BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      020002  001407                                   BEQ     1001$                   ;&& BRANCH IF NOT
      020004  104401  020012                           TYPE    ,1000$                  ;&& TYPE: "T # 21"
      020010  000404                                   BR      1001$                   ;&& GET OVER ASCII
      020012     124     040     043       1000$:  .ASCIZ  /T # 21/<CRLF>          ;&& THE ASCII MESSAGE
                                                       .EVEN
      020022                                   1001$:
 5204 020022  012737  000016  001364                   MOV     #16,$TMP2               ;SET UP FUNCTION COUNT COMPARE
 5205 020030  012737  177771  001360                   MOV     #-7,$TMPO               ;SET UP WCR LOAD VARIABLE
 5206 020036  004737  003646                  999$:    JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 5207 020042  013777  002616  162450                   MOV     INBUF,@BAR              ;SET-UP BAR
 5208 020050  017737  162452  002532          1$:      MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 5209 020056  017737  162446  002534                   MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 5210 020064  012777  020174  162434                   MOV     #3$,@DRINV              ;INTERRUPT VECTOR
 5211 020072  013777  002540  162430                   MOV     LEVEL,@DRVS             ;INTERRUPT VECTOR PRIORITY TO LEVEL OF DEVICE
 5212 020100  013777  001360  162410                   MOV     $TMPO,@WCR              ;SET UP FOR NUMBER OF TRANSFERS IN $TMPO
 5213 020106  005037  177776                          CLR     PSW                     ;LET THE DR11 INTERRUPT
 5214 020112  012777  010000  162402                   MOV     #MA,@CSR                ;MAINT MODE
 5215 020120  012737  001000  002660                   MOV     #1000,TIME              ;MOVE WAIT COUNTER TO LOCATION TIME
 5216 020126  052777  000501  162366                   BIS     #IE+CY+GO,@CSR          ;IE, CYCLE & GO
 5217 020134  005337  002660                  2$:      DEC     TIME                    ;DECREMENT UNTIL ZERO
 5218 020140  001375                                   BNE     2$                      ;BRANCH BACK IF NOT
 5219 020142  017737  162354  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 5220 020150  013777  002532  162350                   MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5221 020156  013777  002534  162344                   MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5222 020164  104035                                   ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 5223 020166  005077  162330                           CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 5224 020172  000442                                   BR      TST22                   ;BRANCH TO NEXT TEST
 5225 020174  062706  000004                  3$:      ADD     #4,SP                   ;CLEAN UP STACK AFTER INTERRUPT
 5226 020200  013777  002532  162320                   MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5227 020206  013777  002534  162314                   MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5228 020214  017737  162302  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 5229 020222  013701  002560                           MOV     RCSR,R1                 ;MOVE RECEIVED DATA TO R1 ALSO AND
 5230 020226  042701  177761                           BIC     #CFNC,R1                ;CLEAR ALL BUT THE FUNCTION BITS
 5231 020232  020137  001364                           CMP     R1,$TMP2                ;SEE IF FUNCTION BIT(S) HAD INCREMENTED PROPERLY
 5232 020236  001412                                   BEQ     4$                      ;BRANCH IF THEY HAD
 5233 020240  013737  002560  002572                   MOV     RCSR,ECSR               ;MOVE RECEIVED DATA TO EXPECTED LOCATION
 5234 020246  042737  000016  002572                   BIC     #FNC,ECSR               ;CLEAR THE FUNCTION BIT(S) THAT WERE THERE AND
 5235 020254  053737  001364  002572                   BIS     $TMP2,ECSR              ;PUT FUNCTION BIT(S) EXPECTED IN THEIR PLACE
 5236 020262  104212                                   ERROR   +212                    ;FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE
 5237 020264  005237  001360                  4$:      INC     $TMPO                   ;ADJUST WCR LOAD LOCATION
 5238 020270  162737  000002  001364                   SUB     #2,$TMP2                ;SUBTRACT 2 FROM FUNCTION COUNT TEST LOCATION
 5239 020276  001264                                   BNE     1$                      ;BRANCH BACK FOR ANOTHER TRY
 5245                                          .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 DONE.
                                               ;*
                                               ;;*****************************************************************
      020300                                   TST22:
      020300  000004                                   SCOPE                            ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      020302  012737  020336  001310                   MOV     #999$,$LPERR             ;SET LOOP ON ERROR TO 999$
      020310  032777  004000  161022                   BIT     #BIT11,@SWR              ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      020316  001407                                   BEQ     1001$                    ;&& BRANCH IF NOT
      020320  104401  020326                           TYPE    ,1000$                   ;&& TYPE: "T # 22"
      020324  000404                                   BR      1001$                    ;&& GET OVER ASCII
      020326     124     040     043   1000$:  .ASCIZ  /T # 22/<CRLF>           ;&& THE ASCII MESSAGE
                                                       .EVEN
      020336                                   1001$:
 5246 020336  005077  162160                   999$:   CLR     @CSR                     ;FORCE ACCESS TO CSR
 5247 020342  012737  000010  002622                   MOV     #10,BUFLEN               ;BUFLEN=10
 5248 020350  013737  002622  002630                   MOV     BUFLEN,WCLEN             ;PREPARE NUMBER FOR WCR
 5249 020356  005437  002630                           NEG     WCLEN                    ;2'S COMPLEMENT OF BUFLEN
 5250 020362  004737  003302                           JSR     PC,LODBUF                ;LOAD IN BUFFER WITH INCREMENTING PATTERN
 5251 020366  004737  003330                           JSR     PC,CHKBFF                ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
 5252 020372  013777  002630  162116                   MOV     WCLEN,@WCR               ;SET UP WCR
 5253 020400  013777  002616  162112                   MOV     INBUF,@BAR               ;SET UP BAR
 5254 020406  012777  177777  162110                   MOV     #-1,@BDR                 ;MAINT AIDE
 5255 020414  017737  162106  002532                   MOV     @DRINV,SDRINV            ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 5256 020422  017737  162102  002534                   MOV     @DRVS,SDRVS              ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 5257 020430  012777  020532  162070                   MOV     #2$,@DRINV               ;INTERRUPT VECTOR
 5258 020436  013777  002540  162064                   MOV     LEVEL,@DRVS              ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
 5259 020444  005037  177776                           CLR     PSW                      ;LET DR11 INTERRUPT
 5260 020450  012777  010000  162044                   MOV     #MA,@CSR                 ;MAINT MODE
 5261 020456  052777  000501  162036                   BIS     #IE+CY+GO,@CSR           ;IE, CYCLE & GO
 5262 020464  012737  001000  002660                   MOV     #1000,TIME               ;SET LOOP COUNTER FOR WAIT
 5263 020472  005337  002660                   1$:     DEC     TIME                     ;DECREMENT UNTIL WE GET TO ZERO
 5264 020476  001375                                   BNE     1$                       ;BRANCH BACK IF NOT ZERO
 5265 020500  013777  002532  162020                   MOV     SDRINV,@DRINV            ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5266 020506  013777  002534  162014                   MOV     SDRVS,@DRVS              ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5267 020514  017737  162002  002560                   MOV     @CSR,RCSR                ;MOVE RECEIVED DATA TO RCSR
 5268 020522  104035                                   ERROR   +35                      ;DR11 FAILED TO INTERRUPT
 5269 020524  005077  161772                           CLR     @CSR                     ;CLEAR THE CSR TO DO AN INIT
 5270 020530  000402                                   BR      3$                       ;BRANCH AROUND THE STACK CLEANUP
 5271 020532  062706  000004                   2$:     ADD     #4,SP                    ;CLEAN UP STACK AFTER THE INTERRUPT
 5272 020536  013777  002532  161762          3$:     MOV     SDRINV,@DRINV            ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5273 020544  013777  002534  161756                   MOV     SDRVS,@DRVS              ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5274 020552  004737  003356                           JSR     PC,INTA                  ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 5275 020556  104051                                   ERROR   +51                      ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 5276 020560  005037  002714                           CLR     ERRCNT                   ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
 5277 020564  004737  003526                           JSR     PC,DATCHK                ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
 5278 020570  104201                                   ERROR   +201                     ;BUFFER DATA NOT CORRECT
 5279 020572  004737  003624                           JSR     PC,DATCH2                ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
 5280
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                                                .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.
                                        ;*
                                        ;;*****************************************************************
     020576                             TST23:
     020576  000004                             SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     020600  012737  020634  001310             MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
     020606  032777  004000  160524             BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
     020614  001407                             BEQ     1001$                   ;&& BRANCH IF NOT
     020616  104401  020624                     TYPE    ,1000$                  ;&& TYPE: "T # 23"
     020622  000404                             BR      1001$                   ;&& GET OVER ASCII
     020624     124     040     043     1000$:  .ASCIZ  /T # 23/<CRLF>          ;&& THE ASCII MESSAGE
                                                .EVEN
     020634                             1001$:
     020634  004737  003646             999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
     020640  012737  001000  002660             MOV     #1000,TIME              ;SET DELAY
     020646  012737  000010  002622             MOV     #10,BUFLEN              ;BUFLEN=10
     020654  013737  002622  002630             MOV     BUFLEN,WCLEN            ;PREPARE NUMBER FOR WCR
     020662  005437  002630                     NEG     WCLEN                   ;2'S COMPLEMENT OF BUFLEN
     020666  004737  003302                     JSR     PC,LODBUF               ;LOAD IN BUFFER WITH INCREMENTING PATTERN
     020672  004737  003330                     JSR     PC,CHKBFF               ;LOAD CHECK BUFFER WITH MODIFIED INCREMENTING PATTERN
     020676  013777  002630  161612             MOV     WCLEN,@WCR              ;SET UP WCR
     020704  013777  002616  161606             MOV     INBUF,@BAR              ;SET UP BAR
     020712  012777  177777  161604             MOV     #-1,@BDR                ;MAINT AIDE
     020720  017737  161602  002532             MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     020726  017737  161576  002534             MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
     020734  012777  021034  161564             MOV     #2$,@DRINV              ;INTERRUPT VECTOR
     020742  013777  002540  161560             MOV     LEVEL,@DRVS             ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
     020750  012777  010000  161544             MOV     #MA,@CSR                ;MAINT MODE
     020756  052777  000501  161536             BIS     #IE+CY+GO,@CSR          ;IE, CYCLE & GO
     020764  005337  002660             1$:     DEC     TIME                    ;WAIT FOR TRANSFERS TO COMPLETE
     020770  001375                             BNE     1$                      ;BRANCH BACK IF WE ARE STILL WAITING
     020772  013777  002532  161526             MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     021000  013777  002534  161522             MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
     021006  004737  003356                     JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
     021012  104051                             ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
     021014  005037  002714                     CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
     021020  004737  003526                     JSR     PC,DATCHK               ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
     021024  104201                             ERROR   +201                    ;BUFFER DATA NOT CORRECT
     021026  004737  003624                     JSR     PC,DATCH2               ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
     021032  000415                             BR      3$                      ;BRANCH TO CONTINUE
     021034  062706  000004             2$:     ADD     #4,SP                   ;CLEAN UP THE STACK FROM THIS INTERRUPT
     021040  013777  002532  161460             MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
     021046  013777  002534  161454             MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
     021054  017737  161442  002560             MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
     021062  104036                             ERROR   +36                     ;DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE
     021064  000523                             BR      TST24                   ;BRANCH TO NEXT TEST
     021066  012777  010000  161426     3$:     MOV     #MA,@CSR                ;MAINT MODE
     021074  012737  001000  002660             MOV     #1000,TIME              ;SET TIME LOOP COUNTER
     021102  013777  002630  161406             MOV     WCLEN,@WCR              ;MOVE WCLEN TO WCR
     021110  013777  002616  161402             MOV     INBUF,@BAR              ;MOVE INBUF TO BAR
     021116  017737  161404  002532             MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
     021124  017737  161400  002534             MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
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 5327 021132  012777  021304  161366          MOV     #8$,@DRINV        ;SET UP INTERRUPT VECTOR
 5328 021140  012777  010000  161354          MOV     #MA,@CSR          ;MAINT MODE
 5329 021146  052777  000501  161346          BIS     #IE+CY+GO,@CSR    ;IE, CYCLE & GO
 5330 021154  005337  002660          4$:     DEC     TIME              ;DECREMENT TO ZERO WHILE WAITING
 5331 021160  001375                          BNE     4$                ;BRANCH BACK IF NOT ZERO
 5332 021162  013777  002532  161336          MOV     SDRINV,@DRINV     ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5333 021170  013777  002534  161332          MOV     SDRVS,@DRVS       ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5334 021176  017737  161320  002560          MOV     @CSR,RCSR         ;MOVE RECEIVED DATA TO RCSR
 5335 021204  022737  010700  002560          CMP     #10700,RCSR       ;SEE IF ONLY READY, MAINT, IE & CYCLE ARE SET
 5336 021212  001404                          BEQ     5$                ;BRANCH IF THEY ARE
 5337 021214  012737  010700  002572          MOV     #10700,ECSR       ;MOVE EXPECTED DATA TO ECSR
 5338 021222  104040                          ERROR   +40               ;CSR IS WRONG
 5339 021224  017737  161270  002566  5$:     MOV     @BAR,RBAR         ;MOVE RECEIVED DATA TO RBAR
 5340 021232  022777  177770  161256          CMP     #-10,@WCR         ;CHECK THAT NO TRANSFERS WERE MADE
 5341 021240  001004                          BNE     6$                ;BRANCH TO ERROR IF THERE WERE
 5342 021242  023737  002616  002566          CMP     INBUF,RBAR        ;CHECK THAT NO TRANSFERS WERE MADE
 5343 021250  001412                          BEQ     7$                ;BRANCH AROUND ERROR IF NONE
 5344 021252  017737  161240  002570  6$:     MOV     @WCR,RWCR         ;MOVE RECEIVED DATA TO RWCR
 5345 021260  012737  177770  002602          MOV     #-10,EWCR         ;MOVE EXPECTED DATA TO EWCR
 5346 021266  013737  002616  002600          MOV     INBUF,EBAR        ;MOVE EXPECTED DATA TO EBAR
 5347 021274  104041                          ERROR   +41               ;TRANSFERS SHOULD HAVE BEEN INHIBITED
 5348 021276  005077  161220          7$:     CLR     @CSR              ;CLEAR THE CSR TO DO AN INIT
 5349 021302  000414                          BR      TST24             ;BRANCH TO NEXT TEST
 5350 021304  062706  000004          8$:     ADD     #4,SP             ;CLEAN UP STACK AFTER INTERRUPT
 5351 021310  013777  002532  161210          MOV     SDRINV,@DRINV     ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5352 021316  013777  002534  161204          MOV     SDRVS,@DRVS       ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5353 021324  017737  161172  002560          MOV     @CSR,RCSR         ;MOVE RECEIVED DATA TO RCSR
 5354 021332  104042                          ERROR , +42               ;DR11 SHOULD NOT HAVE INTERRUPTED A 2ND TIME
```

```
  5360                                          .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.
                                                ;*
                                                ;;*****************************************************************
       021334                                   TST24:
       021334  000004                                   SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       021336  012737  021372  001310                   MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
       021344  032777  004000  157766                   BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       021352  001407                                   BEQ     1001$                   ;&& BRANCH IF NOT
       021354  104401  021362                           TYPE    ,1000$                  ;&& TYPE: "T # 24"
       021360  000404                                   BR      1001$                   ;&& GET OVER ASCII
       021362     124     040     043       1000$:      .ASCIZ  /T # 24/<CRLF>          ;&& THE ASCII MESSAGE
                                                        .EVEN
       021372                                   1001$:
  5361 021372  004737  003646               999$:       JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  5362 021376  005077  161120                           CLR     @CSR                    ;FORCE ACCESS TO CSR
  5363 021402  012737  000200  002622                   MOV     #200,BUFLEN             ;LENGTH OF BUFFER = 200
  5364 021410  013737  002622  002630                   MOV     BUFLEN,WCLEN            ;PREPARE NUMBER FOR WCR
  5365 021416  005437  002630                           NEG     WCLEN                   ;2'S COMPLEMENT OF BUFLEN
  5366 021422  004737  003302                           JSR     PC,LODBUF               ;LOAD INBUF WITH INCREMENTING PATTERN
  5367 021426  004737  003330                           JSR     PC,CHKBFF               ;LOAD CHKBUF WITH MODIFIED INCREMENTED PATTERN
  5368 021432  013777  002630  161056                   MOV     WCLEN.@WCR              ;SET UP WCR
  5369 021440  013777  002616  161052                   MOV     INBUF,@BAR              ;SET UP BAR
  5370 021446  012777  177777  161050                   MOV     #-1,@BDR                ;MAINT AIDE
  5371 021454  017737  161046  002532                   MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
  5372 021462  017737  161042  002534                   MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
  5373 021470  012777  021572  161030                   MOV     #2$,@DRINV              ;INT VECTOR
  5374 021476  013777  002540  161024                   MOV     LEVEL,@DRVS             ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
  5375 021504  005037  177776                           CLR     PSW                     ;LET THE DR11 INTERRUPT
  5376 021510  012777  010000  161004                   MOV     #MA,@CSR                ;MAINT MODE
  5377 021516  012737  001000  002660                   MOV     #1000,TIME              ;SET WAIT LOOP COUNTER
  5378 021524  052777  000501  160770                   BIS     #IE+CY+GO,@CSR          ;IE, CYCLE & GO
  5379 021532  005337  002660               1$:         DEC     TIME                    ;DECREMENT UNTIL WE GET TO ZERO
  5380 021536  001375                                   BNE     1$                      ;BRANCH BACK IF NOT ZERO
  5381 021540  017737  160756  002560                   MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
  5382 021546  013777  002532  160752                   MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  5383 021554  013777  002534  160746                   MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
  5384 021562  104043                                   ERROR   +43                     ;EXPECTED INTERRUPT DID NOT OCCUR
  5385 021564  005077  160732                           CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
  5386 021570  000402                                   BR      3$                      ;BRANCH AROUND THE STACK CLEANUP
  5387 021572  062706  000004               2$:         ADD     #4,SP                   ;CLEAN UP THE STACK AFTER INTERRUPT
  5388 021576  013777  002532  160722       3$:         MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
  5389 021604  013777  002534  160716                   MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
  5390 021612  004737  003356                           JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
  5391 021616  104051                                   ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORRECT
  5392 021620  005037  002714                           CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
  5393 021624  004737  003526                           JSR     PC,DATCHK               ;CHECK INBUF AFTER A MAINTENANCE MODE OPERATION
  5394 021630  104201                                   ERROR   +201                    ;BUFFER DATA NOT CORRECT
  5395 021632  004737  003624                           JSR     PC,DATCH2               ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATCHK
```

```
 5402                                       .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.
                                            ;;*
                                            ;;*****************************************************************
      021636                                TST25:
      021636  000004                                SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      021640  012737  021674  001310                MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
      021646  032777  004000  157464                BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      021654  001407                                BEQ     1001$                   ;&& BRANCH IF NOT
      021656  104401  021664                        TYPE    ,1000$                  ;&& TYPE: "T # 25"
      021662  000404                                BR      1001$                   ;&& GET OVER ASCII
      021664     124     040     043        1000$:  .ASCIZ  /T # 25/<CRLF>          ;&& THE ASCII MESSAGE
                                                    .EVEN
      021674                                1001$:
 5403 021674  004737  003646                999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 5404 021700  005077  160616                        CLR     @CSR                    ;FORCE ACCESS TO CSR
 5405 021704  012777  177776  160604                MOV     #-2,@WCR                ;SET UP WCR
 5406 021712  013777  002614  160600                MOV     DIOMEM,@BAR             ;SET UP BAR
 5407 021720  017737  160602  002532                MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 5408 021726  017737  160576  002534                MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 5409 021734  012777  022044  160564                MOV     #2$,@DRINV              ;INTERRUPT VECTOR TO 3$
 5410 021742  013777  002540  160560                MOV     LEVEL,@DRVS             ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
 5411 021750  005037  177776                        CLR     PSW                     ;LET THE DR11 INTERRUPT
 5412 021754  012777  010000  160540                MOV     #MA,@CSR                ;MAINT MODE
 5413 021762  052777  000062  160532                BIS     #F1+X6+X7,@CSR          ;SET FNCT1, XBA16, AND XBA17
 5414 021770  052777  000501  160524                BIS     #IE+CY+GO,@CSR          ;SET IE, CYCLE, AND GO
 5415 021776  012737  001000  002660                MOV     #1000,TIME              ;SET DELAY COUNTER
 5416 022004  005337  002660                1$:     DEC     TIME                    ;DECREMENT UNTIL ZERO
 5417 022010  001375                                BNE     1$                      ;BRANCH BACK IF NOT
 5418 022012  013777  002532  160506                MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5419 022020  013777  002534  160502                MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5420 022026  017737  160470  002560                MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 5421 022034  104035                                ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 5422 022036  005077  160460                        CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 5423 022042  000431                                BR      TST26                   ;BRANCH TO THE NEXT TEST
 5424 022044  062706  000004                2$:     ADD     #4,SP                   ;RESTORE THE STACK
 5425 022050  013777  002532  160450                MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5426 022056  013777  002534  160444                MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5427 022064  017737  160432  002560                MOV     @CSR,RCSR               ;MOVE CSR DATA TO RCSR
 5428 022072  013701  002560                        MOV     RCSR,R1                 ;MOVE DATA TO R1 FOR CHECKING
 5429 022076  042701  037577                        BIC     #37577,R1               ;CLEAR ALL BUT ERROR, NEX AND READY BITS
 5430 022102  022701  140200                        CMP     #ER+NX+RY,R1            ;SEE IF ALL THESE BITS ARE SET
 5431 022106  001407                                BEQ     TST26                   ;BRANCH TO THE NEXT TEST IF THEY ARE ALL SET
 5432 022110  013737  002560  002572                MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
 5433 022116  052737  140200  002572                BIS     #ER+NX+RY,ECSR          ;SET THE BIT THAT SHOULD HAVE BEEN SET
 5434 022124  104040                                ERROR   +40                     ;CSR IS WRONG
 5441                                        .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.
                                             ;*
                                             ;;***************************************************************
      022126                                 TST26:
      022126  000004                                 SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      022130  012737  022164  001310                 MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
      022136  032777  004000  157174                 BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      022144  001407                                 BEQ     1001$                   ;&& BRANCH IF NOT
      022146  104401  022154                         TYPE    ,1000$                  ;&& TYPE: "T # 26"
      022152  000404                                 BR      1001$                   ;&& GET OVER ASCII
      022154     124     040     043 1000$:  .ASCIZ  /T # 26/<CRLF>          ;&& THE ASCII MESSAGE
                                                     .EVEN
      022164                                 1001$:
 5442 022164  004737  003646                 999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 5443 022170  012777  177760  160320                 MOV     #-20,@WCR               ;SET UP WCR
 5444 022176  012777  177776  160314                 MOV     #-2,@BAR                ;SET UP BAR FOR PROC STATUS ADDRESS
 5445 022204  017737  160316  002532                 MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 5446 022212  017737  160312  002534                 MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 5447 022220  012777  022316  160300                 MOV     #2$,@DRINV              ;INTERRUPT VECTOR TO 3$
 5448 022226  013777  002540  160274                 MOV     LEVEL,@DRVS             ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
 5449 022234  012737  001000  002660                 MOV     #1000,TIME              ;SET WAIT LOOP COUNTER
 5450 022242  005037  177776                         CLR     PSW                     ;LET THE DR11 INTERRUPT
 5451 022246  012777  010000  160246                 MOV     #MA,@CSR                ;MAINT MODE
 5452 022254  052777  000563  160240                 BIS     #563,@CSR               ;CYCLE, IE, FNCT1, XBA17, XBA16, AND GO TO CSR
 5453 022262  005337  002660                 1$:     DEC     TIME                    ;DECREMENT UNTIL WE GET TO ZERO
 5454 022266  001375                                 BNE     1$                      ;BRANCH BACK IF NOT ZERO
 5455 022270  013777  002532  160230                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5456 022276  013777  002534  160224                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5457 022304  017737  160212  002560                 MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
 5458 022312  104035                                 ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 5459 022314  000433                                 BR      TST27                   ;BRANCH TO NEXT TEST
 5460 022316  062706  000004                 2$:     ADD     #4,SP                   ;CLEAN UP STACK AFTER INTERRUPT
 5461 022322  013777  002532  160176                 MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5462 022330  013777  002534  160172                 MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5463 022336  017737  160160  002560                 MOV     @CSR,RCSR               ;MOVE CSR CONTENTS TO RCSR
 5464 022344  013701  002560                         MOV     RCSR,R1                 ;MOVE CONTENTS TO R1 FOR TESTING
 5465 022350  042701  037577                         BIC     #37577,R1               ;CLEAR ALL BUT THE ERROR AND READY BITS
 5466 022354  022701  140200                         CMP     #ER+RY+NX,R1            ;SEE IF ERROR, READY AND NEX ARE SET
 5467 022360  001411                                 BEQ     TST27                   ;BRANCH TO NEXT TEST IF THEY ARE
 5468 022362  013737  002560  002572                 MOV     RCSR,ECSR               ;MOVE EXPECTED DATA TO ECSR
 5469 022370  052737  140200  002572                 BIS     #ER+RY+NX,ECSR          ;SET THE BITS THAT SHOULD HAVE BEEN SET
 5470 022376  104040                                 ERROR   +40                     ;CSR IS WRONG
 5471 022400  005077  160116                         CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
```

```
                                               .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.
                                               ;;*
                                               ;;*************************************************************
 022404                                        TST27:
 022404 000004                                         SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 022406 012737  022452  001310                         MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
 022414 032777  004000  156716                         BIT     #BIT11,@SWR         ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 022422 001407                                         BEQ     1001$               ;&& BRANCH IF NOT
 022424 104401  022432                                 TYPE    ,1000$              ;&& TYPE: "T # 27"
 022430 000404                                         BR      1001$               ;&& GET OVER ASCII
 022432    124     040     043         1000$:          .ASCIZ  /T # 27/<CRLF>      ;&& THE ASCII MESSAGE
                                                       .EVEN
 022442                                1001$:
 022442 032737  000001  002610                         BIT     #BIT0,BORW          ;TESTING A "B" OR A "W"?
 022450 001456                                         BEQ     INOOUT              ;BRANCH TO INOOUT IF DR11-B
 022452 004737  003646                 999$:           JSR     PC,CLENUP           ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 022456 012777  100000  160036                         MOV     #EIR,@CSR           ;GO TO EIR MODE
 022464 017737  160032  002562                         MOV     @CSR,REIR           ;MOVE EIR DATA TO REIR
 022472 005077  160024                                 CLR     @CSR                ;GO BACK TO CSR
 022476 013701  002562                                 MOV     REIR,R1             ;MOVE DATA TO R1 ALSO
 022502 000301                                         SWAB    R1                  ;GET BIT 8 INTO BIT 0 BY SWAPPING BYTES
 022504 006301                                         ASL     R1                  ;MOVE BIT 0 INTO BIT 1
 022506 042701  177775                                 BIC     #CBIT1,R1           ;CLEAR ALL BUT BIT 1
 022512 013702  002720                                 MOV     DDW,R2              ;PUT DEVICE DESCRIPTOR WORD IN R2
 022516 042702  177775                                 BIC     #CBIT1,R2           ;CLEAR ALL BUT BIT 1
 022522 001402                                         BEQ     1$                  ;BRANCH IF IT IS CLEAR
 022524 005002                                         CLR     R2                  ;CLEAR THE BIT
 022526 000402                                         BR      2$                  ;GO TEST THE BIT
 022530 012702  000002                 1$:             MOV     #BIT1,R2            ;SET THE BIT
 022534 020102                         2$:             CMP     R1,R2               ;SEE IF RECEIVED MATCHES EXPECTED
 022536 001017                                         BNE     5$                  ;BRANCH TO CHECK FOR LOOP ON TEST
 022540 013737  002562  002574                         MOV     REIR,EEIR           ;MOVE EXPECTED DATA TO EEIR
 022546 032737  000400  002574                         BIT     #BIT8,EEIR          ;TEST STATE OF BIT 8
 022554 001404                                         BEQ     3$                  ;BRANCH IF IT IS CLEAR
 022556 042737  000400  002574                         BIC     #BIT8,EEIR          ;REVERSE STATE - EXPECTED CLEAR
 022564 000403                                         BR      4$                  ;GO CALL ERROR
 022566 052737  000400  002574         3$:             BIS     #BIT8,EEIR          ;REVERSE STATE - EXPECTED SET
 022574 104054                         4$:             ERROR   +54                 ;2-N CYCLE BURST SWITCH IN WRONG POSITION
 022576 032777  040400  156534         5$:             BIT     #BIT14+BIT8,@SWR;SEE IF WE SHOULD LOOP ON THIS TEST
 022604 001322                                         BNE     999$                ;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.

022606  032737  000004  002720  INOOUT: BIT     #BIT2,DDW       ;SEE IF CABLE IS IN
022614  001002                          BNE     TST30           ;BRANCH TO NEXT TEST IF CABLE IS IN
022616  000137  025622                  JMP     ENDEV           ;JUMP TO ENDEV - TESTS ARE NOT TO BE DONE
```

```
5522                                    .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'.
                                        ;;*
                                        ;;*******************************************************************
     022622                             TST30:
     022622  000004                              SCOPE                            ;PROCESS LOOPING AND TEST NUMBER INCREMENT
     022624  012737  022706  001310              MOV      #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
     022632  032777  004000  156500              BIT      #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
     022640  001407                              BEQ      1001$                   ;&& BRANCH IF NOT
     022642  104401  022650                      TYPE     ,1000$                  ;&& TYPE: "T # 30"
     022646  000404                              BR       1001$                   ;&& GET OVER ASCII
     022650     124     040     043     1000$:   .ASCIZ   /T # 30/<CRLF>          ;&& THE ASCII MESSAGE
                                                 .EVEN
     022660                             1001$:
5523 022660  004737  003646                      JSR      PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
5524 022664  005037  002714                      CLR      ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +202
5525 022670  012700  000002                      MOV      #2,R0                   ;DO 2 SETS OF 200 PATTERNS
5526 022674  012701  007220                      MOV      #MAICLR,R1              ;MOVE ADDRESS OF EXPECTED PATTERNS TO R1
5527 022700  005002                              CLR      R2                      ;START WITH PATTERN ZERO
5528 022702  012703  000200             1$:      MOV      #200,R3                 ;MOVE 200 TO THE LOOP COUNTER
5529 022706  052777  010000  157606     999$:    BIS      #MA,@CSR                ;SET MAINTENANCE AND
5530 022714  005077  157602                      CLR      @CSR                    ;CLEAR TO DO AN INIT
5531 022720  017737  157576  002560              MOV      @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
5532 022726  022737  000200  002560              CMP      #RY,RCSR                ;MAKE SURE READY BIT IS THE ONLY BIT SET
5533 022734  001404                              BEQ      2$                      ;BRANCH IF SO
5534 022736  012737  000200  002572              MOV      #RY,ECSR                ;MOVE EXPECTED DATA TO ECSR
5535 022744  104032                              ERROR    +32                     ;READY IS NOT THE ONLY BIT SET
5536 022746  012777  177777  157542     2$:      MOV      #-1,@WCR                ;MOVE 1 WORD COUNT TO WCR IN CASE OF IE ENABLED
5537 022754  012777  056104  157536              MOV      #NOCARE,@BAR            ;MOVE A NOT-CARE ADDRESS TO BAR FOR SAME REASON
5538 022762  010277  157534                      MOV      R2,@CSR                 ;SET THE PARTICULAR FUNCTION BITS IN CSR
5539 022766  017737  157530  002560              MOV      @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
5540 022774  011137  002572                      MOV      (R1),ECSR               ;MOVE EXPECTED DATA TO ECSR
5541 023000  023737  002572  002560              CMP      ECSR,RCSR               ;COMPARE EXPECTED WITH RECEIVED
5542 023006  001427                              BEQ      6$                      ;BRANCH IF OK
5543 023010  012737  000401  023020              MOV      #CY+GO,3$               ;REESTABLISH BIT PATTERN
5544 023016  040227                              BIC      R2,(PC)+                ;SEE IF BOTH CYCLE AND GO WERE SET
5545 023020  000401                     3$:      .WORD    CY+GO                   ;LOCATION TO HOLD BOTH CYCLE AND GO BITS
5546 023022  001016                              BNE      5$                      ;BRANCH TO ERROR ONLY IF EITHER OR BOTH BITS WERE CLEAR
5547 023024  005737  002712                      TST      MEMGMT                  ;SEE IF MEMORY MANAGEMENT IS OUT THERE
5548 023030  001404                              BEQ      4$                      ;BRANCH IF NOT
5549 023032  032737  000060  002572              BIT      #X6+X7,ECSR             ;SEE IF EITHER XBA16 OR XBA17 ARE SET
5550 023040  001407                              BEQ      5$                      ;BRANCH TO ERROR IF BOTH ARE CLEAR
5551 023042  052737  140000  002572     4$:      BIS      #ER+NX,ECSR             ;SET THE ERROR AND NEX BITS - EXPECT THEM TO SET
5552 023050  023737  002572  002560              CMP      ECSR,RCSR               ;NOW SEE IF DATA MATCHES
5553 023056  001403                              BEQ      6$                      ;BRANCH AROUND ERROR IF IT DOES
5554 023060  010237  002536             5$:      MOV      R2,BUT                  ;MOVE THE BITS SET INTO CSR TO THE BUT LOCATION
5555 023064  104202                              ERROR    +202                    ;CSR PATTERN NOT CORRECT
5556 023066  062701  000002             6$:      ADD      #2,R1                   ;INCREMENT R1 TO NEXT EXPECTED PATTERN
5557 023072  005202                              INC      R2                      ;INCREMENT THE PATTERN
5558 023074  005303                              DEC      R3                      ;DECREMENT THE LOOP COUNTER
5559 023076  001303                              BNE      999$                    ;BRANCH BACK IF NOT DONE
5560 023100  062702  000200                      ADD      #200,R2                 ;ADD 200 TO PATTERN LOCATION
```

```
   5561 023104  005300                         DEC     R0              ;DECREMENT THE LOOP COUNTER AND
   5562 023106  001275                         BNE     1$              ;BRANCH BACK IF 2ND OCTAL GROUP NOT DONE
```

```
  5568                                        .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).
                                              ;;*
                                              ;;*****************************************************************
       023110                                 TST31:
       023110  000004                                 SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
       023112  012737  023146  001310                 MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
       023120  032777  004000  156212                 BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
       023126  001407                                 BEQ     1001$                   ;&& BRANCH IF NOT
       023130  104401  023136                         TYPE    ,1000$                  ;&& TYPE: ''T # 31''
       023134  000404                                 BR      1001$                   ;&& GET OVER ASCII
       023136     124     040     043 1000$:  .ASCIZ  /T # 31/<CRLF>          ;&& THE ASCII MESSAGE
                                                      .EVEN
       023146                                 1001$:
  5569 023146  004737  003646         999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
  5570 023152  012777  001360  157340         MOV     #$TMP0,@BAR             ;PUT AN ADDRESS IN THE BAR
  5571 023160  012777  000001  157334         MOV     #GO,@CSR                ;SET JUST THE GO BIT TO CLEAR THE READY BIT
  5572 023166  017737  157330  002560         MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
  5573 023174  001403                         BEQ     1$                      ;BRANCH AROUND ERROR IF EQUAL TO ZERO
  5574 023176  005037  002572                 CLR     ECSR                    ;MOVE EXPECTED DATA TO ECSR
  5575 023202  104040                         ERROR   +40                     ;CSR IS WRONG
  5576 023204  017737  157310  002566 1$:     MOV     @BAR,RBAR               ;MOVE RECEIVED DATA TO RBAR
  5577 023212  032737  000001  002566         BIT     #BIT0,RBAR              ;SEE IF THIS BIT IS CLEAR
  5578 023220  001407                         BEQ     TST32                   ;BRANCH TO NEXT TEST IF IT WAS
  5579 023222  013737  002566  002600         MOV     RBAR,EBAR               ;MOVE EXPECTED DATA TO EBAR
  5580 023230  042737  000001  002600         BIC     #BIT0,EBAR              ;CLEAR THE BIT THAT SHOULD HAVE BEEN CLEAR
  5581 023236  104044                         ERROR   +44                     ;BAR IS WRONG
```

```
 5588                                     .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.
                                          ;*
                                          ;;*************************************************************************
      023240                              TST32:
      023240  000004                              SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
      023242  012737  023312  001310              MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
      023250  032777  004000  156062              BIT     #BIT11,@SWR         ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
      023256  001407                              BEQ     1001$               ;&& BRANCH IF NOT
      023260  104401  023266                      TYPE    ,1000$              ;&& TYPE: "T # 32"
      023264  000404                              BR      1001$               ;&& GET OVER ASCII
      023266     124     040     043      1000$:  .ASCIZ  /T # 32/<CRLF>      ;&& THE ASCII MESSAGE
                                                  .EVEN
      023276                              1001$:
 5589 023276  012702  000007              1$:     MOV     #7,R2               ;SET UP LOOP COUNTER - DO 7 BIT PATTERNS
 5590 023302  005037  002714                      CLR     ERRCNT              ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
 5591 023306  012703  007202                      MOV     #PATRNS,R3          ;MOVE ADDRESS OF PATTERNS TO R3
 5592 023312  017737  157210  002532      999$:   MOV     @DRINV,SDRINV       ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 5593 023320  017737  157204  002534              MOV     @DRVS,SDRVS         ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 5594 023326  012777  023470  157172              MOV     #3$,@DRINV          ;INTERRUPT VECTOR TO 4$
 5595 023334  013777  002540  157166              MOV     LEVEL,@DRVS         ;INTERRUPT STATUS AT PRIORITY LEVEL OF DEVICE
 5596 023342  005037  177776                      CLR     PSW                 ;LET THE DR11 INTERRUPT
 5597 023346  012777  010000  157146              MOV     #MA,@CSR            ;DO AN INIT BY SETTING AND
 5598 023354  005077  157142                      CLR     @CSR                ;CLEARING THE CSR MAINTENANCE BIT
 5599 023360  012777  177777  157130              MOV     #-1,@WCR            ;SET UP FOR 1 TRANSFER
 5600 023366  012777  002612  157124              MOV     #NPR1,@BAR          ;TRANSFER FROM BUS ADDRESS IN NPR1
 5601 023374  005077  157124                      CLR     @BDR                ;GET READY TO RECEIVE DATA
 5602 023400  011337  002612                      MOV     (R3),NPR1           ;SET UP TRANSFER DATA
 5603 023404  012777  000110  157110              MOV     #F3+IE,@CSR         ;SET THE NON BURST (FNCT3) AND IE
 5604 023412  052777  000401  157102              BIS     #CY+GO,@CSR         ;SET THE CYCLE AND GO BITS
 5605 023420  005037  002660                      CLR     TIME                ;CLEAR THE TIME LOCATION FOR WAIT LOOP
 5606 023424  005237  002660              2$:     INC     TIME                ;INCREMENT UNTIL WE GET TO ZERO AGAIN
 5607 023430  001375                              BNE     2$                  ;BRANCH BACK IF WE AREN'T THERE YET
 5608 023432  013777  002532  157066              MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5609 023440  013777  002534  157062              MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5610 023446  017737  157050  002560              MOV     @CSR,RCSR           ;MOVE RECEIVED DATA TO RCSR
 5611 023454  011337  002604                      MOV     (R3),ENPR1          ;MOVE PATTERN TO ENPR1
 5612 023460  104035                              ERROR   +35                 ;DR11 FAILED TO INTERRUPT
 5613 023462  005077  157034                      CLR     @CSR                ;CLEAR THE CSR TO DO AN INIT
 5614 023466  000450                              BR      5$                  ;BRANCH TO SEE IF THERE ARE ANY MORE PATTERNS TO CHECK
 5615 023470  062706  000004              3$:     ADD     #4,SP               ;CLEAN STACK AFTER INTERRUPT
 5616 023474  013777  002532  157024              MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 5617 023502  013777  002534  157020              MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
 5618 023510  004737  004064                      JSR     PC,ERRCHK           ;CLEAR IE, CHECK FOR ERROR
 5619 023514  104021                              ERROR   +21                 ;ERROR BIT SHOULD HAVE BEEN CLEAR
 5620 023516  017737  156776  002566              MOV     @BAR,RBAR           ;MOVE RECEIVED DATA TO RBAR
 5621 023524  012737  002615  002600              MOV     #NPR1+3,EBAR        ;MOVE EXPECTED DATA TO EBAR
 5622 023532  017737  156766  002564              MOV     @BDR,RBDR           ;MOVE RECEIVED DATA TO RBDR
 5623 023540  011337  002576                      MOV     (R3),EBDR           ;MOVE EXPECTED DATA TO EBDR
 5624 023544  017737  156746  002570              MOV     @WCR,RWCR           ;MOVE RECEIVED DATA TO RWCR
 5625 023552  005037  002602                      CLR     EWCR                ;MOVE EXPECTED DATA TO EWCR
 5626 023556  023737  002566  002600              CMP     RBAR,EBAR           ;COMPARE RECEIVED WITH EXPECTED
 5627 023564  001010                              BNE     4$                  ;BRANCH IF WRONG
```

```
   5628 023566  023737  002564  002576          CMP     RBDR,EBDR       ;COMPARE RECEIVED WITH EXPECTED
   5629 023574  001004                          BNE     4$              ;BRANCH IF WRONG
   5630 023576  023737  002570  002602          CMP     RWCR,EWCR       ;COMPARE RECEIVED WITH EXPECTED
   5631 023604  001401                          BEQ     5$              ;BRANCH IF OK
   5632 023606  104211                  4$:     ERROR   +211            ;CSR AND-OR WCR AND-OR BAR ARE INCORRECT
   5633 023610  062703  000002          5$:     ADD     #2,R3           ;INCREMENT TO NEXT PATTERN
   5634 023614  005302                          DEC     R2              ;DECREMENT THE LOOP COUNTER
   5635 023616  001235                          BNE     999$            ;BRANCH BACK IF NOT ZERO YET
```

```
                                        .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.
                                        ;*
                                        ;;*****************************************************************
023620                                  TST33:
023620  000004                                  SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
023622  012737  023656  001310                  MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
023630  032777  004000  155502                  BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
023636  001407                                  BEQ     1001$                   ;&& BRANCH IF NOT
023640  104401  023646                          TYPE    ,1000$                  ;&& TYPE: "T # 33"
023644  000404                                  BR      1001$                   ;&& GET OVER ASCII
023646     124     040     043          1000$:  .ASCIZ  /T # 33/<CRLF>          ;&& THE ASCII MESSAGE
                                                .EVEN
023656                                  1001$:
023656  004737  003646                  999$:   JSR     PC,CLENUP               ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
023662  012737  000200  002622                  MOV     #200,BUFLEN             ;LENGTH OF BUFFER=200
023670  004737  003302                          JSR     PC,LODBUF               ;LOAD THE BUFFER WITH INCREMENTING PATTERN
023674  012737  177600  002630                  MOV     #-200,WCLEN             ;PREPARE NUMBER FOR WCR
023702  013777  002630  156606                  MOV     WCLEN,@WCR              ;SET UP WCR
023710  013777  002616  156602                  MOV     INBUF,@BAR              ;SET UP BAR
023716  012777  177777  156600                  MOV     #-1,@BDR                ;MAINT AIDE
023724  017737  156576  002532                  MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
023732  017737  156572  002534                  MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
023740  012777  024050  156560                  MOV     #2$,@DRINV              ;INT VECTOR
023746  013777  002540  156554                  MOV     LEVEL,@DRVS             ;INTERRUPT STATUS TO LEVEL OF DEVICE
023754  005037  177776                          CLR     PSW                     ;LET THE DR11 INTERRUPT
023760  012777  000100  156534                  MOV     #IE,@CSR                ;SET INTERRUPT ENABLE
023766  052777  000401  156526                  BIS     #CY+GO,@CSR             ;CYCLE, GO
023774  012737  001000  002660                  MOV     #1000,TIME              ;WAIT FOR INTERRUPT
024002  005337  002660                  1$:     DEC     TIME                    ;DECREMENT UNTIL WE REACH ZERO
024006  001375                                  BNE     1$                      ;BRANCH BACK IF NOT ZERO
024010  013777  002532  156510                  MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
024016  013777  002534  156504                  MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
024024  017737  156472  002560                  MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
024032  104035                                  ERROR   +35                     ;DR11 FAILED TO INTERRUPT
024034  012777  010000  156460                  MOV     #MA,@CSR                ;SET THE MAINTENANCE BIT AND
024042  005077  156454                          CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
024046  000426                                  BR      TST34                   ;BRANCH TO NEXT TEST
024050  062706  000004                  2$:     ADD     #4,SP                   ;CLEAN UP STACK AFTER INTERRUPT
024054  013777  002532  156444                  MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
024062  013777  002534  156440                  MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
024070  004737  003356                          JSR     PC,INTA                 ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
024074  104051                                  ERROR   +51                     ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
024076  017737  156422  002564                  MOV     @BDR,RBDR               ;MOVE RECEIVED DATA TO RBDR
024104  022737  000177  002564                  CMP     #177,RBDR               ;CHECK THAT WORD #200 OF INBUF IS IN BDR
024112  001404                                  BEQ     TST34                   ;BRANCH TO NEXT TEST IF IT IS
024114  012737  000177  002576                  MOV     #177,EBDR               ;MOVE EXPECTED DATA TO EBDR
024122  104045                                  ERROR   +45                     ;BAD DATA IN BDR
```

```
                                                .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.
                                                ;*
                                                ;;*************************************************************
 024124                                         TST34:
 024124  000004                                         SCOPE                           ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 024126  012737  024176  001310                         MOV     #999$,$LPERR            ;SET LOOP ON ERROR TO 999$
 024134  032777  004000  155176                         BIT     #BIT11,@SWR             ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 024142  001407                                         BEQ     1001$                   ;&& BRANCH IF NOT
 024144  104401  024152                                 TYPE    ,1000$                  ;&& TYPE: "T # 34"
 024150  000404                                         BR      1001$                   ;&& GET OVER ASCII
 024152     124     040     043             1000$:      .ASCIZ  /T # 34/<CRLF>          ;&& THE ASCII MESSAGE
                                                        .EVEN
 024162                                     1001$:
 024162  012702  000007                     1$:         MOV     #7,R2                   ;DO 7 BIT PATTERNS
 024166  005037  002714                                 CLR     ERRCNT                  ;CLEAR THE ERRCNT LOCATION FOR USE OF ERROR +201
 024172  012703  007202                                 MOV     #PATRNS,R3              ;MOVE ADDRESS OF PATTERNS TO R3
 024176  017737  156324  002532             999$:       MOV     @DRINV,SDRINV           ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 024204  017737  156320  002534                         MOV     @DRVS,SDRVS             ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 024212  012777  024364  156306                         MOV     #3$,@DRINV              ;INTERRUPT VECTOR TO 3$
 024220  013777  002540  156302                         MOV     LEVEL,@DRVS             ;INTERRUPT STATUS TO LEVEL OF DEVICE
 024226  005037  177776                                 CLR     PSW                     ;LET DR11 INTERRUPT
 024232  012777  010000  156262                         MOV     #MA,@CSR                ;DO AN INIT
 024240  005077  156256                                 CLR     @CSR                    ;FORCE ACCESS TO CSR
 024244  012777  177777  156244                         MOV     #-1,@WCR                ;SET UP FOR 1 TRANSFER
 024252  012777  002612  156240                         MOV     #NPR1,@BAR              ;TRANSFER TO BUS ADDRESS IN NPR1
 024260  005037  002612                                 CLR     NPR1                    ;GET READY TO RECEIVE DATA
 024264  011377  156234                                 MOV     (R3),@BDR               ;SET UP TO TRANSFER DATA
 024270  012777  000112  156224                         MOV     #F1+F3+IE,@CSR          ;DATO (FNCT1), FNCT3, IE
 024276  052777  000401  156216                         BIS     #CY+GO,@CSR             ;CYCLE, GO
 024304  012737  001000  002660                         MOV     #1000,TIME              ;CLEAR THE TIME LOCATION FOR WAIT LOOP
 024312  005337  002660                     2$:         DEC     TIME                    ;DECREMENT UNTIL WE GET BACK TO ZERO
 024316  001375                                         BNE     2$                      ;BRANCH BACK IF NOT ZERO
 024320  013777  002532  156200                         MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 024326  013777  002534  156174                         MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 024334  017737  156162  002560                         MOV     @CSR,RCSR               ;MOVE RECEIVED DATA TO RCSR
 024342  011337  001360                                 MOV     (R3),$TMP0              ;MOVE PATTERN TO $TMP0
 024346  104035                                         ERROR   +35                     ;DR11 FAILED TO INTERRUPT
 024350  012777  010000  156144                         MOV     #MA,@CSR                ;SET THE MAINTENANCE BIT AND
 024356  005077  156140                                 CLR     @CSR                    ;CLEAR THE CSR TO DO AN INIT
 024362  000445                                         BR      6$                      ;BRANCH TO DO NEXT PATTERN
 024364  062706  000004                     3$:         ADD     #4,SP                   ;CLEAN UP STACK FROM INTERRUPT
 024370  013777  002532  156130                         MOV     SDRINV,@DRINV           ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 024376  013777  002534  156124                         MOV     SDRVS,@DRVS             ;RESTORE LOCATION USED AS THE INTERRUPT PS
 024404  004737  004064                                 JSR     PC,ERRCHK               ;CLEAR IE, CHECK FOR ERROR
 024410  104021                                         ERROR   +21                     ;ERROR BIT SHOULD HAVE BEEN CLEAR
 024412  017737  156100  002570                         MOV     @WCR,RWCR               ;MOVE RECEIVED DATA TO RWCR
 024420  001403                                         BEQ     4$                      ;BRANCH IF IT IS EQUAL TO ZERO
 024422  011337  001362                                 MOV     (R3),$TMP1              ;MOVE PATTERN TO $TMP0
 024426  104206                                         ERROR   +206                    ;WCR NOT EQUAL TO ZERO
 024430  017737  156064  002566             4$:         MOV     @BAR,RBAR               ;MOVE RECEIVED ADDRESS TO RBAR
 024436  022737  002615  002566                         CMP     #NPR1+3,RBAR            ;COMPARE CORRECT BAR WITH BAR CABLE MODE TESTING LEAVES
                                                                                        ;BIT 0 OF BAR SET. THEREFORE MUST CHECK FOR ODD ADDRESS
```

```
024444  001406                          BEQ     5$              ;BRANCH IF IT IS OK
024446  012737  002615  002600          MOV     #NPR1+3,EBAR    ;MOVE EXPECTED DATA TO EBAR
024454  011337  001362                  MOV     (R3),$TMP1      ;MOVE PATTERN TO $TMPO
024460  104207                          ERROR   +207            ;BAR IS WRONG
024462  021337  002612          5$:     CMP     (R3),NPR1       ;CHECK FOR CORRECT DATA
024466  001403                          BEQ     6$              ;BRANCH IF CORRECT DATA WAS TRANSFERRED
024470  011337  002604                  MOV     (R3),ENPR1      ;MOVE EXPECTED DATA TO ENPR1
024474  104210                          ERROR   +210            ;DATA NOT TRANSFERED CORRECTLY
024476  062703  000002          6$:     ADD     #2,R3           ;POINT TO NEXT BIT PATTERN
024502  005302                          DEC     R2              ;COUNT 1 PATTERN DONE
024504  001234                          BNE     999$            ;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.
                                          ;*
                                          ;;*****************************************************************
 024506                                   TST35:
 024506  000004                                   SCOPE                      ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 024510  012737  024544  001310                   MOV     #999$,$LPERR       ;SET LOOP ON ERROR TO 999$
 024516  032777  004000  154614                   BIT     #BIT11,@SWR        ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 024524  001407                                   BEQ     1001$              ;&& BRANCH IF NOT
 024526  104401  024534                           TYPE    ,1000$             ;&& TYPE: 'T # 35''
 024532  000404                                   BR      1001$              ;&& GET OVER ASCII
 024534     124     040     043           1000$:  .ASCIZ  /T # 35/<CRLF>     ;&& THE ASCII MESSAGE
                                                  .EVEN
 024544                                   1001$:
 024544  005077  155752                   999$:   CLR     @CSR               ;FORCE ACCESS TO CSR
 024550  012737  000200  002622                   MOV     #200,BUFLEN        ;LENGTH OF BUFFER=200
 024556  004737  003302                           JSR     PC,LODBUF          ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 024562  013737  002622  002630                   MOV     BUFLEN,WCLEN       ;PREPARE NUMBER FOR WCR
 024570  005437  002630                           NEG     WCLEN              ;2'S COMPLEMENT OF BUFLEN
 024574  013777  002630  155714                   MOV     WCLEN,@WCR         ;SET UP WCR
 024602  013777  002616  155710                   MOV     INBUF,@BAR         ;SET UP BAR
 024610  012777  052525  155706                   MOV     #52525,@BDR        ;SET UP BDR
 024616  017737  155704  002532                   MOV     @DRINV,SDRINV      ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 024624  017737  155700  002534                   MOV     @DRVS,SDRVS        ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 024632  012777  024742  155666                   MOV     #2$,@DRINV         ;INTERRUPT VECTOR
 024640  013777  002540  155662                   MOV     LEVEL,@DRVS        ;INTERRUPT STATUS TO LEVEL OF DEVICE
 024646  005037  177776                           CLR     PSW                ;LET THE DR11 INTERRUPT
 024652  012777  000102  155642                   MOV     #IE+F1,@CSR        ;IE, FNCT1
 024660  052777  000401  155634                   BIS     #CY+GO,@CSR        ;CYCLE, GO
 024666  012737  001000  002660                   MOV     #1000,TIME         ;MOVE WAIT LOOP VALUE TO TIME LOCATION
 024674  005337  002660                   1$:     DEC     TIME               ;DECREMENT UNTIL WE REACH ZERO
 024700  001375                                   BNE     1$                 ;BRANCH BACK IF NOT ZERO
 024702  013777  002532  155616                   MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 024710  013777  002534  155612                   MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
 024716  017737  155600  002560                   MOV     @CSR,RCSR          ;MOVE RECEIVED DATA TO RCSR
 024724  104035                                   ERROR   +35                ;DR11 FAILED TO INTERRUPT
 024726  012777  010000  155566                   MOV     #MA,@CSR           ;SET THE MAINTENANCE BIT AND
 024734  005077  155562                           CLR     @CSR               ;CLEAR THE CSR TO DO AN INIT
 024740  000421                                   BR      TST36              ;BRANCH TO NEXT TEST
 024742  062706  000004                   2$:     ADD     #4,SP              ;CLEAN STACK AFTER INTERRUPT
 024746  013777  002532  155552                   MOV     SDRINV,@DRINV      ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 024754  013777  002534  155546                   MOV     SDRVS,@DRVS        ;RESTORE LOCATION USED AS THE INTERRUPT PS
 024762  004737  003356                           JSR     PC,INTA            ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 024766  104051                                   ERROR   +51                ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 024770  004737  003716                           JSR     PC,DATOCK          ;CHECK INBUF
 024774  104046                                   ERROR   +46                ;BUFFER DATA NOT CORRECT
 024776  004737  004000                           JSR     PC,DATOC2          ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATOCK
 025002  104047                                   ERROR   +47                ;TOO MANY WORDS WERE TRANSFERED
```

```
   5778                                     .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.
                                            ;*
                                            ;;*********************************************************************
        025004                              TST36:
        025004  000004                              SCOPE                       ;PROCESS LOOPING AND TEST NUMBER INCREMENT
        025006  012737  025042  001310              MOV     #999$,$LPERR        ;SET LOOP ON ERROR TO 999$
        025014  032777  004000  154316              BIT     #BIT11,@SWR         ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
        025022  001407                              BEQ     1001$               ;&& BRANCH IF NOT
        025024  104401  025032                      TYPE    ,1000$              ;&& TYPE: "T # 36"
        025030  000404                              BR      1001$               ;&& GET OVER ASCII
        025032     124     040     043      1000$:  .ASCIZ  /T # 36/<CRLF>      ;&& THE ASCII MESSAGE
                                                    .EVEN
        025042                              1001$:
   5779 025042  004737  003646              999$:   JSR     PC,CLENUP           ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
   5780 025046  005077  155450                      CLR     @CSR                ;FORCE ACCESS TO CSR
   5781 025052  012737  000200  002622              MOV     #200,BUFLEN         ;LENGTH OF BUFFER=200
   5782 025060  004737  003302                      JSR     PC,LODBUF           ;LOAD THE BUFFER WITH INCREMENTING PATTERN
   5783 025064  013737  002622  002630              MOV     BUFLEN,WCLEN        ;PREPARE NUMBER FOR WCR
   5784 025072  005437  002630                      NEG     WCLEN               ;2'S COMPLEMENT OF BUFLEN
   5785 025076  013777  002630  155412              MOV     WCLEN,@WCR          ;SET-UP WCR
   5786 025104  013777  002616  155406              MOV     INBUF,@BAR          ;SET-UP BAR
   5787 025112  012777  177777  155404              MOV     #-1,@BDR            ;MAINT AIDE
   5788 025120  017737  155402  002532              MOV     @DRINV,SDRINV       ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
   5789 025126  017737  155376  002534              MOV     @DRVS,SDRVS         ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
   5790 025134  012777  025244  155364              MOV     #2$,@DRINV          ;INT VECTOR
   5791 025142  013777  002540  155360              MOV     LEVEL,@DRVS         ;INTERRUPT STATUS TO LEVEL OF DEVICE
   5792 025150  005037  177776                      CLR     PSW                 ;LET THE DR11 INTERRUPT
   5793 025154  012777  000110  155340              MOV     #F3+IE,@CSR         ;FNCT3, IE
   5794 025162  052777  000401  155332              BIS     #CY+GO,@CSR         ;CYCLE, GO
   5795 025170  012737  001000  002660              MOV     #1000,TIME          ;SET WAIT LOOP COUNTER
   5796 025176  005337  002660              1$:     DEC     TIME                ;DECREMENT UNTIL WE REACH ZERO
   5797 025202  001375                              BNE     1$                  ;BRANCH BACK IF NOT ZERO
   5798 025204  013777  002532  155314              MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
   5799 025212  013777  002534  155310              MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
   5800 025220  017737  155276  002560              MOV     @CSR,RCSR           ;MOVE RECEIVED DATA TO RCSR
   5801 025226  104035                              ERROR   +35                 ;DR11 FAILED TO INTERRUPT
   5802 025230  012777  010000  155264              MOV     #MA,@CSR            ;SET THE MAINTENANCE BIT AND
   5803 025236  005077  155260                      CLR     @CSR                ;CLEAR THE CSR TO DO AN INIT
   5804 025242  000426                              BR      TST37               ;BRANCH TO NEXT TEST
   5805 025244  062706  000004              2$:     ADD     #4,SP               ;CLEAN UP STACK AFTER INTERRUPT
   5806 025250  013777  002532  155250              MOV     SDRINV,@DRINV       ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
   5807 025256  013777  002534  155244              MOV     SDRVS,@DRVS         ;RESTORE LOCATION USED AS THE INTERRUPT PS
   5808 025264  004737  003356                      JSR     PC,INTA             ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
   5809 025270  104051                              ERROR   +51                 ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
   5810 025272  017737  155226  002564              MOV     @BDR,RBDR           ;MOVE RECEIVED DATA TO RBDR
   5811 025300  022737  000177  002564              CMP     #177,RBDR           ;CHECK THAT WORD #200 OF INBUF IS IN BDR
   5812 025306  001404                              BEQ     TST37               ;BRANCH TO NEXT TEST IF OK
   5813 025310  012737  000177  002576              MOV     #177,EBDR           ;MOVE EXPECTED DATA TO EBDR
   5814 025316  104045                              ERROR   +45                 ;BAD DATA IN BDR
```

```
                                              .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.
                                      ;*
                                      ;;****************************************************************
 025320                               TST37:
 025320  000004                               SCOPE                     ;PROCESS LOOPING AND TEST NUMBER INCREMENT
 025322  012737  025356  001310               MOV     #999$,$LPERR      ;SET LOOP ON ERROR TO 999$
 025330  032777  004000  154002               BIT     #BIT11,@SWR       ;&& TEST TO SEE IF TEST NUMBER TRACER ENABLED
 025336  001407                               BEQ     1001$             ;&& BRANCH IF NOT
 025340  104401  025346                       TYPE    ,1000$            ;&& TYPE: "T # 37"
 025344  000404                               BR      1001$             ;&& GET OVER ASCII
 025346     124     040     043       1000$:  .ASCIZ  /T # 37/<CRLF>    ;&& THE ASCII MESSAGE
                                              .EVEN
 025356                               1001$:
 025356  004737  003646               999$:   JSR     PC,CLENUP         ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
 025362  005077  155134                       CLR     @CSR              ;FORCE ACCESS TO CSR
 025366  012737  000200  002622               MOV     #200,BUFLEN       ;LENGTH OF BUFFER=200
 025374  004737  003302                       JSR     PC,LODBUF         ;LOAD THE BUFFER WITH INCREMENTING PATTERN
 025400  013737  002622  002630               MOV     BUFLEN,WCLEN      ;PREPARE NUMBER FOR WCR
 025406  005437  002630                       NEG     WCLEN             ;2'S COMPLEMENT OF BUFLEN
 025412  013777  002630  155076               MOV     WCLEN,@WCR        ;SET UP WCR
 025420  013777  002616  155072               MOV     INBUF,@BAR        ;SET UP BAR
 025426  012777  052525  155070               MOV     #52525,@BDR       ;SET UP BDR
 025434  017737  155066  002532               MOV     @DRINV,SDRINV     ;SAVE LOCATION TO BE USED AS THE INTERRUPT VECTOR
 025442  017737  155062  002534               MOV     @DRVS,SDRVS       ;SAVE LOCATION TO BE USED AS THE INTERRUPT PS
 025450  012777  025560  155050               MOV     #2$,@DRINV        ;INTERRUPT VECTOR
 025456  013777  002540  155044               MOV     LEVEL,@DRVS       ;INTERRUPT STATUS TO LEVEL OF DEVICE
 025464  005037  177776                       CLR     PSW               ;LET THE DR11 INTERRUPT
 025470  012777  000112  155024               MOV     #F1+F3+IE,@CSR    ;FNCT1, FNCT3, IE
 025476  052777  000401  155016               BIS     #CY+GO,@CSR       ;CYCLE, GO
 025504  012737  001000  002660               MOV     #1000,TIME        ;SET WAIT LOOP COUNTER
 025512  005337  002660               1$:     DEC     TIME              ;DECREMENT UNTIL WE GET TO ZERO
 025516  001375                               BNE     1$                ;BRANCH BACK IF NOT ZERO
 025520  013777  002532  155000               MOV     SDRINV,@DRINV     ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 025526  013777  002534  154774               MOV     SDRVS,@DRVS       ;RESTORE LOCATION USED AS THE INTERRUPT PS
 025534  017737  154762  002560               MOV     @CSR,RCSR         ;MOVE RECEIVED DATA TO RCSR
 025542  104035                               ERROR   +35               ;DR11 FAILED TO INTERRUPT
 025544  012777  010000  154750               MOV     #MA,@CSR          ;SET THE MAINTENANCE BIT AND
 025552  005077  154744                       CLR     @CSR              ;CLEAR THE CSR TO DO AN INIT
 025556  000421                               BR      TST40             ;BRANCH TO NEXT TEST
 025560  062706  000004               2$:     ADD     #4,SP             ;CLEAN UP STACK AFTER INTERRUPT
 025564  013777  002532  154734               MOV     SDRINV,@DRINV     ;RESTORE LOCATION USED AS THE INTERRUPT VECTOR
 025572  013777  002534  154730               MOV     SDRVS,@DRVS       ;RESTORE LOCATION USED AS THE INTERRUPT PS
 025600  004737  003356                       JSR     PC,INTA           ;GO CLEAR IE, CHECK ERROR, READY, WCR=0 AND BAR
 025604  104051                               ERROR   +51               ;CSR AND-OR WCR AND-OR BAR ARE INCORECT
 025606  004737  003716                       JSR     PC,DATOCK         ;CHECK INBUF
 025612  104046                               ERROR   +46               ;BUFFER DATA NOT CORRECT
 025614  004737  004000                       JSR     PC,DATOC2         ;GO BACK TO SUBROUTINE AFTER ERROR RTS IN DATOCK
 025620  104047                               ERROR   +47               ;TOO MANY WORDS WERE TRANSFERED
```

```
5856                                            .SBTTL  END OF DEVICE PASS ROUTINE
5857                                            ;;*****************************************************************
5858 025622  000004                            ENDEV:  SCOPE                           ;FOR POSSIBLE LOOP ON TEST
5859 025624  005237  026010                            INC     PREOP                   ;INCREMENT DEVICE PASS COUNTER          ;DPM001
5860 025630  005037  001302                            CLR     $TSTNM                  ;CLEAR TEST NO. COUNT FOR SCOPE ROUTINE
5861 025634  022737  000001  002414                    CMP     #1,QTYBRD               ;IS THERE MORE THAN 1 BOARD UNDER TEST?
5862 025642  001450                                    BEQ     5$                      ;BRANCH IF NO
5863 025644  005737  001312                            TST     $ERTTL                  ;SEE IF THERE WERE ANY ERRORS
5864 025650  001013                                    BNE     2$                      ;BRANCH AROUND EOP TEST IF SO
5865 025652  004737  026012                            JSR     PC,DOWEPR               ;GO SEE IF WE SHOULD PRINT THE EOP      ;DPM001
5866 025656  000442                                    BR      5$                      ;HERE IF NOT                            ;DPM001
5867 025660  000411                                    BR      3$                      ;HERE IF SO                             ;DPM001
5868 025662  032737  000077  026010                    BIT     #77,PREOP               ;HERE IF ENABLED - DO WE PRINT THIS EOP?;DPM001
5869 025670  001035                                    BNE     5$                      ;BRANCH IF SO                           ;DPM001
5870 025672  005037  026010                            CLR     PREOP                   ;CLEAR THE DEVICE PASS COUNTER          ;DPM001
5871 025676  000402                                    BR      3$                      ;BRANCH                                 ;DPM001
5872 025700  104401  001405                    2$:     TYPE    ,$CRLF                  ;TYPE A <CRLF>
5873 025704  104401  037424                    3$:     TYPE    ,BOARD                  ;TYPE:  'BOARD # '
5874 025710  013746  001422                            MOV     $UNIT,-(SP)             ;;SAVE $UNIT FOR TYPEOUT
     025714  104405                                    TYPDS                           ;;GO TYPE--DECIMAL ASCII WITH SIGN
5875 025716  104401  040341                            TYPE    ,TSTCOM                 ;TYPE:  ' TESTING COMPLETE, PASS #'     ;DPM001
5876 025722  013746  002716                            MOV     $PASS2,-(SP)            ;MOVE MAJOR PASS COUNTER TO STACK       ;DPM001
5877 025726  013746  001416                            MOV     $PASS,-(SP)             ;MOVE PASS NUMBER TO STACK              ;DPM001
5878 025732  104414                                    TYPDE                           ;TYPE NUMBER IN EXTENDED DECIMAL        ;DPM001
5879 025734  005737  001312                            TST     $ERTTL                  ;SEE IF ANY ERRORS THIS DEVICE
5880 025740  001407                                    BEQ     4$                      ;BRANCH AROUND TOTAL ERRORS MESSAGE IF NONE
5881 025742  104401  036350                            TYPE    ,ETDEV                  ;TYPE:  ' - TOTAL ERRORS THIS DEVICE = '
5882 025746  013746  001312                            MOV     $ERTTL,-(SP)            ;MOVE NUMBER OF ERRORS TO THE STACK
5883 025752  104405                                    TYPDS                           ;GO TYPE THE NUMBER
5884 025754  004737  003126                            JSR     PC,ERCAPT               ;GO LOG THE UNIT #, PASS # & # OF ERRORS THIS DEVICE
5885 025760  104401  001405                    4$:     TYPE    ,$CRLF                  ;TYPE A <CRLF>
5886 025764  005237  001420                    5$:     INC     $DEVCT                  ;INCREMENT DEVICE COUNTER
5887 025770  023737  002414  001420                    CMP     QTYBRD,$DEVCT           ;ALL DEVICES TESTED?
5888 025776  001423                                    BEQ     $EOP                    ;GO TO END OF PASS ROUTINE IF SO
5889 026000  005237  001422                            INC     $UNIT                   ;INCREMENT THE UNIT NUMBER
5890 026004  000137  012370                            JMP     TSTDEV                  ;GO TEST NEXT DEVICE
5891 026010  000000                            PREOP:  .WORD   0                       ;DEVICE PASS COUNTER                    ;DPM001
5892
5893 026012  105737  002706                    DOWEPR: TSTB    EOPLOC                  ;SEE IF EOP MESSAGES ARE TO PRINT       ;DPM001
5894 026016  001406                                    BEQ     1$                      ;BRANCH IF SO                           ;DPM001
5895 026020  105737  032555                            TSTB    CHARCT                  ;SEE IF A CHARACTER IS WAITING          ;DPM001
5896 026024  001407                                    BEQ     3$                      ;BRANCH IF NOT                          ;DPM001
5897 026026  062716  000002                            ADD     #2,(SP)                 ;RETURN TO 2ND RETURN LOCATION          ;DPM001
5898 026032  000402                                    BR      2$                      ;RETURN                                 ;DPM001
5899 026034  062716  000004                    1$:     ADD     #4,(SP)                 ;FUDGE RETURN TO TEST FOR EOP PRINT     ;DPM001
5900 026040  105037  032555                    2$:     CLRB    CHARCT                  ;CLEAR CHARCT                           ;DPM001
5901 026044  000207                            3$:     RTS     PC                      ;RETURN TO USER                         ;DPM001
```

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  5902                                    .SBTTL  END OF PASS ROUTINE

                                  ;;*****************************************************************
                                  ;*INCREMENT THE PASS NUMBER ($PASS)
                                  ;*TYPE "END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY"
                                  ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
                                  ;*IF THERES A MONITOR GO TO IT
                                  ;*IF THERE ISN'T JUMP TO GOAGIN

     026046                          $EOP:
     026046  000004                          SCOPE
     026050  005037  001302                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
     026054  005237  001416                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
     026060  100004                          BPL     1$              ;BRANCH IF STILL POSITIVE
     026062  005037  001416                  CLR     $PASS           ;CLEAR $PASS AND
     026066  005237  002716                  INC     $PASS2          ;INCREMENT OVERFLOW LOCATION
     026072  005327                  1$:     DEC     (PC)+           ;;LOOP?
     026074  000001                  $EOPCT: .WORD   1
     026076  003116                          BGT     $DOAGN          ;;YES
     026100  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
     026102  000001                  $ENDCT: .WORD   1
     026104  026074                          .WORD   $EOPCT
     026106  005737  001312                  TST     $ERTTL          ;SEE IF ANY ERRORS THIS PASS               ;DPM001
     026112  001012                          BNE     2$              ;BRANCH IF SO TO PRINT EOP                 ;DPM001
     026114  004737  026012                  JSR     PC,DOWEPR       ;GO SEE IF EOP IS TO PRINT                 ;DPM001
     026120  000475                          BR      $GET42          ;HERE IF NOT                               ;DPM001
     026122  000406                          BR      2$              ;HERE IF SO                                ;DPM001
     026124  032737  000077  026010          BIT     #77,PREOP       ;HERE IF ENABLED - DO WE PRINT THIS EOP?;DPM001
     026132  001070                          BNE     $GET42          ;BRANCH IF SO                              ;DPM001
     026134  005037  026010                  CLR     PREOP           ;CLEAR THE DEVICE PASS COUNTER             ;DPM001
     026140                          2$:
     026140  104401  026146                  TYPE    ,65$            ;;TYPE ASCIZ STRING
     026144  000407                          BR      64$             ;;GET OVER THE ASCIZ
     026146     012     015     105  65$:    .ASCIZ  <12><15>/END PASS #/
                                             .EVEN
     026164                          64$:
     026164  013746  002716                  MOV     $PASS2,-(SP)    ;MOVE UPPER PASS COUNT TO STACK            ;DPM001
     026170  013746  001416                  MOV     $PASS,-(SP)     ;MOVE PASS COUNT TO STACK                  ;DPM001
     026174  104414                          TYPDE                   ;GO TYPE PASS COUNT IN EXTENDED DECIMAL    ;DPM001
     026176  005737  001312                  TST     $ERTTL          ;SEE IF ANY ERRORS THIS PASS               ;DPM001
     026202  001442                          BEQ     $GET            ;BRANCH IF NOT                             ;DPM001
     026204  022737  000001  002414          CMP     #1,QTYBRD       ;ARE WE TESTING 1 BOARD?                   ;DPM001
     026212  001002                          BNE     3$              ;BRANCH IF NOT - LOGGING IS DONE           ;DPM001
     026214  004737  003126                  JSR     PC,ERCAPT       ;GO LOG THE UNIT #, PASS # & # OF ERRORS THIS DEVICE
     026220                          3$:
     026220  104401  026226                  TYPE    ,67$            ;;TYPE ASCIZ STRING
     026224  000424                          BR      66$             ;;GET OVER THE ASCIZ
     026226     040     040     124  67$:    .ASCIZ  /  TOTAL ERRORS THIS PASS ALL MODULE(S) /
                                             .EVEN
     026276                          66$:
     026276  013746  001312                  MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
                                                                     ;;TOTAL NUMBER OF ERRORS
     026302  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
     026304  005037  001312                  CLR     $ERTTL          ;;CLEAR ERROR TOTAL
     026310  104401  001405          $GET:   TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
     026314  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
     026320  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
     026322  000005                            RESET                   ;;CLEAR THE WORLD
     026324  004710                   $ENDAD:  JSR     PC,(R0)         ;;GO TO MONITOR
     026326  000240                            NOP                     ;;SAVE ROOM
     026330  000240                            NOP                     ;;FOR
     026332  000240                            NOP                     ;;ACT11
     026334                           $DOAGN:
     026334  000137                            JMP     @(PC)+          ;;RETURN
     026336  026344                   $RTNAD:  .WORD   GOAGIN
     026340     377     377      000  $ENULL:  .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
                                               .EVEN
     026344  005037  001420           GOAGIN:  CLR     $DEVCT          ;CLEAR DEVICE COUNT
     026350  022737  000001   002414           CMP     #1,QTYBRD       ;IS THERE ONLY ONE DEVICE UNDER TEST?
     026356  001002                            BNE     RSTRT           ;BR, IF NOT
     026360  000137  012556                    JMP     REINIT          ;GO DO ANOTHER PASS
     026364  005037  001422           RSTRT:   CLR     $UNIT           ;CLEAR UNIT NUMBER
     026370  000137  012356                    JMP     BEGIN1          ;GO BEGIN TEST OF NEXT DEVICE
```

```
 5909                                              .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
                                                   ;;*

     026374  105737  001357                        $TYPE:  TSTB    $TPFLG                ;;IS THERE A TERMINAL?
     026400  100002                                        BPL     1$                    ;;BR IF YES
     026402  000000                                        HALT                          ;;HALT HERE IF NO TERMINAL
     026404  000430                                        BR      3$                    ;;LEAVE
     026406  010046                                1$:     MOV     R0,-(SP)              ;;SAVE R0
     026410  017600  000002                                MOV     @2(SP),R0             ;;GET ADDRESS OF ASCIZ STRING
     026414  122737  000001  001430                        CMPB    #APTENV,$ENV          ;;RUNNING IN APT MODE
     026422  001011                                        BNE     62$                   ;;NO,GO CHECK FOR APT CONSOLE
     026424  132737  000100  001431                        BITB    #APTSPOOL,$ENVM       ;;SPOOL MESSAGE TO APT
     026432  001405                                        BEQ     62$                   ;;NO,GO CHECK FOR CONSOLE
     026434  010037  026444                                MOV     R0,61$                ;;SETUP MESSAGE ADDRESS FOR APT
     026440  004737  033634                                JSR     PC,$ATY3              ;;SPOOL MESSAGE TO APT
     026444  000000                                61$:    .WORD   0                     ;;MESSAGE ADDRESS
     026446  132737  000040  001431                62$:    BITB    #APTCSUP,$ENVM        ;;APT CONSOLE SUPPRESSED
     026454  001003                                        BNE     60$                   ;;YES,SKIP TYPE OUT
     026456  112046                                2$:     MOVB    (R0)+,-(SP)           ;;PUSH CHARACTER TO BE TYPED ONTO STACK
     026460  001005                                        BNE     4$                    ;;BR IF IT ISN'T THE TERMINATOR
     026462  005726                                        TST     (SP)+                 ;;IF TERMINATOR POP IT OFF THE STACK
     026464  012600                                60$:    MOV     (SP)+,R0              ;;RESTORE R0
     026466  062716  000002                        3$:     ADD     #2,(SP)               ;;ADJUST RETURN PC
     026472  000002                                        RTI                           ;;RETURN
     026474  122716  000011                        4$:     CMPB    #HT,(SP)              ;;BRANCH IF <HT>
     026500  001430                                        BEQ     8$
     026502  122716  000200                                CMPB    #CRLF,(SP)            ;;BRANCH IF NOT <CRLF>
     026506  001006                                        BNE     5$
     026510  005726                                        TST     (SP)+                 ;;POP  <CR><LF> EQUIV
     026512  104401                                        TYPE                          ;;TYPE A CR AND LF
     026514  001405                                        $CRLF
     026516  105037  026736                                CLRB    $CHARCNT              ;;CLEAR CHARACTER COUNT
     026522  000755                                        BR      2$                    ;;GET NEXT CHARACTER
     026524  004737  026606                        5$:     JSR     PC,$TYPEC             ;;GO TYPE THIS CHARACTER
     026530  123726  001356                        6$:     CMPB    $FILLC,(SP)+          ;;IS IT TIME FOR FILLER CHARS.?
     026534  001350                                        BNE     2$                    ;;IF NO GO GET NEXT CHAR.
     026536  013746  001354                                MOV     $NULL,-(SP)           ;;GET # OF FILLER CHARS. NEEDED
                                                                                         ;;AND THE NULL CHAR.
     026542  105366  000001                        7$:     DECB    1(SP)                 ;;DOES A NULL NEED TO BE TYPED?
     026546  002770                                        BLT     6$                    ;;BR IF NO--GO POP THE NULL OFF OF STACK
     026550  004737  026606                                JSR     PC,$TYPEC             ;;GO TYPE A NULL
     026554  105337  026736                                DECB    $CHARCNT              ;;DO NOT COUNT AS A COUNT
     026560  000770                                        BR      7$                    ;;LOOP
```

```
                                        ;HORIZONTAL TAB PROCESSOR

     026562  112716  000040             8$:       MOVB    #' ,(SP)          ;;REPLACE TAB WITH SPACE
     026566  004737  026606             9$:       JSR     PC,$TYPEC         ;;TYPE A SPACE
     026572  132737  000007  026736               BITB    #7,$CHARCNT       ;;BRANCH IF NOT AT
     026600  001372                               BNE     9$                ;;TAB STOP
     026602  005726                               TST     (SP)+             ;;POP SPACE OFF STACK
     026604  000724                               BR      2$                ;;GET NEXT CHARACTER
     026606  105777  152536             $TYPEC:   TSTB    @$TPS             ;;WAIT UNTIL PRINTER IS READY
     026612  100375                               BPL     $TYPEC
     026614  116677  000002  152530               MOVB    2(SP),@$TPB       ;;LOAD CHAR TO BE TYPED INTO DATA REG.
     026622  105777  152516                       TSTB    @$TKS             ;;SEE IF KEYBOARD IS TALKING.
     026626  100027                               BPL     2$                ;;BRANCH IF IT ISN'T.
     026630  117737  152512  032555               MOVB    @$TKB,CHARCT      ;&& PUT CHARACTER IN CHARCT
     026636  142737  000200  032555               BICB    #200,CHARCT       ;&& BIT CLEAR PARITY BIT.
     026644  122737  000023  032555               CMPB    #23,CHARCT        ;&& SEE IF THIS IS A ^S.
     026652  001015                               BNE     2$                ;;BRANCH TO CONTINUE IF IT ISN'T.
     026654  105777  152464             3$:       TSTB    @$TKS             ;;WAIT FOR ANOTHER INPUT.
     026660  100375                               BPL     3$                ;;BRANCH BACK IF NOT READY.
     026662  117737  152460  032555               MOVB    @$TKB,CHARCT      ;&& PUT CHARACTER IN CHARCT
     026670  142737  000200  032555               BICB    #200,CHARCT       ;&& BIT CLEAR PARITY BIT.
     026676  122737  000021  032555               CMPB    #21,CHARCT        ;&& SEE IF THIS IS A ^Q.
     026704  001363                               BNE     3$                ;;BRANCH BACK FOR MORE WAIT IF NOT.
     026706  122766  000015  000002     2$:       CMPB    #CR,2(SP)         ;;IS CHARACTER A CARRIAGE RETURN?
     026714  001003                               BNE     1$                ;;BRANCH IF NO
     026716  105037  026736                       CLRB    $CHARCNT          ;;YES--CLEAR CHARACTER COUNT
     026722  000406                               BR      $TYPEX            ;;EXIT
     026724  122766  000012  000002     1$:       CMPB    #LF,2(SP)         ;;IS CHARACTER A LINE FEED?
     026732  001402                               BEQ     $TYPEX            ;;BRANCH IF YES
     026734  105227                               INCB    (PC)+             ;;COUNT THE CHARACTER
     026736  000000                     $CHARCNT:.WORD    0                 ;;CHARACTER COUNT STORAGE
     026740  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
        026742  017646  000000          $TYPOS: MOV     @(SP),-(SP)             ;;PICKUP THE MODE
        026746  116637  000001  027165          MOVB    1(SP),$0FILL            ;;LOAD ZERO FILL SWITCH
        026754  112637  027167                  MOVB    (SP)+,$OMODE+1          ;;NUMBER OF DIGITS TO TYPE
        026760  062716  000002                  ADD     #2,(SP)                 ;;ADJUST RETURN ADDRESS
        026764  000406                          BR      $TYPON
        026766  112737  000001  027165  $TYPOC: MOVB    #1,$0FILL               ;;SET THE ZERO FILL SWITCH
        026774  112737  000006  027167          MOVB    #6,$OMODE+1             ;;SET FOR SIX(6) DIGITS
        027002  112737  000005  027164  $TYPON: MOVB    #5,$OCNT                ;;SET THE ITERATION COUNT
        027010  010346                          MOV     R3,-(SP)                ;;SAVE R3
        027012  010446                          MOV     R4,-(SP)                ;;SAVE R4
        027014  010546                          MOV     R5,-(SP)                ;;SAVE R5
        027016  113704  027167                  MOVB    $OMODE+1,R4             ;;GET THE NUMBER OF DIGITS TO TYPE
        027022  005404                          NEG     R4
        027024  062704  000006                  ADD     #6,R4                   ;;SUBTRACT IT FOR MAX. ALLOWED
        027030  110437  027166                  MOVB    R4,$OMODE               ;;SAVE IT FOR USE
        027034  113704  027165                  MOVB    $0FILL,R4               ;;GET THE ZERO FILL SWITCH
        027040  016605  000012                  MOV     12(SP),R5               ;;PICKUP THE INPUT NUMBER
        027044  005003                          CLR     R3                      ;;CLEAR THE OUTPUT WORD
        027046  006105                  1$:     ROL     R5                      ;;ROTATE MSB INTO "C"
        027050  000404                          BR      3$                      ;;GO DO MSB
        027052  006105                  2$:     ROL     R5                      ;;FORM THIS DIGIT
        027054  006105                          ROL     R5
        027056  006105                          ROL     R5
        027060  010503                          MOV     R5,R3
        027062  006103                  3$:     ROL     R3                      ;;GET LSB OF THIS DIGIT
        027064  105337  027166                  DECB    $OMODE                  ;;TYPE THIS DIGIT?
        027070  100016                          BPL     7$                      ;;BR IF NO
        027072  042703  177770                  BIC     #177770,R3              ;;GET RID OF JUNK
        027076  001002                          BNE     4$                      ;;TEST FOR 0
        027100  005704                          TST     R4                      ;;SUPPRESS THIS 0?
        027102  001403                          BEQ     5$                      ;;BR IF YES
        027104  005204                  4$:     INC     R4                      ;;DON'T SUPPRESS ANYMORE 0'S
```

```
     027106  052703  000060                   BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
     027112  052703  000040          5$:      BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
     027116  110337  027162                   MOVB    R3,8$           ;;SAVE FOR TYPING
     027122  104401  027162                   TYPE    ,8$             ;;GO TYPE THIS DIGIT
     027126  105337  027164          7$:      DECB    $OCNT           ;;COUNT BY 1
     027132  003347                           BGT     2$              ;;BR IF MORE TO DO
     027134  002402                           BLT     6$              ;;BR IF DONE
     027136  005204                           INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
     027140  000744                           BR      2$              ;;GO DO THE LAST DIGIT
     027142  012605                   6$:      MOV     (SP)+,R5        ;;RESTORE R5
     027144  012604                           MOV     (SP)+,R4        ;;RESTORE R4
     027146  012603                           MOV     (SP)+,R3        ;;RESTORE R3
     027150  016666  000002  000004           MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
     027156  012616                           MOV     (SP)+,(SP)
     027160  000002                           RTI                     ;;RETURN
     027162     000                   8$:      .BYTE   0               ;;STORAGE FOR ASCII DIGIT
     027163     000                            .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
     027164     000                   $OCNT:   .BYTE   0               ;;OCTAL DIGIT COUNTER
     027165     000                   $OFILL:  .BYTE   0               ;;ZERO FILL SWITCH
     027166  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 NUMBER. LEADING ZEROS WILL ALWAYS BE
                                        ;*REPLACED WITH SPACES.
                                        ;*CALL:
                                        ;*       MOV     NUM,-(SP)           ;;PUT THE BINARY 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

027170  012737  000001  001364  $TYPDE: MOV     #1,$TMP2            ;&& SHOW ENTRY AT $TYPDE
027176  000402                          BR      $TYPD               ;&& GO TO ROUTINE
027200  005037  001364          $TYPDS: CLR     $TMP2               ;&& SHOW ENTRY AT $TYPDS
027204                          $TYPD:
027204  010046                          MOV     R0,-(SP)            ;;PUSH R0 ON STACK
027206  010146                          MOV     R1,-(SP)            ;;PUSH R1 ON STACK
027210  010246                          MOV     R2,-(SP)            ;;PUSH R2 ON STACK
027212  010346                          MOV     R3,-(SP)            ;;PUSH R3 ON STACK
027214  010546                          MOV     R5,-(SP)            ;;PUSH R5 ON STACK
027216  012746  020200                  MOV     #20200,-(SP)        ;;SET BLANK SWITCH AND SIGN
027222  016605  000020                  MOV     20(SP),R5           ;;GET THE INPUT NUMBER
027226  100004                          BPL     1$                  ;;BR IF INPUT IS POS.
027230  005405                          NEG     R5                  ;;MAKE THE BINARY NUMBER POS.
027232  112766  000055  000001          MOVB    #'-,1(SP)           ;;MAKE THE ASCII NUMBER NEG.
027240  005000                  1$:     CLR     R0                  ;;ZERO THE CONSTANTS INDEX
027242  012703  027504                  MOV     #$DBLK,R3           ;;SETUP THE OUTPUT POINTER
027246  112723  000040                  MOVB    #' ,(R3)+           ;;SET THE FIRST CHARACTER TO A BLANK
027252  005002                  2$:     CLR     R2                  ;;CLEAR THE BCD NUMBER
027254  016001  027474                  MOV     $DTBL(R0),R1        ;;GET THE CONSTANT
027260  160105                  3$:     SUB     R1,R5               ;;FORM THIS BCD DIGIT
027262  002402                          BLT     4$                  ;;BR IF DONE
027264  005202                          INC     R2                  ;;INCREASE THE BCD DIGIT BY 1
027266  000774                          BR      3$
027270  060105                  4$:     ADD     R1,R5               ;;ADD BACK THE CONSTANT
027272  005702                          TST     R2                  ;;CHECK IF BCD DIGIT=0
027274  001002                          BNE     5$                  ;;FALL THROUGH IF 0
027276  105716                          TSTB    (SP)                ;;STILL DOING LEADING 0'S?
027300  100407                          BMI     7$                  ;;BR IF YES
027302  106316                  5$:     ASLB    (SP)                ;;MSD?
027304  103003                          BCC     6$                  ;;BR IF NO
027306  116663  000001  177777          MOVB    1(SP),-1(R3)        ;;YES--SET THE SIGN
027314  052702  000060          6$:     BIS     #'0,R2              ;;MAKE THE BCD DIGIT ASCII
027320  052702  000040          7$:     BIS     #' ,R2              ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
027324  110223                          MOVB    R2,(R3)+            ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
027326  005720                          TST     (R0)+               ;;JUST INCREMENTING
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        027330  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
        027334  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
        027336  003002                          BGT     8$              ;;GO TO EXIT
        027340  010502                          MOV     R5,R2           ;;GET THE LSD
        027342  000764                          BR      6$              ;;GO CHANGE TO ASCII
        027344  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
        027346  100003                          BPL     9$              ;;BR IF NO
        027350  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
        027356  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
        027360  005737  001364                  TST     $TMP2           ;&& WAS ENTRY AT $TYPDS?
        027364  001405                          BEQ     10$             ;&& BRANCH IF SO
        027366  005766  000020                  TST     20(SP)          ;&& TEST THE OVERFLOW LOCATION
        027372  001402                          BEQ     10$             ;&& BRANCH IF NON-ZERO
        027374  004737  027516                  JSR     PC,EXPAND       ;&& GO EXPAND THE DECIMAL NUMBER
        027400                          10$:
        027400  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
        027402  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
        027404  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
        027406  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
        027410  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
        027412  104401  027504                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
        027416  005737  001364                  TST     $TMP2           ;&& SEE IF ENTRY WAS AT $TYPDS
        027422  001417                          BEQ     11$             ;&& BRANCH IF SO
        027424  016666  000002  000006          MOV     2(SP),6(SP)     ;&& ADJUST THE STACK
        027432  012666  000002                  MOV     (SP)+,2(SP)     ;&&
        027436  005726                          TST     (SP)+           ;&&
        027440  105037  027513                  CLRB    $DBLK+7         ;&& REPLACE ORIGINAL TERMINATOR
        027444  112737  000040  027512          MOVB    #' ,$DBLK+6     ;&& REPLACE ORIGINAL SPACE CHARACTER
        027452  112737  000040  027504          MOVB    #' ,$DBLK       ;&& REPLACE ORIGINAL SPACE CHARACTER
        027460  000002                          RTI                     ;&& RETURN TO USER
        027462  016666  000002  000004  11$:    MOV     2(SP),4(SP)     ;;ADJUST THE STACK
        027470  012616                          MOV     (SP)+,(SP)
        027472  000002                          RTI                     ;;RETURN TO USER
        027474  023420  001750  000144  $DTBL:  .WORD   10000.,1000.,100.,10.
        027504                          $DBLK:  .BLKW   5
```

```
                                            .SBTTL  SUBROUTINE TO EXPAND DECIMAL TO LARGER THAN 32767
                                    ;;*******************************************************************
027516  012702  027512              EXPAND: MOV     #$DBLK+6,R2        ;&& MOVE LOCATION OF LCD+1 TO R2
027522  012703  027516                      MOV     #$DBLK+12,R3       ;&& MOVE NEW LOCATION OF LCD+2 TO R3
027526  105043                              CLRB    -(R3)              ;&& MAKE SURE TERMINATOR IS THERE
027530  114243                              MOVB    -(R2),-(R3)        ;&& MOVE THE 5 ASCII'S TO THEIR NEW LOCATIONS
027532  114243                              MOVB    -(R2),-(R3)        ;&&
027534  114243                              MOVB    -(R2),-(R3)        ;&&
027536  114243                              MOVB    -(R2),-(R3)        ;&&
027540  114243                              MOVB    -(R2),-(R3)        ;&&
027542  112743  000040                      MOVB    #' ,-(R3)          ;&& MOVE 4 SPACE CHARACTERS TO THE 4 NEW LOCATIONS
027546  112743  000040                      MOVB    #' ,-(R3)          ;&&
027552  112743  000040                      MOVB    #' ,-(R3)          ;&&
027556  112743  000040                      MOVB    #' ,-(R3)          ;&&
027562  013746  001360                      MOV     $TMP0,-(SP)        ;&& SAVE $TMP0
027566  005037  001360                      CLR     $TMP0              ;&& CLEAR LOCATION TO USE AS ACCUMULATOR
027572  013746  001362                      MOV     $TMP1,-(SP)        ;&& SAVE $TMP1
027576  005037  001362                      CLR     $TMP1              ;&& CLEAR LOCATION TO USE AS 2ND ACCUMULATOR
027602  012701  027513                      MOV     #$DBLK+7,R1        ;&& MOVE ADDRESS OF LCD TO R2
027606  012702  027762                      MOV     #$NUMS+10,R2       ;&& MOVE ADDRESS+10 OF WORD STREAM OF 8^6 TO R2
027612  016600  000026              1$:     MOV     26(SP),R0          ;&& MOVE OVERFLOW LOCATION CONTENTS TO R0
027616  111137  001360                      MOVB    (R1),$TMP0         ;&& MOVE ASCII TO THE TEMPORARY LOCATION
027622  052737  000060  001360              BIS     #'0,$TMP0          ;&& MAKE LOCATION AN ASCII IF NOT ALREADY
027630  061237  001360              2$:     ADD     (R2),$TMP0         ;&& ADD THE NUMBER TO THE ASCII
027634  022737  000071  001360              CMP     #'9,$TMP0          ;&& HAVE WE SURPASSED ASCII '9'?
027642  002025                              BGE     4$                 ;&& BRANCH IF NOT
027644  162737  000012  001360              SUB     #10.,$TMP0         ;&& SUBTRACT 10 FROM THE ASCII AND
027652  010103                              MOV     R1,R3              ;&& MOVE PRESENT ASCII ADDRESS TO R3
027654  005303                      3$:     DEC     R3                 ;&& DECREMENT TO NEXT SIGNIFICANT ASCII DIGIT
027656  105213                              INCB    (R3)               ;&& ADD THE CARRY TO THE ASCII
027660  152713  000060                      BISB    #'0,(R3)           ;&& SET BITS TO MAKE IT A NUMBER ASCII
027664  122713  000071                      CMPB    #'9,(R3)           ;&& SEE IF CARRY NEEDS TO BE TRANSFERED
027670  002012                              BGE     4$                 ;&& BRANCH IF NOT
027672  111337  001362                      MOVB    (R3),$TMP1         ;&& MOVE BYTE TO LOCATION $TMP1
027676  162737  000012  001362              SUB     #10.,$TMP1         ;&& SUBTRACT 10 DECIMAL AND
027704  113713  001362                      MOVB    $TMP1,(R3)         ;&& MOVE IT BACK
027710  022703  027504                      CMP     #$DBLK,R3          ;&& SEE IF ALL POSITIONS HAVE BEEN DONE
027714  001357                              BNE     3$                 ;&& BRANCH BACK IF NOT
027716  005300                      4$:     DEC     R0                 ;&& DECREMENT THE OVERFLOW LOCATION R0
027720  001343                              BNE     2$                 ;&& BRANCH IF NOT ALL ADDED
027722  113711  001360                      MOVB    $TMP0,(R1)         ;&& MOVE NEW NUMBER TO LOCATION
027726  005301                              DEC     R1                 ;&& POINT R1 TO THE NEXT ASCII LOCATION
027730  005742                              TST     -(R2)              ;&& POINT R2 TO NEXT DIGIT TO ADD
027732  022701  027507                      CMP     #$DBLK+3,R1        ;&& SEE IF ALL DIGITS HAVE BEEN ADDED
027736  001325                              BNE     1$                 ;&& BRANCH IF NOT DONE
027740  012637  001362                      MOV     (SP)+,$TMP1        ;&& RESTORE $TMP1
027744  012637  001360                      MOV     (SP)+,$TMP0        ;&& RESTORE $TMP0
027750  000207                              RTS     PC                 ;&& RETURN
027752  000003  000002  000007      $NUMS:  .WORD   3,2,7,6,8.
```

```
  5915                                         .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.
        027764  022737  000176  001340  $CKSWR: CMP     #SWREG,SWR              ;;IS THE SOFT-SWR SELECTED?
        027772  001112                          BNE     15$                     ;;BRANCH IF NO
        027774  105737  032555                  TSTB    CHARCT                  ;&& SEE IF CHARACTER WAS INPUTED DURING PRINT
        030000  001405                          BEQ     1$                      ;&& BRANCH IF NOT
        030002  113746  032555                  MOVB    CHARCT,-(SP)            ;&& MOVE CHARACTER TO THE STACK
        030006  105037  032555                  CLRB    CHARCT                  ;&& CLEAR THE CHARACTER FROM CHARCT
        030012  000405                          BR      2$                      ;&& GO CHECK IT OUT
        030014  105777  151324          1$:     TSTB    @$TKS                   ;;CHAR THERE?
        030020  100077                          BPL     15$                     ;;IF NO, DON'T WAIT AROUND
        030022  117746  151320                  MOVB    @$TKB,-(SP)             ;;SAVE THE CHAR
        030026  042716  177600          2$:     BIC     #^C177,(SP)             ;;STRIP-OFF THE ASCII
        030032  022726  000007                  CMP     #7,(SP)+                ;;IS IT A CONTROL G?
        030036  001404                          BEQ     3$                      ;&& YES, BRANCH AROUND RETURN TO USER SETUP
        030040  116637  177776  032555          MOVB    -2(SP),CHARCT           ;&& MOVE CHARACTER BACK TO CHARCT
        030046  000464                          BR      15$                     ;&& RETURN TO USER
        030050  123727  001334  000001  3$:     CMPB    $AUTOB,#1               ;;ARE WE RUNNING IN AUTO-MODE?
        030056  001460                          BEQ     15$                     ;;BRANCH IF YES

        030060  104401  030544                  TYPE    ,$CNTLG                 ;;ECHO THE CONTROL-G (^G)
        030064  104401  030551          $GTSWR: TYPE    ,$MSWR                  ;;TYPE CURRENT CONTENTS
        030070  013746  000176                  MOV     SWREG,-(SP)             ;;SAVE SWREG FOR TYPEOUT
        030074  104402                          TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        030076  104401  030562                  TYPE    ,$MNEW                  ;;PROMPT FOR NEW SWR
        030102  105037  032555          19$:    CLRB    CHARCT                  ;&& CLEAR ANY CHARACTER THAT WAS INPUTED DURING PR:NT
        030106  005046                          CLR     -(SP)                   ;;CLEAR COUNTER
        030110  005046                          CLR     -(SP)                   ;;THE NEW SWR
        030112  105777  151226          7$:     TSTB    @$TKS                   ;;CHAR THERE?
        030116  100375                          BPL     7$                      ;;IF NOT TRY AGAIN

        030120  117746  151222                  MOVB    @$TKB,-(SP)             ;;PICK UP CHAR
        030124  042716  177600                  BIC     #^C177,(SP)             ;;MAKE IT 7-BIT ASCII


        030130  021627  000025          9$:     CMP     (SP),#25                ;;IS IT A CONTROL-U?
        030134  001005                          BNE     10$                     ;;BRANCH IF NOT
        030136  104401  030537                  TYPE    ,$CNTLU                 ;;YES, ECHO CONTROL-U (^U)
        030142  062706  000006          20$:    ADD     #6,SP                   ;;IGNORE PREVIOUS INPUT
        030146  000746                          BR      $GTSWR                  ;;LET'S TRY IT AGAIN

        030150  021627  000015          10$:    CMP     (SP),#15                ;;IS IT A <CR>?
        030154  001022                          BNE     16$                     ;;BRANCH IF NO
        030156  005766  000004                  TST     4(SP)                   ;;YES, IS IT THE FIRST CHAR?
        030162  001403                          BEQ     11$                     ;;BRANCH IF YES
        030164  016677  000002  151146          MOV     2(SP),@SWR              ;;SAVE NEW SWR
        030172  062706  000006          11$:    ADD     #6,SP                   ;;CLEAR UP STACK
        030176  104401  001405          14$:    TYPE    ,$CRLF                  ;;ECHO <CR> AND <LF>
        030202  123727  001335  000001          CMPB    $INTAG,#1               ;;RE-ENABLE TTY KBD INTERRUPTS?
        030210  001003                          BNE     15$                     ;;BRANCH IF NOT
        030212  012777  000100  151124          MOV     #100,@$TKS              ;;RE-ENABLE TTY KBD INTERRUPTS
        030220  000002                  15$:    RTI                             ;;RETURN
        030222  004737  026606          16$:    JSR     PC,$TYPEC               ;;ECHO CHAR
        030226  021627  000060                  CMP     (SP),#60                ;;CHAR < 0?
        030232  002420                          BLT     18$                     ;;BRANCH IF YES
        030234  021627  000067                  CMP     (SP),#67                ;;CHAR > 7?
        030240  003015                          BGT     18$                     ;;BRANCH IF YES
        030242  042726  000060                  BIC     #60,(SP)+               ;;STRIP-OFF ASCII
        030246  005766  000002                  TST     2(SP)                   ;;IS THIS THE FIRST CHAR
        030252  001403                          BEQ     17$                     ;;BRANCH IF YES
        030254  006316                          ASL     (SP)                    ;;NO, SHIFT PRESENT
        030256  006316                          ASL     (SP)                    ;;    CHAR OVER TO MAKE
        030260  006316                          ASL     (SP)                    ;;    ROOM FOR NEW ONE.
        030262  005266  000002          17$:    INC     2(SP)                   ;;KEEP COUNT OF CHAR
        030266  056616  177776                  BIS     -2(SP),(SP)             ;;SET IN NEW CHAR
        030272  000707                          BR      7$                      ;;GET THE NEXT ONE
        030274  104401  001404          18$:    TYPE    ,$QUES                  ;;TYPE ?<CR><LF>
        030300  000720                          BR      20$                     ;;SIMULATE CONTROL-U
                                        .DSABL  LSB

                                        ;;**************'***************************************************************
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                                          .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
                                  ;

030302  011646                    $RDCHR: MOV     (SP),-(SP)       ;;PUSH DOWN THE PC
030304  016666  000004  000002            MOV     4(SP),2(SP)      ;;SAVE THE PS
030312  105777  151026            1$:     TSTB    @$TKS            ;;WAIT FOR
030316  100375                            BPL     1$               ;;A CHARACTER
030320  117766  151022  000004            MOVB    @$TKB,4(SP)      ;;READ THE TTY
030326  042766  177600  000004            BIC     #^C<177>,4(SP)   ;;GET RID OF JUNK IF ANY
030334  026627  000004  000023            CMP     4(SP),#23        ;;IS IT A CONTROL-S?
030342  001013                            BNE     3$               ;;BRANCH IF NO
030344  105777  150774            2$:     TSTB    @$TKS            ;;WAIT FOR A CHARACTER
030350  100375                            BPL     2$               ;;LOOP UNTIL ITS THERE
030352  117746  150770                    MOVB    @$TKB,-(SP)      ;;GET CHARACTER
030356  042716  177600                    BIC     #^C177,(SP)      ;;MAKE IT 7-BIT ASCII
030362  022627  000021                    CMP     (SP)+,#21        ;;IS IT A CONTROL-Q?
030366  001366                            BNE     2$               ;;IF NOT DISCARD IT
030370  000750                            BR      1$               ;;YES, RESUME
030372  026627  000004  000140    3$:     CMP     4(SP),#140       ;;IS IT UPPER CASE?
030400  002407                            BLT     4$               ;;BRANCH IF YES
030402  026627  000004  000175            CMP     4(SP),#175       ;;IS IT A SPECIAL CHAR?
030410  003003                            BGT     4$               ;;BRANCH IF YES
030412  042766  000040  000004            BIC     #40,4(SP)        ;;MAKE IT UPPER CASE
030420  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

030422  010346                            $RDLIN: MOV     R3,-(SP)               ;;SAVE R3
030424  012703  030530                    1$:     MOV     #$TTYIN,R3             ;;GET ADDRESS
030430  022703  030537                    2$:     CMP     #$TTYIN+7.,R3          ;;BUFFER FULL?
030434  101405                                    BLOS    4$                     ;;BR IF YES
030436  104410                                    RDCHR                          ;;GO READ ONE CHARACTER FROM THE TTY
030440  112613                                    MOVB    (SP)+,(R3)             ;;GET CHARACTER
030442  122713  000177                    10$:    CMPB    #177,(R3)              ;;IS IT A RUBOUT
030446  001003                                    BNE     3$                     ;;SKIP IF NOT
030450  104401  001404                    4$:     TYPE    ,$QUES                 ;;TYPE A '?'
030454  000763                                    BR      1$                     ;;CLEAR THE BUFFER AND LOOP
030456  111337  030526                    3$:     MOVB    (R3),9$                ;;ECHO THE CHARACTER
030462  104401  030526                            TYPE    ,9$
030466  122723  000015                            CMPB    #15,(R3)+              ;;CHECK FOR RETURN
030472  001356                                    BNE     2$                     ;;LOOP IF NOT RETURN
030474  105063  177777                            CLRB    -1(R3)                 ;;CLEAR RETURN (THE 15)
030500  104401  001406                            TYPE    ,$LF                   ;;TYPE A LINE FEED
030504  012603                                    MOV     (SP)+,R3               ;;RESTORE R3
030506  011646                                    MOV     (SP),-(SP)             ;;ADJUST THE STACK AND PUT ADDRESS OF THE
030510  016666  000004  000002                    MOV     4(SP),2(SP)            ;;      FIRST ASCII CHARACTER ON IT
030516  012766  030530  000004                    MOV     #$TTYIN,4(SP)
030524  000002                                    RTI                            ;;RETURN
030526     000                            9$:     .BYTE   0                      ;;STORAGE FOR ASCII CHAR. TO TYPE
030527     000                                    .BYTE   0                      ;;TERMINATOR
030530                                    $TTYIN: .BLKB   7.                     ;;RESERVE 7. BYTES FOR TTY INPUT
030537     136     125     015            $CNTLU: .ASCIZ  /^U/<15><12>           ;;CONTROL "U"
030544     136     107     015            $CNTLG: .ASCIZ  /^G/<15><12>           ;;CONTROL "G"
030551     015     012     123            $MSWR:  .ASCIZ  <15><12>/SWR = /
030562     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
                                        ;

     030574  011646                     $RDDEC: MOV     (SP),-(SP)               ;;PROVIDE SPACE FOR
     030576  016666  000004  000002             MOV     4(SP),2(SP)              ;;THE INPUT NUMBER
     030604  010046                             MOV     R0,-(SP)                 ;;PUSH R0 ON STACK
     030606  010146                             MOV     R1,-(SP)                 ;;PUSH R1 ON STACK
     030610  010246                             MOV     R2,-(SP)                 ;;PUSH R2 ON STACK
     030612  104411                     1$:     RDLIN                            ;;READ AN ASCIZ LINE
     030614  012600                             MOV     (SP)+,R0                 ;;ADDRESS OF 1ST CHAR.
     030616  010037  030742                     MOV     R0,6$                    ;;SAVE INCASE OF BAD INPUT
     030622  005046                             CLR     -(SP)                    ;;CLEAR DATA WORD
     030624  005002                             CLR     R2                       ;;SIGN SET POSITIVE
     030626  122710  000055                     CMPB    #'-,(R0)                 ;;SEE IF A MINUS SIGN WAS TYPED
     030632  001001                             BNE     2$                       ;;BR IF NO MINUS SIGN
     030634  112002                             MOVB    (R0)+,R2                 ;;SAVE FOR LATER USE
     030636  112001                     2$:     MOVB    (R0)+,R1                 ;;PICKUP THIS CHARACTER
     030640  001424                             BEQ     3$                       ;;GET OUT IF ZERO
     030642  122701  000060                     CMPB    #'0,R1                   ;;MAKE SURE THIS CHARACTER
     030646  003032                             BGT     5$                       ;;IS A DIGIT BETWEEN 0 & 9
     030650  122701  000071                     CMPB    #'9,R1
     030654  002427                             BLT     5$
     030656  032716  170000                     BIT     #^C7777,(SP)             ;;DON'T LET NUMBER GET TO BIG
     030662  001024                             BNE     5$                       ;;BR IF NUMBER WOULD OVERFLOW
     030664  006316                             ASL     (SP)                     ;;*2
     030666  011646                             MOV     (SP),-(SP)               ;;SAVE FOR LATER
     030670  006316                             ASL     (SP)                     ;;*4
     030672  006316                             ASL     (SP)                     ;;*8.
     030674  062616                             ADD     (SP)+,(SP)               ;;*10.
     030676  102416                             BVS     5$                       ;;OVERFLOW ISN'T ALLOWED
     030700  162701  000060                     SUB     #'0,R1                   ;;STRIP AWAY THE ASCII JUNK
     030704  060116                             ADD     R1,(SP)                  ;;ADD IN THIS DIGIT
     030706  102412                             BVS     5$                       ;;OVERFLOW ISN'T ALLOWED
     030710  000752                             BR      2$                       ;;LOOP
     030712  005702                     3$:     TST     R2                       ;;CHECK IF NUMBER IS NEG
     030714  001401                             BEQ     4$                       ;;BR IF NO
     030716  005416                             NEG     (SP)                     ;;YES--NEGATE THE NUMBER
     030720  012666  000012             4$:     MOV     (SP)+,12(SP)             ;;SAVE THE RESULT
     030724  012602                             MOV     (SP)+,R2                 ;;POP STACK INTO R2
     030726  012601                             MOV     (SP)+,R1                 ;;POP STACK INTO R1
     030730  012600                             MOV     (SP)+,R0                 ;;POP STACK INTO R0
     030732  000002                             RTI                              ;;RETURN

     030734  005726                     5$:     TST     (SP)+                    ;;CLEAN PARTIAL NUMBER FROM STACK
     030736  105010                             CLRB    (R0)                     ;;SET A TERMINATOR
     030740  104401                             TYPE                             ;;TYPE THE INPUT UP TO BAD CHAR.
```

```
        030742  000000                    6$:     .WORD   0               ;;POINTER GOES HERE
        030744  104401  001404                    TYPE    ,$QUES          ;;''?'' ''CR'' &''LF''
        030750  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

    030752  011646                      $RDOCT: MOV     (SP),-(SP)              ;;PROVIDE SPACE FOR THE
    030754  016666  000004  000002              MOV     4(SP),2(SP)             ;;INPUT NUMBER
    030762  010046                              MOV     R0,-(SP)                ;;PUSH R0 ON STACK
    030764  010146                              MOV     R1,-(SP)                ;;PUSH R1 ON STACK
    030766  010246                              MOV     R2,-(SP)                ;;PUSH R2 ON STACK
    030770  104411                      1$:     RDLIN                           ;;READ AN ASCIZ LINE
    030772  012600                              MOV     (SP)+,R0                ;;GET ADDRESS OF 1ST CHARACTER
    030774  010037  031100                      MOV     R0,5$                   ;;AND SAVE IT
    031000  005001                              CLR     R1                      ;;CLEAR DATA WORD
    031002  005002                              CLR     R2
    031004  112046                      2$:     MOVB    (R0)+,-(SP)             ;;PICKUP THIS CHARACTER
    031006  001420                              BEQ     3$                      ;;IF ZERO GET OUT
    031010  122716  000060                      CMPB    #'0,(SP)                ;;MAKE SURE THIS CHARACTER
    031014  003026                              BGT     4$                      ;;IS AN OCTAL DIGIT
    031016  122716  000067                      CMPB    #'7,(SP)
    031022  002423                              BLT     4$
    031024  006301                              ASL     R1                      ;;*2
    031026  006102                              ROL     R2
    031030  006301                              ASL     R1                      ;;*4
    031032  006102                              ROL     R2
    031034  006301                              ASL     R1                      ;;*8
    031036  006102                              ROL     R2
    031040  042716  177770                      BIC     #^C7,(SP)               ;;STRIP THE ASCII JUNK
    031044  062601                              ADD     (SP)+,R1                ;;ADD IN THIS DIGIT
    031046  000756                              BR      2$                      ;;LOOP
    031050  005726                      3$:     TST     (SP)+                   ;;CLEAN TERMINATOR FROM STACK
    031052  010166  000012                      MOV     R1,12(SP)               ;;SAVE THE RESULT
    031056  010237  031110                      MOV     R2,$HIOCT
    031062  012602                              MOV     (SP)+,R2                ;;POP STACK INTO R2
    031064  012601                              MOV     (SP)+,R1                ;;POP STACK INTO R1
    031066  012600                              MOV     (SP)+,R0                ;;POP STACK INTO R0
    031070  000002                              RTI                             ;;RETURN
    031072  005726                      4$:     TST     (SP)+                   ;;CLEAN PARTIAL FROM STACK
    031074  105010                              CLRB    (R0)                    ;;SET A TERMINATOR
    031076  104401                              TYPE                            ;;TYPE UP THRU THE BAD CHAR.
    031100  000000                      5$:     .WORD   0
    031102  104401  001404                      TYPE    ,$QUES                  ;;"?" "CR" & "LF"
    031106  000730                              BR      1$                      ;;TRY AGAIN
    031110  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.
 031112  010046                     $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 031114  016600  000002                     MOV     2(SP),R0        ;;GET TRAP ADDRESS
 031120  005740                             TST     -(R0)           ;;BACKUP BY 2
 031122  111000                             MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 031124  006300                             ASL     R0              ;;POSITION FOR INDEXING
 031126  016000  031146                     MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
 031132  000200                             RTS     R0              ;;GO TO ROUTINE
                                    ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
 031134  011646                     $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
 031136  016666  000004  000002             MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
 031144  000002                             RTI                     ;;RESTORE THE PSW
                                    .SBTTL  TRAP TABLE
                                    ;;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                    ;;*BY THE "TRAP" INSTRUCTION.
                                    ;       ROUTINE
                                    ;       -------
 031146  031134                     $TRPAD: .WORD   $TRAP2
 031150  026374                             $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 031152  026766                             $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 031154  026742                             $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 031156  027002                             $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 031160  027200                             $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
 031162  030064                             $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING
 031164  027764                             $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
 031166  030302                             $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
 031170  030422                             $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
 031172  030752                             $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
 031174  030574                             $RDDEC  ;;CALL=RDDEC    TRAP+13(104413) READ A DECIMAL NUMBER FROM TTY
 031176  027170                             $TYPDE  ;;CALL=TYPDE    TRAP+14(104414) TYPE DECIMAL EXTENDED
```

```
                                            .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

031200  032777  001000  150132  $SCOPE: BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
031206  001406                          BEQ     1$              ;;BR IF NO
031210  005737  001312                  TST     $ERTTL          ;;SEE IF THERE WERE ANY ERRORS YET
031214  001403                          BEQ     1$              ;;BR IF NOT YET
031216  013716  001310                  MOV     $LPERR,(SP)     ;;FUDGE RETURN
031222  000002                          RTI                     ;;RETURN
031224  032777  040000  150106  1$:     BIT     #BIT14,@SWR     ;;LOOP ON TEST?
031232  001403                          BEQ     2$              ;;BR IF NO
031234  013716  001306                  MOV     $LPADR,(SP)     ;;FUDGE RETURN
031240  000002                          RTI                     ;;RETURN
031242  105737  002706          2$:     TSTB    EOPLOC          ;&& TEST TO SEE IF EOP'S ARE TO PRINT
031246  001043                          BNE     6$              ;&& BRANCH IF NOT
031250  105737  032555                  TSTB    CHARCT          ;&& SEE IF A CHARACTER WAS INPUTED IN A PRINT ROUTINE
031254  001406                          BEQ     3$              ;&& BRANCH TO CHECK KEYBOARD IF NOT
031256  113737  032555  002706          MOVB    CHARCT,EOPLOC   ;&& MOVE THE CHARACTER TO EOPLOC
031264  105037  032555                  CLRB    CHARCT          ;&& CLEAR THE LOCATION
031270  000411                          BR      4$              ;&& BRANCH TO CHECK THE CHARACTER
031272  105777  150046          3$:     TSTB    @$TKS           ;&& SEE IF EOP REQUESTED
031276  100055                          BPL     8$              ;&& BRANCH IF NOT
031300  117737  150042  002706          MOVB    @$TKB,EOPLOC    ;&& GET CHARACTER
031306  142737  000200  002706          BICB    #200,EOPLOC     ;&& CLEAR PARITY BIT
031314  122737  000030  002706  4$:     CMPB    #30,EOPLOC      ;&& SEE IF A (^X)
031322  001406                          BEQ     5$              ;&& BRANCH IF IT IS
031324  113737  002706  032555          MOVB    EOPLOC,CHARCT   ;&& MOVE CHARACTER BACK TO CHARCT FOR POSSIBLE FUTURE USE
031332  105037  002706                  CLRB    EOPLOC          ;&& CLEAR THE LOCATION
031336  000435                          BR      8$              ;&& BRANCH TO START SCOPE ROUTINE
031340  104401  032174          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

031344  105337  002706                  DECB    EOPLOC          ;&& MAKE ^X ANOTHER CHARACTER AND
031350  105037  032555                  CLRB    CHARCT          ;&& CLEAR ANY CHARACTER THAT MAY BE THERE
031354  000426                          BR      8$              ;&& BRANCH TO START SCOPE ROUTINE
031356  105737  032555          6$:     TSTB    CHARCT          ;&& SEE IF A CHARACTER WAS INPUTED IN THE TYPE ROUTINE
031362  001011                          BNE     7$              ;&& GO TEST THE CHARACTER IF SO
031364  105777  147754                  TSTB    @$TKS           ;&& SEE IF CHARACTER WAITING
031370  100020                          BPL     8$              ;&& BRANCH IF NOT
031372  117737  147750  032555          MOVB    @$TKB,CHARCT    ;&& MOVE THE CHARACTER FOR TESTING
031400  142737  000200  032555          BICB    #200,CHARCT     ;&& CLEAR THE PARITY BIT
031406  122737  000030  032555  7$:     CMPB    #30,CHARCT      ;&& SEE IF ANOTHER (^X) WAS INPUTED
031414  001006                          BNE     8$              ;&& BRANCH IF NOT
031416  105037  002706                  CLRB    EOPLOC          ;&& CLEAR EOPLOC TO RESUME EOP MESSAGES
031422  104401  032504                  TYPE    ,EOPRSM         ;&& TYPE: 'EOP'S AND EOD'S WILL RESUME PRINTING'
```

```
031426  105037  032555                  CLRB    CHARCT          ;&& MAKE CHARACTER SOMETHING ELSE
031432  105737  032555          8$:     TSTB    CHARCT          ;&& SEE IF A CHARACTER IS WAITING
031436  001477                          BEQ     9$              ;&& BRANCH AROUND (^Y) TEST IF NOT
031440  122737  000031  032555          CMPB    #31,CHARCT      ;&& IS THIS A (^Y) (REQUEST FOR RUN SUMMARY)
031446  001073                          BNE     9$              ;&& BRANCH IF NOT
031450  022737  044652  044650          CMP     #CAPSTK,CAPNTR  ;SEE IF THERE IS ANY DATA TO PRINT
031456  001003                          BNE     11$             ;BRANCH TO PRINT IT IF THERE IS
031460  104401  036311                  TYPE    ,NODATA         ;TYPE:  'NO ERROR TOTALS TO REPORT'
031464  000462                          BR      17$             ;KICK OUT
031466  022737  047132  044650  11$:    CMP     #ENDSTK,CAPNTR  ;SEE IF STACK IS FULL OF BULL
031474  001002                          BNE     12$             ;BRANCH AROUND STACK IS FULL MESSAGE IF NOT
031476  104401  036120                  TYPE    ,STKIFL         ;TYPE:  'STACK IS FULL - DATA MAY HAVE BEEN LOST'
031502  104401  036173          12$:    TYPE    ,ERCHDR         ;TYPE:  'SUMMATION OF ERRORS SINCE BEGINNING OR LAST REPORT'
                                                                ;        'BOARD #   PASS #   ERRTTL'
031506  012700  044652                  MOV     #CAPSTK,R0      ;MOVE ADDRESS OF STACK TO PRINT TO R0
031512  012701  000020                  MOV     #16.,R1         ;MOVE 16 BOARDS TO SEARCH TO R0
031516  005037  001362                  CLR     $TMP1           ;CLEAR $TMP1, DEVICE POINTER
031522  021037  001362          13$:    CMP     (R0),$TMP1      ;SEE IF UNIT NUMBER IS TO PRINT
031526  001403                          BEQ     14$             ;BRANCH TO PRINT DATA IF SO
031530  062700  000010                  ADD     #10,R0          ;GO TO NEXT SET OF DATA AND
031534  000420                          BR      16$             ;GO SEE IF ANY MORE TO CHECK
031536  012046                  14$:    MOV     (R0)+,-(SP)     ;MOVE UNIT NUMBER TO STACK FOR PRINTING
031540  104405                          TYPDS                   ;GO TYPE UNIT NUMBER IN DECIMAL
031542  104401  037352                  TYPE    ,SPACES         ;TYPE 2 SPACES
031546  012046                          MOV     (R0)+,-(SP)     ;MOVE OVERFLOW PASS NUMBER TO STACK FOR PRINTING
031550  001002                          BNE     15$             ;BRANCH IF NON-ZERO
031552  104401  037352                  TYPE    ,SPACES         ;TYPE AN EXTRA 2 SPACES - NUMBER WILL NOT BE EXTENDED
031556  012046                  15$:    MOV     (R0)+,-(SP)     ;MOVE MAJOR PASS NUMBER TO STACK FOR PRINTING
031560  104414                          TYPDE                   ;GO TYPE PASS NUMBER IN EXTENDED DECIMAL
031562  104401  037352                  TYPE    ,SPACES         ;TYPE 2 SPACES
031566  012046                          MOV     (R0)+,-(SP)     ;MOVE ERROR TOTAL TO STACK FOR PRINTING
031570  104405                          TYPDS                   ;GO TYPE ERROR TOTAL IN DECIMAL
031572  104401  001405                  TYPE    ,$CRLF          ;TYPE <CRLF>
031576  020037  044650          16$:    CMP     R0,CAPNTR       ;SEE IF ALL DATA HAS BEEN PRINTED
031602  001347                          BNE     13$             ;BRANCH BACK IF NOT
031604  005237  001362                  INC     $TMP1           ;INCREMENT DEVICE POINTER
031610  012700  044652                  MOV     #CAPSTK,R0      ;INITIALIZE TO BEGINNING FOR ANOTHER POSSIBLE PASS
031614  005301                          DEC     R1              ;DECREMENT THE LOOP COUNTER AND
031616  001341                          BNE     13$             ;BRANCH UNTIL ALL DEVICE DATA PRINTED
031620  012737  044652  044650          MOV     #CAPSTK,CAPNTR  ;REINITIALIZE CAPNTR
031626  104401  001405                  TYPE    ,$CRLF          ;TYPE ANOTHER <CRLF>
031632  105037  032555          17$:    CLRB    CHARCT          ;CLEAR ANY CHARACTER ENTERED DURING PRINTING
031636  104407                  9$:     CKSWR                   ;;TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER
                                ;#####START OF CODE FOR THE XOR TESTER#####
031640  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
031642  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
031646  012737  031666  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
031654  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
031660  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
031664  000517                          BR      $SVLAD          ;;GO TO THE NEXT TEST
031666  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
031670  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
031674  000505                          BR      7$              ;;LOOP ON THE PRESENT TEST
031676                          6$:;#####END OF CODE FOR THE XOR TESTER#####
031676  032777  000400  147434          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
031704  001505                          BEQ     4$              ;;BR IF NO
```

```
     031706  005046                             CLR     -(SP)              ;;CLEAR A TEMP. LOCATION
     031710  117716  147424                     MOVB    @SWR,(SP)          ;;PICKUP THE DESIRED TEST NUMBER
     031714  042716  000200                     BIC     #$SWRMK,(SP)       ;;MASK OUT UNDESIRED BITS
     031720  001416                             BEQ     8$                 ;;BRANCH IF BAD TEST NUMBER IN SWR
     031722  022716  000037                     CMP     #37,(SP)           ;;CHECK THE NUMBER IN THE SWR
     031726  002413                             BLT     8$                 ;;BRANCH IF TEST NUMBER IS OUT OF RANGE
     031730  011637  001302                     MOV     (SP),$TSTNM        ;;UPDATE THE TEST NUMBER IN $TSTNM
     031734  011637  001414                     MOV     (SP),$TESTN        ;&& UPDATE THE TEST NUMBER IN $TESTN
     031740  005316                             DEC     (SP)               ;;BACKUP BY ONE
     031742  006316                             ASL     (SP)               ;;SCALE THE TEST NUMBER AS AN INDEX
     031744  062716  032556                     ADD     #$SW08TBL,(SP)     ;;FORM THE ADDRESS OF TEST POINTER
     031750  013637  001306                     MOV     @(SP)+,$LPADR      ;;SET LOOP ADDRESS TO DESIRED TEST
     031754  000501                             BR      $OVER              ;;GO LOOP ON THE TEST
     031756  005726                     8$:     TST     (SP)+              ;;CLEAN THE BAD TEST NUMBER OFF OF THE STACK
     031760  022737  177777  032654  2$:2$:  CMP     #-1,CPSAVE         ;SEE IF TIMEOUT WAS PREVIOUSLY RECORDED ;DPM001
     031766  001447                             BEQ     2001$              ;BRANCH AROUND ROUTINE IF SO            ;DPM001
     031770  005227  177777                     INC     #-1                ;TEST FOR 1ST TIME THROUGH              ;DPM001
     031774  001005                             BNE     900$               ;BRANCH IF NOT                          ;DPM001
     031776  013746  000004                     MOV     4,-(SP)            ;SAVE TIMEOUT VECTOR AT 4               ;DPM001
     032002  012737  032056  000004             MOV     #1999$,4           ;SET VECTOR TO LOCATION BELOW           ;DPM001
     032010  013737  177766  032654  900$:   MOV     177766,CPSAVE      ;MOVE CPU ERR REG VALUE TO LOC FOR TST  ;DPM001
     032016  032737  000001  032654          BIT     #BIT00,CPSAVE      ;SEE IF THE POWER MONITOR BIT IS ON     ;DPM001
     032024  001423                             BEQ     2000$              ;BRANCH TO CONTINUE ROUTINE IF CLEAR    ;DPM001
     032026  042737  000001  177766          BIC     #BIT00,177766      ;CLEAR THE BIT FOUND TO BE SET          ;DPM001
     032034  017746  147300                     MOV     @SWR,-(SP)         ;SAVE SWR VALUE                         ;DPM001
     032040  042777  001000  147272          BIC     #BIT09,@SWR        ;DON'T ALLOW LOOP ON ERROR ON THIS ERROR;DPM001
     032046  104177                             EMT     +177               ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
     032050  012677  147264                     MOV     (SP)+,@SWR         ;RESTORE SWR TO ORIGINAL VALUE          ;DPM001
     032054  000407                             BR      2000$              ;BRANCH OVER TIMEOUT SECTION            ;DPM001
     032056  022626                     1999$:  CMP     (SP)+,(SP)+        ;CLEAN UP THE STACK AFTER TIMEOUT       ;DPM001
     032060  012737  177777  032654          MOV     #-1,CPSAVE         ;MOVE -1 TO CPSAVE - NO CPU ERR REG     ;DPM001
     032066  005237  032076                     INC     2000$+2            ;INCREMENT 1ST TIME THROUGH LOCATION    ;DPM001
     032072  000403                             BR      910$               ;BRANCH OVER 1ST TIME THROUGH TEST      ;DPM001
     032074  005227  177777             2000$:  INC     #-1                ;TEST FOR 1ST TIME THROUGH              ;DPM001
     032100  001002                             BNE     2001$              ;BRANCH IF NOT                          ;DPM001
     032102  012637  000004             910$:   MOV     (SP)+,4            ;RESTORE LOCATION 4                     ;DPM001
     032106                             2001$:  ;TSTB   $ERFLG             ;;HAS AN ERROR OCCURRED? ;&& ELIMINATED FOR CZDRLD
     032106  001406                             BEQ     $SVLAD             ;;BR IF NO
     032110  013737  001310  001306  7$:     MOV     $LPERR,$LPADR      ;;SET LOOP ADDRESS TO LAST SCOPE
     032116  000420                             BR      $OVER
     032120  105037  001303             4$:     CLRB    $ERFLG             ;;ZERO THE ERROR FLAG
     032124  105237  001302             $SVLAD: INCB    $TSTNM             ;;COUNT TEST NUMBERS
     032130  113737  001302  001414          MOVB    $TSTNM,$TESTN      ;;SET TEST NUMBER IN APT MAILBOX
     032136  011637  001306                     MOV     (SP),$LPADR        ;;SAVE SCOPE LOOP ADDRESS
     032142  011637  001310                     MOV     (SP),$LPERR        ;;SAVE ERROR LOOP ADDRESS
     032146  005037  001376                     CLR     $ESCAPE            ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
     032152  112737  000001  001315          MOVB    #1,$ERMAX          ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
     032160  013777  001302  147154  $OVER:  MOV     $TSTNM,@DISPLAY    ;;DISPLAY TEST NUMBER
     032166  013716  001306                     MOV     $LPADR,(SP)        ;;FUDGE RETURN ADDRESS
     032172  000002                             RTI                        ;;RETURN
     032174     136     130     200  HAKTPM: .ASCII  /^X/<CRLF>/HIT ANY KEY TO OBTAIN A PROGRESS REPORT./<CRLF> ;&&
     032250     105     116     124          .ASCII  /ENTER (^X) TO RESUME EOP'S AND EOD'S/<CRLF>                ;&&
     032315     105     116     124          .ASCII  /ENTER THE KEY REPEATEDLY, AS RESETS DONE IN THE DIAGNOSTIC/<CRLF> ;&&
     032410     115     101     131          .ASCIZ  /MAY CLEAR THE CHARACTER BEFORE THE TESTS FOR THE CHARACTER/<CRLF> ;&&
     032504     136     130     200  EOPRSM: .ASCIZ  /^X/<CRLF>/EOP'S AND EOD'S WILL RESUME PRINTING/<CRLF>      ;&&
     032555     000                     CHARCT: .BYTE   0                  ;&& LOCATION TO HOLD INPUTED CHARACTER
                                                .EVEN
```

```
      032556                      $SW08TBL:
      032556  012636                      .WORD   TST1+30         ;STARTING ADDRESS+30 OF TEST 1
      032560  013034                      .WORD   TST2+30         ;STARTING ADDRESS+30 OF TEST 2
      032562  013164                      .WORD   TST3+30         ;STARTING ADDRESS+30 OF TEST 3
      032564  013516                      .WORD   TST4+30         ;STARTING ADDRESS+30 OF TEST 4
      032566  014222                      .WORD   TST5+30         ;STARTING ADDRESS+30 OF TEST 5
      032570  014416                      .WORD   TST6+30         ;STARTING ADDRESS+30 OF TEST 6
      032572  014764                      .WORD   TST7+30         ;STARTING ADDRESS+30 OF TEST 7
      032574  015142                      .WORD   TST10+30        ;STARTING ADDRESS+30 OF TEST 10
      032576  015376                      .WORD   TST11+30        ;STARTING ADDRESS+30 OF TEST 11
      032600  015562                      .WORD   TST12+30        ;STARTING ADDRESS+30 OF TEST 12
      032602  015746                      .WORD   TST13+30        ;STARTING ADDRESS+30 OF TEST 13
      032604  016132                      .WORD   TST14+30        ;STARTING ADDRESS+30 OF TEST 14
      032606  016322                      .WORD   TST15+30        ;STARTING ADDRESS+30 OF TEST 15
      032610  016554                      .WORD   TST16+30        ;STARTING ADDRESS+30 OF TEST 16
      032612  017012                      .WORD   TST17+30        ;STARTING ADDRESS+30 OF TEST 17
      032614  017410                      .WORD   TST20+30        ;STARTING ADDRESS+30 OF TEST 20
      032616  020014                      .WORD   TST21+30        ;STARTING ADDRESS+30 OF TEST 21
      032620  020330                      .WORD   TST22+30        ;STARTING ADDRESS+30 OF TEST 22
      032622  020626                      .WORD   TST23+30        ;STARTING ADDRESS+30 OF TEST 23
      032624  021364                      .WORD   TST24+30        ;STARTING ADDRESS+30 OF TEST 24
      032626  021666                      .WORD   TST25+30        ;STARTING ADDRESS+30 OF TEST 25
      032630  022156                      .WORD   TST26+30        ;STARTING ADDRESS+30 OF TEST 26
      032632  022434                      .WORD   TST27+30        ;STARTING ADDRESS+30 OF TEST 27
      032634  022652                      .WORD   TST30+30        ;STARTING ADDRESS+30 OF TEST 30
      032636  023140                      .WORD   TST31+30        ;STARTING ADDRESS+30 OF TEST 31
      032640  023270                      .WORD   TST32+30        ;STARTING ADDRESS+30 OF TEST 32
      032642  023650                      .WORD   TST33+30        ;STARTING ADDRESS+30 OF TEST 33
      032644  024154                      .WORD   TST34+30        ;STARTING ADDRESS+30 OF TEST 34
      032646  024536                      .WORD   TST35+30        ;STARTING ADDRESS+30 OF TEST 35
      032650  025034                      .WORD   TST36+30        ;STARTING ADDRESS+30 OF TEST 36
      032652  025350                      .WORD   TST37+30        ;STARTING ADDRESS+30 OF TEST 37
      032654  000000              CPSAVE: .WORD   0               ;LOCATION TO SAVE CPU ERR REG CONTENTS  ;DPM001
```

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  5926                                     .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

        032656  105037  033224             $ERROR: CLRB    IBSAVE          ;CLEAR THE ITEM BYTE SAVE LOCATION        ;RAN001
        032662  104407                             CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
        032664  105237  001303             7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
        032670  001775                             BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
        032672  013777  001302  146442             MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
        032700  032777  002000  146432             BIT     #BIT10,@SWR     ;;BELL ON ERROR?
        032706  001402                             BEQ     1$              ;;NO - SKIP
        032710  104401  001400                     TYPE    ,$BELL          ;;RING BELL
        032714  005237  001312             1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
        032720  005237  002714                     INC     ERRCNT          ;&& INCREMENT THE ERROR COUNT
        032724  011637  001316                     MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
        032730  162737  000002  001316             SUB     #2,$ERRPC
        032736  117737  146354  001314             MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
        032744  122737  000177  001314             CMPB    #177,$ITEMB     ;SEE IF THIS IS THE POWER FAIL CALL       ;DPM001
        032752  001445                             BEQ     1001$           ;BRANCH AROUND ROUTINE IF IT IS           ;DPM001
        032754  105737  033224                     TSTB    IBSAVE          ;SEE IF THIS IS THE 2ND ERROR CALL        ;DPM001
        032760  001040                             BNE     1000$           ;BRANCH IF SO                             ;DPM001
        032762  022737  177777  032654             CMP     #-1,CPSAVE      ;SEE IF CPU ERR REG EXISTS                ;DPM001
        032770  001436                             BEQ     1001$           ;BRANCH IF NOT                            ;DPM001
        032772  013746  000004                     MOV     4,-(SP)         ;SAVE TIMEOUT VECTOR AT 4                 ;DPM001
        032776  012737  033014  000004             MOV     #5000$,4        ;TIMEOUTS TO 5000$                        ;DPM001
        033004  013737  177766  032654             MOV     177766,CPSAVE   ;MOVE CPU ERR REG TO CPSAVE FOR TEST      ;DPM001
        033012  000405                             BR      4999$           ;BRANCH OVER TIMEOUT HANDLER              ;DPM001
        033014  022626                     5000$:  CMP     (SP)+,(SP)+     ;CLEAN STACK AFTER TIMEOUT                ;DPM001
        033016  012737  177777  032654             MOV     #-1,CPSAVE      ;SET CPSAVE TO -1 TO NEGATE FURTHER TEST;DPM001
        033024  000420                             BR      1001$           ;BRANCH TO CONTINUE ERROR CALL            ;DPM001
        033026  032737  000001  032654     4999$:  BIT     #BIT00,CPSAVE   ;SEE IF POWER MONITOR BIT IS SET          ;DPM001
        033034  001414                             BEQ     1001$           ;BRANCH IF OK                             ;DPM001
        033036  042737  000001  177766             BIC     #BIT00,177766   ;CLEAR THE BIT FOUND SET                  ;DPM001
        033044  113737  001314  033224             MOVB    $ITEMB,IBSAVE   ;MAKE IBSAVE NON-ZERO FOR DUAL CALL       ;DPM001
        033052  112737  000177  001314             MOVB    #177,$ITEMB     ;SET $ITEMB TO SPECIAL POWER FAIL PNTR    ;DPM001
        033060  000402                             BR      1001$           ;BRANCH OVER IBSAVE CLEARING              ;DPM001
        033062  105037  033224             1000$:  CLRB    IBSAVE          ;CLEAR IBSAVE SO AFTER 2ND ERROR, EXIT    ;DPM001
        033066  012637  000004             1001$:  MOV     (SP)+,4         ;RESTORE STACK TO PRETEST STATE           ;DPM001
        033072  032777  020000  146240             BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
        033100  001002                             BNE     20$             ;;SKIP TYPEOUTS
        033102  004737  033226                     JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
        033106                             20$:
        033106  122737  000001  001430             CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
        033114  001007                             BNE     2$              ;;NO,SKIP APT ERROR REPORT
        033116  113737  001314  033130             MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
        033124  004737  033644                     JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
        033130     000                     21$:    .BYTE   0
```

```
 033131     000                                 .BYTE    0
 033132  000777                        22$:     BR       22$                ;;APT ERROR LOOP
 033134  105737  033224                2$:      TSTB     IBSAVE             ;SEE IF POWER FAIL ERROR CALL           ;RAN001
 033140  001005                                 BNE      3$                 ;BRANCH IF NOT - HALT NOT ALLOWED       ;RAN001
 033142  005777  146172                         TST      @SWR               ;;HALT ON ERROR
 033146  100002                                 BPL      3$                 ;;SKIP IF CONTINUE
 033150  000000                                 HALT                        ;;HALT ON ERROR!
 033152  104407                                 CKSWR                       ;;TEST FOR CHANGE IN SOFT-SWR
 033154  005737  001376                3$:      TST      $ESCAPE            ;;CHECK FOR AN ESCAPE ADDRESS
 033160  001402                                 BEQ      4$                 ;;BR IF NONE
 033162  013716  001376                         MOV      $ESCAPE,(SP)       ;;FUDGE RETURN ADDRESS FOR ESCAPE
 033166  032777  001000  146144        4$:      BIT      #BIT9,@SWR         ;&& SEE IF WE ARE TO LOOP ON ERROR
 033174  001402                                 BEQ      5$                 ;&& BRANCH OUT IF NOT
 033176  013716  001310                         MOV      $LPERR,(SP)        ;&& FUDGE RETURN
 033202                                5$:
 033202  022737  026324  000042                 CMP      #$ENDAD,@#42       ;;ACT-11 AUTO-ACCEPT?
 033210  001001                                 BNE      6$                 ;;BRANCH IF NO
 033212  000000                                 HALT                        ;;YES
 033214                                6$:
 033214  105737  033224                         TSTB     IBSAVE             ;SEE IF THIS IS THE PWR FAIL ERROR CALL ;RAN001
 033220  001221                                 BNE      7$                 ;BRANCH BACK TO CALL ORIGINAL ERR IF SO ;RAN001
 033222  000002                                 RTI                         ;;RETURN
 033224  000000                        IBSAVE:  .WORD    0                  ;LOC'N TO HOLD $ITEMB DURING DUAL ERR   ;RAN001
```

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  5928                                .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.

        033226                        $ERRTYP:
        033226  010046                        MOV     R0,-(SP)        ;;SAVE R0
        033230  113700  001314                MOVB    @#$ITEMB,R0     ;;PICKUP THE ITEM INDEX
        033234  042700  177400                BIC     #177400,R0      ;CLEAR UPPER BYTE                        ;DPM001
        033240  001004                        BNE     1$              ;;IF ITEM NUMBER IS ZERO, TYPE THE PC OF THE ERROR
        033242  013746  001316                MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                      ;;ERROR ADDRESS
        033246  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        033250  000517                        BR      14$             ;;GET OUT
        033252  022700  000177        1$:1$:  CMP     #177,R0         ;SEE IF THIS CALL IS THE PWR FAIL CALL  ;DPM001
        033256  001003                        BNE     100$            ;BRANCH IF NOT                          ;DPM001
        033260  012700  033516                MOV     #PFECH,R0       ;MOVE ADDRESS OF PWR FAIL CALL TO R0    ;DPM001
        033264  000460                        BR      110$            ;BRANCH TO CALL ERROR                   ;DPM001
        033266  010037  001360        100$:   MOV     R0,$TMP0        ;&& MOVE R0 TO $TMP0 FOR 200 TEST
        033272  042700  000200                BIC     #200,R0         ;&& CLEAR BIT 7 IF PRESENT
        033276  005300                        DEC     R0              ;&& MAKE POINTER AN INDEX
        033300  006300                        ASL     R0              ;&& SHIFT TO MULTIPLY BY 10 (OCTAL)
        033302  006300                        ASL     R0              ;&&
        033304  006300                        ASL     R0              ;&&
        033306  105737  001360                TSTB    $TMP0           ;&& SEE IF ITEM NUMBER IS OVER 200
        033312  100037                        BPL     4$              ;&& BRANCH IF ITEM NUMBER IS LESS THAN 200
        033314  023727  002714  000020        CMP     ERRCNT,#20      ;&& SEE IF 20 (OCTAL) ERRORS HAVE PRINTED
        033322  002404                        BLT     2$              ;&& BRANCH TO PRINT THE ERROR IF LESS
        033324  003071                        BGT     14$             ;&& BRANCH TO RETURN IF GREATER - NO MORE DATA IS TO PRINT
        033326  104401  040775                TYPE    ,NOMORE         ;&& TYPE MESSAGE ANNOUNCING NO MORE PRINTING OF ERRORS
        033332  000466                        BR      14$             ;&& BRANCH TO RETURN
        033334  022737  000001  002714  2$:   CMP     #1,ERRCNT       ;&& SEE IF THIS IS THE FIRST ERROR
        033342  001415                        BEQ     3$              ;&& BRANCH IF IT WAS AND GO TYPE ERROR MESSAGE
        033344  123737  001360  033514        CMPB    $TMP0,MEPITM    ;&& SEE IF ITEM MATCHES LAST MULTIPLE ERROR
        033352  001011                        BNE     3$              ;&& BRANCH IF NOT - NEW HEADER NEEDED
        033354  032777  000200  145756        BIT     #BIT7,@SWR      ;&& SEE IF SWITCH REGISTER BIT 7 IS SET
        033362  001052                        BNE     14$             ;&& BRANCH TO RETURN IF SWITCH SET
        033364  042700  177400                BIC     #177400,R0      ;&& CLEAR UPPER BYTE OF R0 EXPOSING ITEM BYTE
        033370  062700  002300                ADD     #ER200+4,R0     ;&& POINT TO DATA TABLE ENTRY
        033374  000432                        BR      9$              ;&& BRANCH TO PRINT DATA
        033376  113737  001360  033514  3$:   MOVB    $TMP0,MEPITM    ;&& MOVE ITEM NUMBER TO MEPITM FOR POSSIBLE FUTURE USE
        033404  062700  000540                ADD     #ER200-$ERRTB,R0;&& ADD 200 BASE POINTER TO R0 AND
        033410  000402                        BR      5$              ;&& BRANCH AROUND ERRCNT CLEAR
        033412  005037  002714        4$:     CLR     ERRCNT          ;&& CLEAR ERRCNT SO MULTIPLE ERRORS GET NEW HEADER
        033416  104401  001405        5$:     TYPE    ,$CRLF          ;&& TYPE  <CRLF>
        033422  062700  001534                ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
        033426  012037  033436        110$:   MOV     (R0)+,6$        ;;PICKUP "ERROR MESSAGE" POINTER
        033432  001404                        BEQ     7$              ;;SKIP TYPEOUT IF NO POINTER
        033434  104401                        TYPE                    ;;TYPE THE "ERROR MESSAGE"
        033436  000000                6$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
        033440  104401  001405                TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
        033444  012037  033454        7$:     MOV     (R0)+,8$        ;;PICKUP "DATA HEADER" POINTER
        033450  001404                        BEQ     9$              ;;SKIP TYPEOUT IF 0
        033452  104401                        TYPE                    ;;TYPE THE "DATA HEADER"
        033454  000000                8$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
        033456  104401  001405                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
        033462  011000                  9$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
        033464  001407                          BEQ     13$             ;;GO AROUND ROUTINE TO TYPE THE DATA IF NONE
        033466  013046                  10$:    MOV     @(R0)+,-(SP)    ;;PUT OCTAL DATA ON STACK FOR TYPING
        033470  104402                          TYPOC                   ;;TYPE AN OCTAL NUMBER
        033472  005710                          TST     (R0)            ;;IS THERE ANOTHER NUMBER?
        033474  001403                          BEQ     13$             ;;BR IF NO
        033476  104401  037352                  TYPE    ,SPACES         ;;TYPE TWO(2) SPACES
        033502  000771                          BR      10$             ;;GO BACK TO PRINT THE OCTAL NUMBER
        033504  104401  001405          13$:    TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
        033510  012600                  14$:    MOV     (SP)+,R0        ;;RESTORE R0
        033512  000207                          RTS     PC              ;;RETURN
        033514  000000                  MEPITM: .WORD   0               ;&& LOCATION TO STORE 200+ ERROR ITEM NUMBER

        033516  033526  033562  033612  PFECH:  .WORD   PFECH1,PFECH2,PFECH3,PFECH4 ;ADDRESSES OF DATA/ASCII BELOW
        033526     120     117     127  PFECH1: .ASCIZ  ?POWER MONITOR BIT FOUND SET?
        033562     124     105     123  PFECH2: .ASCIZ  ?TESTNO  ERR PC  CPUERR?
                                                .EVEN
        033612  001414  001316  032654  PFECH3: .WORD   $TESTN,$ERRPC,CPSAVE,0
        033622     000     000     000  PFECH4: .BYTE   0,0,0,0
```

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                                        .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;*******************************************************************
033626  112737  000001  034072  $ATY1:  MOVB    #1,$FFLG                ;;TO REPORT FATAL ERROR
033634  112737  000001  034070  $ATY3:  MOVB    #1,$MFLG                ;;TO TYPE A MESSAGE
033642  000403                          BR      $ATYC
033644  112737  000001  034072  $ATY4:  MOVB    #1,$FFLG                ;;TO ONLY REPORT FATAL ERROR
033652                          $ATYC:
033652  010046                          MOV     R0,-(SP)                ;;PUSH R0 ON STACK
033654  010146                          MOV     R1,-(SP)                ;;PUSH R1 ON STACK
033656  105737  034070                  TSTB    $MFLG                   ;;SHOULD TYPE A MESSAGE?
033662  001450                          BEQ     5$                      ;;IF NOT:  BR
033664  122737  000001  001430          CMPB    #APTENV,$ENV            ;;OPERATING UNDER APT?
033672  001031                          BNE     3$                      ;;IF NOT:  BR
033674  132737  000100  001431          BITB    #APTSPOOL,$ENVM         ;;SHOULD SPOOL MESSAGES?
033702  001425                          BEQ     3$                      ;;IF NOT:  BR
033704  017600  000004                  MOV     @4(SP),R0               ;;GET MESSAGE ADDR.
033710  062766  000002  000004          ADD     #2,4(SP)                        ;;BUMP RETURN ADDR.
033716  005737  001410          1$:     TST     $MSGTYPE                ;;SEE IF DONE W/ LAST XMISSION?
033722  001375                          BNE     1$                      ;;IF NOT:  WAIT
033724  010037  001424                  MOV     R0,$MSGAD               ;;PUT ADDR IN MAILBOX
033730  105720                  2$:     TSTB    (R0)+                   ;;FIND END OF MESSAGE
033732  001376                          BNE     2$
033734  163700  001424                  SUB     $MSGAD,R0               ;;SUB START OF MESSAGE
033740  006200                          ASR     R0                      ;;GET MESSAGE LNGTH IN WORDS
033742  010037  001426                  MOV     R0,$MSGLGT              ;;PUT LENGTH IN MAILBOX
033746  012737  000004  001410          MOV     #4,$MSGTYPE             ;;TELL APT TO TAKE MSG.
033754  000413                          BR      5$
033756  017637  000004  034002  3$:     MOV     @4(SP),4$               ;;PUT MSG ADDR IN JSR LINKAGE
033764  062766  000002  000004          ADD     #2,4(SP)                        ;;BUMP RETURN ADDRESS
033772  013746  177776                  MOV     177776,-(SP)            ;;PUSH 177776 ON STACK
033776  004737  026374                  JSR     PC,$TYPE                ;;CALL TYPE MACRO
034002  000000                  4$:     .WORD   0
034004                          5$:
034004  105737  034072          10$:    TSTB    $FFLG                   ;;SHOULD REPORT FATAL ERROR?
034010  001416                          BEQ     12$                     ;;IF NOT:  BR
034012  005737  001430                  TST     $ENV                    ;;RUNNING UNDER APT?
034016  001413                          BEQ     12$                     ;;IF NOT:  BR
034020  005737  001410          11$:    TST     $MSGTYPE                ;;FINISHED LAST MESSAGE?
034024  001375                          BNE     11$                     ;;IF NOT:  WAIT
034026  017637  000004  001412          MOV     @4(SP),$FATAL           ;;GET ERROR #
034034  062766  000002  000004          ADD     #2,4(SP)                        ;;BUMP RETURN ADDR.
034042  005237  001410                  INC     $MSGTYPE                ;;TELL APT TO TAKE ERROR
034046  105037  034072          12$:    CLRB    $FFLG                   ;;CLEAR FATAL FLAG
034052  105037  034071                  CLRB    $LFLG                   ;;CLEAR LOG FLAG
034056  105037  034070                  CLRB    $MFLG                   ;;CLEAR MESSAGE FLAG
034062  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
034064  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
034066  000207                          RTS     PC                      ;;RETURN
034070     000                  $MFLG:  .BYTE   0                       ;;MESSG. FLAG
034071     000                  $LFLG:  .BYTE   0                       ;;LOG FLAG
034072     000                  $FFLG:  .BYTE   0                       ;;FATAL FLAG
                                        .EVEN
        000200                  APTSIZE=200
        000001                  APTENV=001
        000100                  APTSPOOL=100
        000040                  APTCSUP=040
```

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                                        .SBTTL  POWER DOWN AND UP ROUTINE

                                        ;;*********************************************************************
                                        ;POWER DOWN AND UP ROUTINE
      034074  012737  034112  000024  $PWRDN: MOV     #$PWRUP,PWRVEC  ;&& SET UP VECTOR TO RETURN TO THE HALT BELOW
      034102  012737  000340  000026          MOV     #LEVEL7,PWRVEC+2;&& RETURN PRIORITY TO 7
      034110  000000                          HALT                    ;;HALT PROCESSOR
      034112  012737  034074  000024  $PWRUP: MOV     #$PWRDN,PWRVEC  ;&& RESET PWRVEC TO PWRDN ROUTINE AND
      034120  012737  000340  000026          MOV     #LEVEL7,PWRVEC+2;&& PRIORITY TO 7
      034126  012706  001300                  MOV     #STACK,SP       ;&& REINITIALIZE THE STACK.
      034132  012746  000340                  MOV     #LEVEL7,-(SP)   ;&& SET UP RETURN PRIORITY TO 7 AND
      034136  012746  011420                  MOV     #START1,-(SP)   ;&& MOVE START1 ADDRESS TO STACK AND
      034142  005037  001360                  CLR     $TMP0           ;&& CLEAR WAIT LOOP COUNTER
      034146  005237  001360          1$:     INC     $TMP0           ;&& GIVE TTY TIME TO RECOVER FROM POWER FAILURE
      034152  001375                          BNE     1$              ;&& BRANCH BACK UNTIL ZERO AGAIN
      034154  104401  034162                  TYPE    ,$POWER         ;&& TYPE THE POWER FAILURE MESSAGE ASCIZED BELOW
      034160  000002                          RTI                     ;&& RETURN TO PROGRAM
      034162     200     120     117  $POWER: .ASCIZ  <CRLF>/POWER FAILURE - RESTARTING PROGRAM/<CRLF>
                                              .EVEN
```

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                                                .SBTTL  MULTIPLE BOARD DIALOGUE ROUTINE
                                        ;;*****************************************************************
                                        ;>>>>>>>MULTIPLE BOARD DIALOGUE ROUTINE<<<<<<<<
                                        ;;*****************************************************************
034230  012706  001300                  MBD:    MOV     #STACK,SP               ;INITIALIZE THE STACK
034234  004737  006610                          JSR     PC,SETTUP               ;GO INITIALIZE THE COMMON TAGS
034240  104401  040643                          TYPE    ,MBDIAL                 ;TYPE:  'MULTIPLE BOARD DIALOGUE'
034244  105037  032555                  PROMPT: CLRB    CHARCT                  ;CLEAR LOCATION FOR POSSIBLE INPUT DURING PRINT
034250  104401  040676                          TYPE    ,ECELR                  ;TYPE:  'ENTER COMMAND ([E]DIT, [L]IST, [B]URST CALIBRATION,
034254  012703  000001                          MOV     #1,R3                   ;EXPECT 1 CHARACTER
034260  004737  002722                          JSR     PC,READ                 ;GO READ 1 CHARACTER
034264  022737  000114  002664                  CMP     #'L,ANSWER              ;LIST PRESENT TABLE?
034272  001073                                  BNE     1$                      ;BRANCH IF NO
034274  104401  040452                          TYPE    ,HEADER                 ;TYPE:  '# OF    START                          2-N
                                                                                ;       'BOARDS  REGADR  VECADR   W-B    P-LEV   CYCLE    T
034300  013737  001474  002720                  MOV     $DDW0,DDW               ;SET UP THE DEVICE DESCRIPTOR WORD FOR PRINTING
034306  013746  002414                          MOV     QTYBRD,-(SP)            ;MOVE NUMBER OF DEVICES TO STACK FOR TYPING
034312  104405                                  TYPDS                           ;TYPE THE NUMBER OF DEVICES
034314  104401  037355                          TYPE    ,SPACE3                 ;TYPE 3 SPACE CHARACTERS
034320  013746  002416                          MOV     REGADR,-(SP)            ;MOVE THE DEVICE REGISTER ADDRESS TO THE STACK
034324  104402                                  TYPOC                           ;TYPE THE DEVICE REGISTER ADDRESS
034326  104401  037361                          TYPE    ,SPACE6                 ;TYPE 6 SPACE CHARACTERS
034332  013746  002456                          MOV     VECADR,-(SP)            ;MOVE THE DEVICE VECTOR ADDRESS TO THE STACK
034336  104403                                  TYPOS                           ;TYPE THE DEVICE VECTOR ADDRESS
034340     003     000                          .BYTE   3,0                     ;TYPE 3 CHARACTERS, LEADING ZEROS SUPPRESSED
034342  104401  037370                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
034346  032737  000001  002720                  BIT     #BIT0,DDW               ;SEE WHICH W/B STATE FOR BOARDS
034354  001403                                  BEQ     10$                     ;GO PRINT W STATE IF W
034356  104401  037405                          TYPE    ,B                      ;TYPE A 'B'
034362  000402                                  BR      11$                     ;GO TO NEXT CHECK
034364  104401  037407                  10$:    TYPE    ,W                      ;TYPE A 'W'
034370  104401  037370                  11$:    TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
034374  004737  006560                          JSR     PC,PNTPRI               ;PRINT DEVICE PRIORITY
034400  104401  037370                          TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
034404  032737  000002  002720                  BIT     #BIT1,DDW               ;SEE WHICH 2/N STATE FOR BOARDS
034412  001003                                  BNE     12$                     ;GO PRINT N STATE IF N
034414  104401  037420                          TYPE    ,TWO                    ;TYPE A '2'
034420  000402                                  BR      13$                     ;GO TO NEXT CHECK
034422  104401  037422                  12$:    TYPE    ,N                      ;TYPE AN 'N'
034426  104401  037370                  13$:    TYPE    ,SPACE7                 ;TYPE 7 SPACE CHARACTERS
034432  032737  000004  002720                  BIT     #BIT2,DDW               ;SEE WHICH CABLE STATE FOR BOARDS
034440  001403                                  BEQ     14$                     ;GO PRINT NO CABLE IF NONE
034442  104401  037414                          TYPE    ,YES                    ;TYPE 'YES'
034446  000402                                  BR      15$                     ;BRANCH TO CONTINUE
034450  104401  037411                  14$:    TYPE    ,NO                     ;TYPE 'NO'
034454  104401  037435                  15$:    TYPE    ,CRLF2                  ;TYPE 2 <CRLF>'S
034460  000671                                  BR      PROMPT                  ;BRANCH TO PROMPT ANOTHER COMMAND
034462  022737  000122  002664          1$:     CMP     #'R,ANSWER              ;RUN PROGRAM?
034470  001020                                  BNE     4$                      ;BRANCH IF NOT
034472  005737  002416                          TST     REGADR                  ;SEE IF REGADR HAS BEEN LOADED
034476  001003                                  BNE     3$                      ;BRANCH TO CHECK VECADR IF SO
034500  104401  037072                  2$:     TYPE    ,MUSTED                 ;TYPE:  'DEVICE ADDRESS AND/OR VECTOR TABLE NOT SET UP - MUS
034504  000657                                  BR      PROMPT                  ;BRANCH BACK FOR PROMPT MESSAGE
034506  005737  002456                  3$:     TST     VECADR                  ;SEE IF VECADR HAS BEEN LOADED
034512  001772                                  BEQ     2$                      ;BRANCH BACK TO PRINT ERROR MESSAGE IF NOT
034514  004737  003170                          JSR     PC,FIXTBL               ;FILL TABLE
034520  012737  177777  002670                  MOV     #-1,MANSIZE             ;MOVE -1 TO MANSIZE TO INDICATE WE HAVE MANUALLY SIZED
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034526  000137  011424                  JMP     START           ;JUMP TO START
034532  022737  000105  002664  4$:     CMP     #'E,ANSWER      ;EDIT TABLE?
034540  001414                          BEQ     EDIT            ;BRANCH TO EDIT IF SO
034542  022737  000102  002664          CMP     #'B,ANSWER      ;ENTER BURST DATA LATE CALIBRATION?
034550  001235                          BNE     PROMPT          ;BRANCH TO PROMPT IF COMMAND NOT RECOGNIZED
034552  005737  002416                  TST     REGADR          ;SEE IF REGADR HAS BEEN LOADED
034556  001750                          BEQ     2$              ;BRANCH TO ERROR MESSAGE IF NOT
034560  005737  002456                  TST     VECADR          ;SEE IF VECADR HAS BEEN LOADED
034564  001745                          BEQ     2$              ;BRANCH TO ERROR MESSAGE IF NOT
034566  000137  035712                  JMP     BDLCR           ;JUMP TO BURST DATA LATE CALIBRATION ROUTINE
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                                         .SBTTL  TABLE EDIT ROUTINE
034572  104401  037535          EDIT:    TYPE    ,NOBUT              ;TYPE:  'NUMBER OF BOARDS UNDER TEST: '
034576  013746  002414                   MOV     QTYBRD,-(SP)        ;PUT QUANTITY OF BOARDS ON STACK FOR PRINTING
034602  104405                           TYPDS                       ;GO PRINT THE QUANTITY OF BOARDS
034604  104401  037400                   TYPE    ,SPACEC             ;TYPE:  '  :  '
034610  012703  000002                   MOV     #2,R3               ;EXPECT MAX OF 2 CHARACTERS
034614  112737  000071  002704           MOVB    #'9,LRGSTC          ;MOVE ASCII '9' TO THE LARGEST CHARACTER LOCATION
034622  004737  002722                   JSR     PC,READ             ;GO READ 2 CHARACTERS
034626  022703  000002                   CMP     #2,R3               ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
034632  001017                           BNE     2$                  ;BRANCH IF NOT
034634  022737  000033  002664           CMP     #ESC,ANSWER         ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
034642  001453                           BEQ     5$                  ;BRANCH TO PROMPT JUMP IF SO
034644  022737  000003  002664           CMP     #CNTLC,ANSWER       ;SEE IF USER WANTS TO EXIT (^C)
034652  001447                           BEQ     5$                  ;BRANCH TO PROMPT JUMP IF EXIT REQUESTED
034654  022737  000015  002664           CMP     #CARETN,ANSWER      ;SEE IF A <CR> WAS INPUTED
034662  001412                           BEQ     4$                  ;IF <CR> USE EXISTING NUMBER
034664  104401  036407          1$:      TYPE    ,BDNERR             ;TYPE:  'ILLEGAL NUMBER (# OTHER THAN 1-16) OR CHARACTER INP
034670  000740                           BR      EDIT                ;BRANCH BACK FOR NEW INPUT
034672  005704                  2$:      TST     R4                  ;CHECK FOR ZERO MODULES INPUT
034674  001773                           BEQ     1$                  ;BRANCH TO PRINT ERROR MESSAGE IF SO
034676  022704  000020                   CMP     #20,R4              ;SEE IF BOARD NUMBER IS ILLEGAL
034702  100770                           BMI     1$                  ;BRANCH TO PRINT ERROR MESSAGE IF SO
034704  010437  002414          3$:      MOV     R4,QTYBRD           ;MOVE INPUTED NUMBER TO QTYBRD
034710  104401  040306          4$:      TYPE    ,SDADRS             ;TYPE:  ' STARTING DEVICE ADDRESS: '
034714  013746  002416                   MOV     REGADR,-(SP)        ;MOVE THE PRESENT ADDRESS TO THE STACK FOR PRINTING
034720  104402                           TYPOC                       ;PRINT THE ADDRESS
034722  104401  037400                   TYPE    ,SPACEC             ;TYPE:  '  :  '
034726  012703  000006                   MOV     #6,R3               ;EXPECT MAXIMUM 6 CHARACTERS
034732  112737  000067  002704           MOVB    #'7,LRGSTC          ;MOVE ASCII '7' TO THE LARGEST CHARACTER LOCATION
034740  004737  002722                   JSR     PC,READ             ;GO READ 6 CHARACTERS
034744  022703  000006                   CMP     #6,R3               ;SEE IF NON-NUMERIC CHARACTER INPUTED
034750  001022                           BNE     8$                  ;BRANCH IF NOT
034752  022737  000033  002664           CMP     #ESC,ANSWER         ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
034760  001704                           BEQ     EDIT                ;BRANCH AROUND ESC PRINT AND PREVIOUS PROMPT BRANCH IF SO
034762  022737  000003  002664           CMP     #CNTLC,ANSWER       ;SEE IF USER WANTS TO EXIT (^C)
034770  001005                           BNE     7$                  ;BRANCH AROUND PROMPT JUMP IF NOT
034772  000137  034244          5$:      JMP     PROMPT              ;JUMP TO PROMPT A NEW COMMAND
034776  104401  036532          6$:      TYPE    ,ADRERR             ;TYPE:  'ADDRESS INPUTED IS NOT'           ;DPM001
                                                                     ;       'IN THE RANGE 160010 TO 163770'   ;DPM001
035002  000742                           BR      4$                  ;BRANCH BACK FOR REINPUT
035004  022737  000015  002664  7$:      CMP     #CARETN,ANSWER      ;SEE IF <CR> WAS ONLY CHARACTER INPUTED
035012  001417                           BEQ     10$                 ;IF <CR> USE EXISTING REG ADDRESS
035014  000735                           BR      4$                  ;BRANCH BACK - INPUT NOT LEGAL
035016  020427  160010          8$:      CMP     R4,#160010          ;IS ANSWER BELOW 160010                   ;DPM001
035022  103765                           BLO     6$                  ;BRANCH TO PRINT ERROR MESSAGE IF IT IS
035024  020427  163770                   CMP     R4,#163770          ;IS ANSWER ABOVE 163770                   ;DPM001
035030  101362                           BHI     6$                  ;BRANCH TO PRINT ERROR MESSAGE IF NOT
035032  032704  000007                   BIT     #7,R4               ;TEST TO MAKE SURE A '0' IS PRESENT IN LOWEST OCTAL DIGIT
035036  001403                           BEQ     9$                  ;BRANCH AROUND ERROR MESSAGE TYPE IF SO
035040  104401  036700                   TYPE    ,ADLCHR             ;TYPE:  'ADDRESS INPUTED HAS OTHER THAN 0 FOR LEAST'
                                                                     ;       'SIGNIFICANT OCTAL DIGIT'
035044  000721                           BR      4$                  ;BRANCH BACK FOR REINPUT
035046  010437  002416          9$:      MOV     R4,REGADR           ;INSTALL NEW # IN TABLE
035052  104401  040252          10$:     TYPE    ,SVADRS             ;TYPE:  'STARTING VECTOR ADDRESS:  '
035056  013746  002456                   MOV     VECADR,-(SP)        ;MOVE PRESENT VECTOR TO STACK FOR PRINTING
035062  104403                           TYPOS                       ;PRINT THE PRESENT VECTOR ADDRESS
035064     003     000                   .BYTE   3,0                 ;TYPE 3 CHARACTERS, SUPPRESS LEADING ZEROS
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035066  104401  037400                    TYPE    ,SPACEC           ;TYPE:  '  : '
035072  012703  000003                    MOV     #3,R3             ;EXPECT ONLY 3 CHARACTERS
035076  004737  002722                    JSR     PC,READ           ;GO READ 3 CHARACTERS
035102  022703  000003                    CMP     #3,R3             ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
035106  001015                            BNE     11$               ;BRANCH IF NOT
035110  022737  000033  002664            CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
035116  001674                            BEQ     4$                ;BRANCH TO PREVIOUS PROMPT IF SO
035120  022737  000003  002664            CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
035126  001721                            BEQ     5$                ;BRANCH TO PROMPT JUMP IF SO
035130  022737  000015  002664            CMP     #CARETN,ANSWER    ;SEE IF <CR> WAS INPUTED
035136  001417                            BEQ     15$               ;BRANCH IF NO CHANGE WANTED
035140  000744                            BR      10$               ;BRANCH BACK - INPUT WAS ILLEGAL
035142  022704  000277            11$:    CMP     #277,R4           ;SEE IF ANSWER IS BELOW 300          ;DPM001
035146  100403                            BMI     13$               ;BRANCH AROUND ERROR MESSAGE IF NOT
035150  104401  036617                    TYPE    ,VECERR           ;TYPE:  'VECTOR INPUTED IS NOT IN THE RANGE OF 300 TO 777';D
035154  000736                            BR      10$               ;BRANCH BACK FOR REINPUT
035156  032704  000003            13$:    BIT     #3,R4             ;MAKE SURE LEAST SIGNIFICANT OCTAL DIGIT IS '0' OR '4'
035162  001403                            BEQ     14$               ;BRANCH OVER ERROR PRINTING IF NOT
035164  104401  037003                    TYPE    ,VCLCHR           ;TYPE:  'VECTOR INPUTED SHOULD HAVE 0 OR 4 AS LEAST DIGIT'
035170  000730                            BR      10$               ;BRANCH BACK FOR REINPUT
035172  010437  002456            14$:    MOV     R4,VECADR         ;INSTALL NEW VECTOR ADDRESS IN TABLE
035176  104401  040201            15$:    TYPE    ,DR1WOB           ;TYPE:  'DR11-W CR B (W=0, B=1) CURRENT STATE = '
035202  013737  001474  002720            MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
035210  012737  000001  002710            MOV     #BITO,BITTST      ;MOVE BIT STATE TO PRINT TO BITTST
035216  004737  006536                    JSR     PC,PSTATE         ;PRINT CURRENT W/B STATE
035222  104401  037400                    TYPE    ,SPACEC           ;TYPE:  '  : '
035226  012703  000001                    MOV     #1,R3             ;ONLY INPUT 1 CHARACTER
035232  004737  002722                    JSR     PC,READ           ;GO READ 1 CHARACTER
035236  005703                            TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
035240  001415                            BEQ     16$               ;BRANCH AROUND NON-NUMERIC TESTS IF SO
035242  022737  000033  002664            CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
035250  001700                            BEQ     10$               ;BRANCH TO PREVIOUS PROMPT IF SO
035252  022737  000015  002664            CMP     #CARETN,ANSWER    ;SEE IF USER WANTS NO CHANGE
035260  001417                            BEQ     18$               ;BRANCH IF SO
035262  022737  000003  002664            CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
035270  001640                            BEQ     5$                ;BRANCH TO PROMPT JUMP IF SO
035272  000741                            BR      15$               ;BRANCH BACK - INPUT NOT LEGAL
035274  005704                    16$:    TST     R4                ;CHECK FOR LEGAL INPUT
035276  001403                            BEQ     17$               ;BRANCH IF OK
035300  022704  000001                    CMP     #1,R4             ;CHECK FOR ILLEGAL INPUT
035304  001334                            BNE     15$               ;BRANCH BACK IF ILLEGAL STATE INPUTED
035306  042737  000001  001474    17$:    BIC     #BITO,$DDWO       ;CLEAR THE BIT TO BE ALTERED
035314  050437  001474                    BIS     R4,$DDWO          ;PUT USER INPUT INTO $DDWO
035320  104401  040137            18$:    TYPE    ,DEVPRI           ;TYPE:  'DEVICE PRIORITY PRESENT LEVEL = '
035324  013737  001474  002720            MOV     $DDWO,DDW         ;MOVE DEVICE DESCRIPTOR WORD TO DDW
035332  004737  006560                    JSR     PC,PNTPRI         ;PRINT DEVICE PRIORITY
035336  104401  037400                    TYPE    ,SPACEC           ;TYPE:  '  : '
035342  012703  000001                    MOV     #1,R3             ;ONLY INPUT 1 CHARACTER
035346  004737  002722                    JSR     PC,READ           ;GO READ 1 CHARACTER
035352  005703                            TST     R3                ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
035354  001415                            BEQ     19$               ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
035356  022737  000033  002664            CMP     #ESC,ANSWER       ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
035364  001704                            BEQ     15$               ;BRANCH TO PREVIOUS PROMPT IF SO
035366  022737  000003  002664            CMP     #CNTLC,ANSWER     ;SEE IF USER WANTS TO EXIT (^C)
035374  001544                            BEQ     26$               ;BRANCH IF EXIT WANTED
035376  022737  000015  002664            CMP     #CARETN,ANSWER    ;SEE IF <CR> INPUTED FOR NO CHANGE WANTED
035404  001413                            BEQ     20$               ;BRANCH IF NO CHANGE WANTED
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   6115 035406  000744                       BR      18$              ;BRANCH BACK - INPUT NOT LEGAL
   6116 035410  006304              19$:     ASL     R4               ;PUT PRIORITY IN PROPER POSITION
   6117 035412  006304                       ASL     R4               ;BY SHIFTING TO THE LEFT 5 PLACES
   6118 035414  006304                       ASL     R4
   6119 035416  006304                       ASL     R4
   6120 035420  006304                       ASL     R4
   6121 035422  042737  000340  001474       BIC     #LEVEL7,$DDWO    ;CLEAR OLD PRIORITY
   6122 035430  050437  001474               BIS     R4,$DDWO         ;SET PRIORITY INTO DEVICE DESCRIPTOR WORD
   6123 035434  104401  040051      20$:     TYPE    ,TORNCB          ;TYPE:  '2 OR N CYCLE BURST (2 CY=0, N CY=1) PRESENT STATE =
   6124 035440  013737  001474  002720       MOV     $DDWO,DDW        ;MOVE DEVICE DESCRIPTOR WORD TO DDW
   6125 035446  012737  000002  002710       MOV     #BIT1,BITTST     ;MOVE BIT STATE TO PRINT TO BITTST
   6126 035454  004737  006536               JSR     PC,PSTATE        ;PRINT 2/N CYCLE STATE
   6127 035460  104401  037400               TYPE    ,SPACEC          ;TYPE:  '  :  '
   6128 035464  012703  000001               MOV     #1,R3            ;ONLY ONE CHARACTER TO INPUT
   6129 035470  004737  002722               JSR     PC,READ          ;READ 1 CHARACTER
   6130 035474  005703                       TST     R3               ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
   6131 035476  001415                       BEQ     21$              ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
   6132 035500  022737  000033  002664       CMP     #ESC,ANSWER      ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
   6133 035506  001704                       BEQ     18$              ;BRANCH TO PREVIOUS PROMPT IF SO
   6134 035510  022737  000003  002664       CMP     #CNTLC,ANSWER    ;SEE IF USER WANTS TO EXIT (^C)
   6135 035516  001473                       BEQ     26$              ;BRANCH IF USER WANTS TO EXIT
   6136 035520  022737  000015  002664       CMP     #CARETN,ANSWER   ;SEE IF USER WANTS NO CHANGE
   6137 035526  001414                       BEQ     23$              ;BRANCH IF USER WANTS NO CHANGE
   6138 035530  000741                       BR      20$              ;BRANCH BACK - USER INPUT NOT LEGAL
   6139 035532  005704              21$:     TST     R4               ;CHECK FOR LEGAL INPUT
   6140 035534  001403                       BEQ     22$              ;BRANCH IF OK
   6141 035536  022704  000001               CMP     #1,R4            ;CHECK FOR ILLEGAL INPUT
   6142 035542  001334                       BNE     20$              ;BRANCH BACK IF ILLEGAL STATE INPUTED
   6143 035544  006304              22$:     ASL     R4               ;SHIFT BIT OVER 1 PLACE
   6144 035546  042737  000002  001474       BIC     #BIT1,$DDWO      ;CLEAR OLD STATE
   6145 035554  050437  001474               BIS     R4,$DDWO         ;SET THE USERS INPUTED STATE TO $DDWO
   6146 035560  104401  040373      23$:     TYPE    ,DOCTS           ;TYPE:  'DO CABLE TESTS (NO=0, YES=1) PRESENT STATE = '
   6147 035564  013737  001474  002720       MOV     $DDWO,DDW        ;MOVE DEVICE DESCRIPTOR WORD TO DDW
   6148 035572  012737  000004  002710       MOV     #BIT2,BITTST     ;MOVE BIT STATE TO PRINT TO BITTST
   6149 035600  004737  006536               JSR     PC,PSTATE        ;PRINT CABLE STATE
   6150 035604  104401  037400               TYPE    ,SPACEC          ;TYPE:  '  :  '
   6151 035610  012703  000001               MOV     #1,R3            ;INPUT ONLY 1 CHARACTER
   6152 035614  004737  002722               JSR     PC,READ          ;GO INPUT 1 CHARACTER
   6153 035620  005703                       TST     R3               ;SEE IF NON-NUMERIC WAS THE ONLY INPUT
   6154 035622  001415                       BEQ     24$              ;BRANCH AROUND NON-NUMERIC TESTS IF NOT
   6155 035624  022737  000033  002664       CMP     #ESC,ANSWER      ;SEE IF USER WANTS TO GO BACK TO PREVIOUS PROMPT
   6156 035632  001700                       BEQ     20$              ;BRANCH TO PREVIOUS PROMPT IF SO
   6157 035634  022737  000003  002664       CMP     #CNTLC,ANSWER    ;SEE IF USER WANTS TO EXIT (^C)
   6158 035642  001421                       BEQ     26$              ;BRANCH IF USER WANTS TO EXIT
   6159 035644  022737  000015  002664       CMP     #CARETN,ANSWER   ;SEE IF USER WANTS NO CHANGE
   6160 035652  001415                       BEQ     26$              ;BRANCH IF USER WANTS NO CHANGE
   6161 035654  000741                       BR      23$              ;BRANCH BACK - USER INPUT NOT LEGAL
   6162 035656  005704              24$:     TST     R4               ;CHECK FOR LEGAL INPUT
   6163 035660  001403                       BEQ     25$              ;BRANCH IF OK
   6164 035662  022704  000001               CMP     #1,R4            ;CHECK FOR ILLEGAL INPUT
   6165 035666  001334                       BNE     23$              ;BRANCH BACK IF ILLEGAL STATE INPUTED
   6166 035670  006304              25$:     ASL     R4               ;SHIFT INPUTED BIT OVER 2 PLACES
   6167 035672  006304                       ASL     R4
   6168 035674  042737  000004  001474       BIC     #BIT2,$DDWO      ;CLEAR BIT TO BE CHANGED
   6169 035702  050437  001474               BIS     R4,$DDWO         ;SET THE USERS INPUTED STATE TO $DDWO
   6170 035706  000137  034244      26$:     JMP     PROMPT           ;JUMP TO GET NEW DEVICE NUMBER
```

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

035712  012737  177777  002670   BDLCR:   MOV     #-1,MANSIZE       ;MOVE -1 TO MANSIZE
035720  004737  003170                    JSR     PC,FIXTBL         ;GO FILL TABLE
035724  104401  037212                    TYPE    ,BDLCRM           ;TYPE:  'BURST DATA LATE CALIBRATION'
                                                                    ;TYPE:  'ATTACH SCOPE PROBE...'
                                                                    ;       'TO CALIBRATE NEXT BOARD, TYPE ANY CHARACTER'
035730  012737  000001  002544            MOV     #BIT0,DEVMSK      ;SET UP BIT MASK TO TEST $DEVM FOR DEVICES
035736  012700  002456                    MOV     #VECADR,R0        ;MOVE VECADR TO R0
035742  012701  002416                    MOV     #REGADR,R1        ;MOVE REGADR TO R1
035746  005037  001422                    CLR     $UNIT             ;CLEAR $UNIT
035752  033737  002544  001466   2$:      BIT     DEVMSK,$DEVM      ;CHECK TO SEE IF DEVICE IS TO BE TESTED
035760  001015                            BNE     5$                ;BRANCH IF SO
035762  005737  002544                    TST     DEVMSK            ;SEE IF BIT 15 IS SET
035766  100004                            BPL     4$                ;BRANCH TO CONTINUE IF NOT SET
035770  104401  036477                    TYPE    ,BCDONE           ;TYPE:  'BURST CALIBRATION COMPLETE'
035774  000137  034244                    JMP     PROMPT            ;JUMP TO PROMPT A NEW COMMAND
036000  022021                   4$:      CMP     (R0)+,(R1)+       ;INCREMENT THE TWO POINTERS
036002  006337  002544                    ASL     DEVMSK            ;UPDATE DEVICE MAP TEST MASK
036006  005237  001422                    INC     $UNIT             ;INCREMENT UNIT NUMBER
036012  000757                            BR      2$                ;GO TEST NEXT BIT OF DEVICE MASK
036014  011137  002522           5$:      MOV     (R1),CSR          ;PUT UUT CSR ADDRESS INTO DEVICE CSR LOCATION
036020  062737  000004  002522            ADD     #4,CSR            ;POINT CSR TO CSR ADDRESS
036026  011037  002526                    MOV     (R0),DRINV        ;PUT UUT VECTOR ADDRESS INTO DEVICE DRINV
036032  104401  037200                    TYPE    ,DEVICE           ;TYPE:  'DEVICE # '
036036  013746  001422                    MOV     $UNIT,-(SP)       ;PUT UNIT NUMBER ON STACK FOR TYPEOUT
036042  104405                            TYPDS                     ;GO TYPE THE UNIT NUMBER IN DECIMAL
036044  104401  037511                    TYPE    ,UCAL             ;TYPE:  ' UNDER CALIBRATION'
036050  004737  003646                    JSR     PC,CLENUP         ;SUBROUTINE TO CLEAR DEVICE REGISTERS & SET CPU PRI TO 7
036054  005077  144442           6$:      CLR     @CSR              ;CLR CYCLE BIT
036060  012737  000077  002660            MOV     #77,TIME          ;MOVE WAIT LOOP COUNTER TO TIME
036066  052777  000400  144426            BIS     #CY,@CSR          ;SET CYCLE BIT
036074  005337  002660           7$:      DEC     TIME              ;SUBTRACT 1 FROM TIME UNTIL ZERO
036100  001375                            BNE     7$                ;BRANCH BACK IF NOT ZERO YET
036102  105777  143236                    TSTB    @$TKS             ;IS A CHARACTER WAITING INDICATING USER WANTS TO GO ON?
036106  100362                            BPL     6$                ;BRANCH IF NOT
036110  017737  144522  002660            MOV     @TKB,TIME         ;WASTE THE CHARACTER, CLEARING THE CHARACTER FLAG
036116  000730                            BR      4$                ;GO ON TO NEXT BOARD
```

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 6212                                          .SBTTL  ASCII AND ASCIZ MESSAGES AND LOCATIONS
 6213 036120     200     123     124  STKIFL:  .ASCIZ  <CRLF>/STACK IS FULL - DATA MAY HAVE BEEN LOST/<CRLF><CRLF>
 6214 036173     136     131     200  ERCHDR:  .ASCII  /^Y/<CRLF>/SUMMATION OF ERRORS SINCE START OR LAST REPORT/
 6215 036254     200     200     102           .ASCIZ  <CRLF><CRLF>/BOARD #   PASS #   ERRTTL/<CRLF>
 6216 036311     136     131     200  NODATA:  .ASCIZ  /^Y/<CRLF>/NO ERROR TOTALS TO REPORT/<CRLF><CRLF>
 6217 036350     040     055     040  ETDEV:   .ASCIZ  / - TOTAL ERRORS THIS DEVICE = /
 6218 036407     111     114     114  BDNERR:  .ASCIZ  /ILLEGAL NUMBER (# OTHER THAN 1-16) OR CHARACTER INPUTED/
 6219 036477     102     125     122  BCDONE:  .ASCIZ  /BURST CALIBRATION COMPLETE/
 6220 036532     101     104     104  ADRERR:  .ASCIZ  /ADDRESS INPUTED IS NOT IN THE RANGE 160010 TO 163770/
 6221 036617     126     105     103  VECERR:  .ASCIZ  /VECTOR INPUTED IS NOT IN THE RANGE OF 300 TO 777/
 6222 036700     101     104     104  ADLCHR:  .ASCIZ  /ADDRESS INPUTED HAS OTHER THAN 0 FOR LEAST SIGNIFICANT OCTAL DIGIT/
 6223 037003     126     105     103  VCLCHR:  .ASCIZ  /VECTOR INPUTED SHOULD HAVE 0 OR 4 AS LEAST DIGIT/
 6224 037064     074     105     123  ESCAPE:  .ASCIZ  /<ESC>/
 6225 037072     200     104     105  MUSTED:  .ASCII  <CRLF>/DEVICE ADDRESS AND-OR VECTOR TABLE NOT SET UP - /
 6226 037153     115     125     123           .ASCIZ  /MUST EDIT FIRST/
 6227 037173     040     000          LETNCR:  .ASCIZ  / /
 6228 037175     136     103     000  CNTRLC:  .ASCIZ  /^C/
 6229 037200     104     105     126  DEVICE:  .ASCIZ  /DEVICE # /
 6230 037212     200     102     125  BDLCRM:  .ASCII  <CRLF>/BURST DATA LATE CALIBRATION/
 6231 037246     200     101     124           .ASCII  <CRLF>/ATTACH SCOPE PROBE.../
 6232 037274     200     124     117           .ASCIZ  <CRLF>/TO CALIBRATE NEXT BOARD, TYPE ANY CHARACTER/<CRLF>
 6233 037352     040     040     000  SPACES:  .ASCIZ  /  /
 6234 037355     040     040     040  SPACE3:  .ASCIZ  /   /
 6235 037361     040     040     040  SPACE6:  .ASCIZ  /      /
 6236 037370     040     040     040  SPACE7:  .ASCIZ  /       /
 6237 037400     040     040     072  SPACEC:  .ASCIZ  /  : /
 6238 037405     102     000          B:       .ASCIZ  /B/
 6239 037407     127     000          W:       .ASCIZ  /W/
 6240 037411     116     117     000  NO:      .ASCIZ  /NO/
 6241 037414     131     105     123  YES:     .ASCIZ  /YES/
 6242 037420     062     000          TWO:     .ASCIZ  /2/
 6243 037422     116     000          N:       .ASCIZ  /N/
 6244 037424     102     117     101  BOARD:   .ASCIZ  /BOARD # /
 6245 037435     200     200     000  CRLF2:   .ASCIZ  <CRLF><CRLF>
 6246 037440     200     101     114  BCFIN:   .ASCIZ  <CRLF>/ALL BOARDS CALIBRATED - BEGINNING TEST/<CRLF>
 6247 037511     040     125     116  UCAL:    .ASCIZ  / UNDER CALIBRATION/<CRLF>
 6248 037535     200     116     125  NOBUT:   .ASCIZ  <CRLF>/NUMBER OF BOARDS UNDER TEST: /
 6249 037574     200     200     104  BRVWPC:  .ASCII  <CRLF><CRLF>/DIAGNOSTIC HAS DETERMINED THE FOLLOWING ABOUT THE/<CRLF>
 6250 037660     104     122     061           .ASCII  /DR11-W(S) IT HAS FOUND.  USER *MUST* DETERMINE ACCURACY/<CRLF><CRLF>
 6251 037751     040     040     040           .ASCIZ  /   BOARD#   REGADR    VECADR     W-B    P-LEV   2-N CY   CABLE/<CRLF>
 6252 040051     200     062     040  TORNCB:  .ASCIZ  <CRLF>/2 OR N CYCLE BURST (2 CY=0, N CY=1) PRESENT STATE = /
 6253 040137     200     104     105  DEVPRI:  .ASCIZ  <CRLF>/DEVICE PRIORITY PRESENT LEVEL = /
 6254 040201     200     104     122  DR1WOB:  .ASCIZ  <CRLF>/DR11-W OR B (W=0, B=1) CURRENT STATE = /
 6255 040252     200     123     124  SVADRS:  .ASCIZ  <CRLF>/STARTING VECTOR ADDRESS:  /
 6256 040306     200     123     124  SDADRS:  .ASCIZ  <CRLF>/STARTING DEVICE ADDRESS: /
 6257 040341     040     124     105  TSTCOM:  .ASCIZ  / TESTING COMPLETE, PASS #/
 6258 040373     200     104     117  DOCTS:   .ASCIZ  <CRLF>/DO CABLE TESTS (NO=0, YES=1) PRESENT STATE = /
 6259 040452     200     200     043  HEADER:  .ASCII  <CRLF><CRLF>/# OF        START                                       2-N     CABLE/
 6260 040546     200     102     117           .ASCIZ  <CRLF>/BOARDS   REGADR    VECADR        W-B     P-LEV    CYCLE    TESTS/<CRLF>
 6261 040643     200     200     115  MBDIAL:  .ASCIZ  <CRLF><CRLF>/MULTIPLE BOARD DIALOGUE/<CRLF>
 6262 040676     200     105     116  ECELR:   .ASCIZ  <CRLF>/ENTER COMMAND ([E]DIT, [L]IST, [B]URST CALIBRATION, [R]UN):  /
 6263 040775     124     110     105  NOMORE:  .ASCII  /THERE ARE STILL MORE ERRORS, BUT WILL NOT BE PRINTED./<CRLF>
 6264 041063     105     122     122           .ASCIZ  /ERRORS WILL STILL BE COUNTED AND PRINTED AT THE EOP./<CRLF>
 6265 041151     200     116     117  NODVPR:  .ASCII  <CRLF>/NO DEVICES RECOGNIZED - DIAGNOSTIC CANNOT BE RUN/<CRLF>
 6266 041233     122     105     123           .ASCIZ  /RESTART AT 204 IF A DEVICE IS PRESENT/<CRLF>
 6267 041302     200     050     136  M1:      .ASCII  <CRLF>/(^X) INHIBITS EOP'S, (^Y) FOR ERROR SUMMARY/<CRLF>
 6268 041357     125     116     111           .ASCIZ  /UNIBUS HANG?  RESTART AT ADDRESS /
 6269 041421     200     200     103  M1A:     .ASCII  <CRLF><CRLF>/CZDRLDO DR11 GEN NPR INTFC LOGIC TEST/<CRLF>
 6270 041471     105     117     120           .ASCIZ  /EOP MSG WILL PRINT EVERY 20 SECONDS APPROXIMATELY/<CRLF>
 6271 041554     104     105     126  BARADR:  .ASCIZ  /DEVICE ADDRESS - /
 6272 041576     054     040     124  TSNUMB:  .ASCIZ  /, TEST NUMBER - /
 6273 041617     054     040     120  PASNUM:  .ASCIZ  /, PASS NUMBER - /
 6274                                          .EVEN
 6275 041640  000C00                  .SAV:    .WORD   0
 6276 041642                                   .BLKW   400
 6277 042642  000000                  BUFF:    .WORD   0
 6278 042644  042644                  XINBUF:  .
 6279 042646                                   .BLKW   400
 6280 043646  043646                  XCHKBU:  .
 6281 043650                                   .BLKW   400
 6282 044650  044652                  CAPNTR:  .WORD   CAPSTK          ;LOCATION TO HOLD POINTER FOR CAPTURE STACK
 6283 044652                          CAPSTK:  .BLKW   600.            ;LOCATIONS TO STORE UP TO 150 DECIMAL PASSES AND THEIR ERROR
 6284 047132  000000                  ENDSTK:  .WORD   0               ;FLAG SIGNALING END OF THE STACK
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                                                  .SBTTL  ERROR MESSAGES
047134       124       105       123   EM1:       .ASCIZ  /TEST SEQUENCING ERROR/
047162       103       101       116   EM2:       .ASCIZ  /CANNOT ACCESS DR11 REGISTER/
047216       104       122       061   EM3:       .ASCIZ  /DR11-B OR W MODE INCORRECT (0=B, 1=W)/
047264       111       116       111   EM4:       .ASCIZ  /INIT FAILED TO CLEAR WCR/
047315       111       116       111   EM5:       .ASCIZ  /INIT FAILED TO CLEAR BAR/
047346       111       116       111   EM6:       .ASCIZ  /INIT FAILED TO CLEAR BDR/
047377       111       116       111   EM7:       .ASCIZ  /INIT FAILED TO CLEAR ALL CSR R-W BITS/
047445       122       105       123   EM10:      .ASCIZ  /RESET FAILED TO CLEAR WCR/
047477       101       124       124   EM11:      .ASCIZ  /ATTEMPT TO SET ALL WCR BITS FAILED/
047542       122       105       123   EM12:      .ASCIZ  /RESET FAILED TO CLEAR BAR/
047574       101       124       124   EM13:      .ASCIZ  /ATTEMPT TO SET ALL BAR BITS TO 1 FAILED/
047644       103       123       122   EM14:      .ASCIZ  /CSR BIT TEST FAILED (FATAL - DIAGNOSTIC NOT CONTINUED)/
047733       103       123       122   EM15:      .ASCIZ  /CSR BIT TEST FAILED/
047757       105       111       122   EM16:      .ASCIZ  /EIR BIT TEST FAILED/
050003       122       105       101   EM17:      .ASCIZ  /READY AND MAINTENANCE ARE NOT THE ONLY BITS SET IN CSR/
050072       101       124       124   EM20:      .ASCIZ  /ATTN AND ERROR FAILED TO SET PROPERLY/
050140       101       124       124   EM21:      .ASCIZ  /ATTN AND ERROR FAILED TO CLEAR PROPERLY/
050210       105       122       122   EM22:      .ASCIZ  /ERROR BIT SHOULD HAVE BEEN CLEAR/
050251       102       111       124   EM23:      .ASCIZ  /BIT PATTERN NOT LOADED PROPERLY IN WCR/
050320       122       105       101   EM24:      .ASCIZ  /READY OF CSR WAS NOT SET/
050351       102       111       124   EM25:      .ASCIZ  /BIT 0 OF THE BAR WAS SET/
050402       102       111       124   EM26:      .ASCIZ  /BIT PATTERN TEST FAILED IN BAR/
050441       127       103       122   EM27:      .ASCIZ  /WCR DATA PATTERN NOT CORRECT/
050476       106       125       116   EM30:      .ASCIZ  /FUNCTION BIT(S) ARE NOT CLEAR/
050534       104       123       124   EM31:      .ASCIZ  /DSTAT A, B OR C ARE NOT AS EXPECTED/
050600       102       104       122   EM32:      .ASCIZ  /BDR IS NOT CLEAR/
050621       101       114       114   EM33:      .ASCIZ  /ALL BDR BITS ARE NOT SET/
050652       102       104       122   EM34:      .ASCIZ  /BDR FAILS TO HOLD A BIT PATTERN/
050712       102       104       122   EM35:      .ASCIZ  /BDR SHOULD NOT HAVE BEEN LOADED WITH NEW PATTERN/
050773       102       104       122   EM36:      .ASCIZ  /BDR PATTERN NOT CORRECT/
051023       122       105       101   EM37:      .ASCIZ  /READY IS NOT THE ONLY BIT SET/
051061       122       105       101   EM40:      .ASCIZ  /READY SHOULD NOT BE SET/
051111       122       105       101   EM41:      .ASCIZ  /READY WAS CLEARED BUT NEVER SET AGAIN/
051157       122       105       101   EM42:      .ASCIZ  /READY CANNOT BE SET BY INIT/
051213       104       122       061   EM43:      .ASCIZ  /DR11 FAILED TO INTERRUPT/
051244       104       122       061   EM44:      .ASCIZ  /DR11 INTERRUPTED, BUT IT SHOULDN'T HAVE/
051314       105       122       122   EM45:      .ASCIZ  /ERROR BIT SHOULD NOT BE CLEAR/
051352       106       125       116   EM46:      .ASCIZ  /FUNCTION BITS DIDN'T INCREMENT IN MAINT MODE/
051427       103       123       122   EM47:      .ASCIZ  /CSR IS WRONG/
051444       124       122       101   EM50:      .ASCIZ  /TRANSFERS SHOULD HAVE BEEN INHIBITED/
051511       104       122       061   EM51:      .ASCIZ  /DR11 SHOULD NOT HAVE INTERRUPTED A SECOND TIME/
051570       105       130       120   EM52:      .ASCIZ  /EXPECTED INTERRUPT DID NOT OCCUR/
051631       127       103       122   EM53:      .ASCIZ  /WCR NOT EQUAL TO ZERO/
051657       102       101       122   EM54:      .ASCIZ  /BAR IS WRONG/
051674       102       101       104   EM55:      .ASCIZ  /BAD DATA IN BDR/
051714       104       101       124   EM56:      .ASCIZ  /DATA NOT TRANSFERED CORRECTLY/
051752       102       125       106   EM57:      .ASCIZ  /BUFFER DATA NOT CORRECT/
052002       124       117       117   EM60:      .ASCIZ  /TOO MANY WORDS WERE TRANSFERED/
052041       125       116       105   EM61:      .ASCIZ  /UNEXPECTED TRAP OR INTERRUPT TO TRAP ADDRESS BELOW/
052124       103       123       122   EM62:      .ASCIZ  /CSR AND-OR WCR AND-OR BAR ARE INCORECT/
052173       104       122       061   EM63:      .ASCIZ  /DR11 INTERRUPTED AT WRONG LEVEL/
052233       062       055       116   EM65:      .ASCIZ  /2-N CYCLE BURST SWITCH IN WRONG POSITION/
052304       115       125       114   EM66:      .ASCIZ  /MULTICYCLE BIT IN THE EIR IS WRONG/
052347       103       123       122   EM202:     .ASCIZ  /CSR PATTERN NOT CORRECT/
052377       102       104       122   EM211:     .ASCIZ  /BDR AND-OR WCR AND-OR BAR ARE INCORECT/
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                                                 .SBTTL  DATA HEADERS
052446      105      130      120  DH1:          .ASCII  /EXPCTD  RECVD/<CRLF>
052464      124      105      123                .ASCIZ  /TEST #  TEST #/
052503      124      105      123  DH2:          .ASCIZ  /TEST #  ERR PC  ABRTPC  REGISTER/
052544      124      105      123  DH3:          .ASCIZ  /TEST #  ERR PC  EXPMOD  ACTMOD  CSRADR/
052613      124      105      123  DH4:          .ASCIZ  /TEST #  ERR PC  WCRADR  WCRCONTENTS/
052657      124      105      123  DH5:          .ASCIZ  /TEST #  ERR PC  BARADR  BAREXP  BARRCV/
052726      124      105      123  DH6:          .ASCIZ  /TEST #  ERR PC  BDRADR  BDRCONTENTS/
052772      124      105      123  DH7:          .ASCIZ  /TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS/
053046      040      040      040  DH14:         .ASCII  /                BIT(S)/<CRLF>
053075      124      105      123                .ASCIZ  /TEST #  ERR PC  TESTED  CSRADR  CSREXP  CSRCONTENTS/
053161      040      040      040  DH16:         .ASCII  /                BIT(S)/<CRLF>
053210      124      105      123                .ASCIZ  /TEST #  ERR PC  TESTED  EIRADR  EIREXP  EIRCONTENTS/
053274      124      105      123  DH17:         .ASCIZ  /TEST #  ERR PC  CSRADR  CSREXP  CSRCONTENTS/
053350      124      105      123  DH23:         .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRCONTENTS/
053424      124      105      123  DH26:         .ASCIZ  /TEST #  ERR PC  BARADR  BAREXP  BARCONTENTS/
053500      124      105      123  DH34:         .ASCIZ  /TEST #  ERR PC  BDRADR  BDREXP  BDRCONTENTS/
053554      124      105      123  DH43:         .ASCIZ  /TEST #  ERR PC  CSRADR  CSRCONTENTS/
053620      124      105      123  DH50:         .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BARADR  BAREXP  BARRCV/
053717      124      105      123  DH56:         .ASCIZ  /TEST #  ERR PC  NPR1AD  NPR1EX  NPR1RC  CSRADR/
053776      040      040      040  DH57:         .ASCII  /                CHECK   CHECK   INPUT   INPUT/<CRLF>
054054      124      105      123                .ASCIZ  /TEST #  ERR PC  BUFADR  BUFDAT  BUFADR  BUFDAT  CSRADR/
054143      040      040      040  DH60:         .ASCII  /                DIDNOT/<CRLF>
054172      124      105      123                .ASCIZ  /TEST #  ERR PC  EXPECT  ADRESS  CSRADR/
054241      124      105      123  DH61:         .ASCIZ  /TEST #  ERR PC  WCRADR  OLDPC   TRAP ADR/
054312      124      105      123  DH62:         .ASCII  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  CSREXP  /
054372      103      123      122                .ASCIZ  /CSRRCV  BAREXP  BARRCV/
054421      124      105      123  DH63:         .ASCIZ  /TEST #  ERR PC  EXPLVL  RCVLVL  CSRADR/
054470      124      105      123  DH64:         .ASCIZ  /TEST #  ERR PC  EXPLVL  CSRADR/
054527      124      105      123  DH65:         .ASCIZ  /TEST #  ERR PC  CSRADR  EIREXP  EIRRCV/
054576      124      105      123  DH66:         .ASCIZ  /TEST #  ERR PC  PATERN  CSRADR  CSRRCV/
054645      124      105      123  DH202:        .ASCIZ  /TEST #  ERR PC  CSRADR  PATLDD  CSREXP  CSRRCV/
054724      124      105      123  DH203:        .ASCIZ  /TEST #  ERR PC  CSRADR  PATERN  CSREXP  CSRCONTENTS/
055010      124      105      123  DH207:        .ASCIZ  /TEST #  ERR PC  PATERN  CSRADR  CSRCONTENTS/
055064      124      105      123  DH210:        .ASCIZ  /TEST #  ERR PC  WCRADR  WCRCONTENTS/
055130      124      105      123  DH211:        .ASCIZ  /TEST #  ERR PC  WCRADR  WCREXP  WCRRCV  BDREXP  BDRRCV  BAREXP  BARRCV/
                                                 .EVEN
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6378                                           .SBTTL  DATA TABLES
6379 055240  001362  001414  000000  DT1:      .WORD   $TMP1,$TESTN,0
6380 055246  001414  001316  002672  DT2:      .WORD   $TESTN,$ERRPC,OLDPC1,DREG,0
6381 055260  001414  001316  001362  DT3:      .WORD   $TESTN,$ERRPC,$TMP1,BORW,CSR,0
6382 055274  001414  001316  002516  DT4:      .WORD   $TESTN,$ERRPC,WCR,RWCR,0
6383 055306  001414  001316  002520  DT5:      .WORD   $TESTN,$ERRPC,BAR,EBAR,RBAR,0
6384 055322  001414  001316  002524  DT6:      .WORD   $TESTN,$ERRPC,BDR,RBDR,0
6385 055334  001414  001316  002522  DT7:      .WORD   $TESTN,$ERRPC,CSR,ECSR,RCSR,0
6386 055350  001414  001316  002536  DT14:     .WORD   $TESTN,$ERRPC,BUT,CSR,ECSR,RCSR,0
6387 055366  001414  001316  002536  DT16:     .WORD   $TESTN,$ERRPC,BUT,CSR,EEIR,REIR,0
6388 055404  001414  001316  002522  DT17:     .WORD   $TESTN,$ERRPC,CSR,ECSR,RCSR,0
6389 055420  001414  001316  002516  DT23:     .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,0
6390 055434  001414  001316  002520  DT26:     .WORD   $TESTN,$ERRPC,BAR,EBAR,RBAR,
6391 055450  001414  001316  002524  DT34:     .WORD   $TESTN,$ERRPC,BDR,EBDR,RBDR,0
6392 055464  001414  001316  002522  DT43:     .WORD   $TESTN,$ERRPC,CSR,RCSR,0
6393 055476  001414  001316  002516  DT50:     .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,BAR,EBAR,RBAR,0
6394 055520  001414  001316  002606  DT56:     .WORD   $TESTN,$ERRPC,ANPR1,ENPR1,NPR1,CSR,0
6395 055536  001414  001316  001370  DT57:     .WORD   $TESTN,$ERRPC,$TMP4,$TMP2,$TMP5,$TMP3,CSR,0
6396 055556  001414  001316  001364  DT60:     .WORD   $TESTN,$ERRPC,$TMP2,$TMP3,CSR,0
6397 055572  001414  001316  002516  DT61:     .WORD   $TESTN,$ERRPC,WCR,OLDPC2,BDVECT,0
6398 055606  001414  001316  002516  DT62:     .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,ECSR,RCSR,EBAR,RBAR,0
6399 055632  001414  001316  002552  DT63:     .WORD   $TESTN,$ERRPC,DRLEV,LEVEL,CSR,0
6400 055646  001414  001316  001362  DT64:     .WORD   $TESTN,$ERRPC,$TMP1,CSR,0
6401 055660  001414  001316  002522  DT65:     .WORD   $TESTN,$ERRPC,CSR,EEIR,REIR,0
6402 055674  001414  001316  002604  DT66:     .WORD   $TESTN,$ERRPC,ENPR1,CSR,RCSR,0
6403 055710  001414  001316  002522  DT202:    .WORD   $TESTN,$ERRPC,CSR,BUT,ECSR,RCSR,0
6404 055726  001414  001316  002522  DT203:    .WORD   $TESTN,$ERRPC,CSR,$TMP0,ECSR,RCSR,0
6405 055744  001414  001316  001362  DT207:    .WORD   $TESTN,$ERRPC,$TMP1,CSR,RCSR,0
6406 055760  001414  001316  002516  DT210:    .WORD   $TESTN,$ERRPC,WCR,RWCR,0
6407 055772  001414  001316  002516  DT211:    .WORD   $TESTN,$ERRPC,WCR,EWCR,RWCR,EBDR,RBDR,EBAR,RBAR,0
```

```
  6408                                            .SBTTL  BUS HANG ROUTINE
  6409 056016  104401  041554            UBHANG: TYPE    ,BARADR             ;TYPE:  'DEVICE ADDRESS - '
  6410 056022  013746  002516                    MOV     WCR,-(SP)           ;PUT DEVICE ADDRESS ON STACK
  6411 056026  104402                            TYPOC                       ;GO TYPE IT IN OCTAL
  6412 056030  104401  041576                    TYPE    ,TSNUMB             ;TYPE:  ', TEST NUMBER - '
  6413 056034  013746  001414                    MOV     $TESTN,-(SP)        ;PUT TEST NUMBER ON STACK
  6414 056040  104403                            TYPOS                       ;GO TYPE IT IN OCTAL
  6415 056042     002     000                    .BYTE   2,0                 ;TYPE 2 DIGITS, LEADING ZEROS SUPRESSED
  6416 056044  104401  041617                    TYPE    ,PASNUM             ;TYPE:  ', PASS NUMBER - '
  6417 056050  013746  002716                    MOV     $PASS2,-(SP)        ;MOVE OVERFLOW NUMBER TO THE STACK
  6418 056054  013746  001416                    MOV     $PASS,-(SP)         ;PUT PASS NUMBER ON STACK
  6419 056060  104414                            TYPDE                       ;GO TYPE IT IN EXTENDED DECIMAL
  6420 056062  104401  001405                    TYPE    ,$CRLF              ;TYPE A <CRLF>
  6421 056066  000000                            HALT                        ;WHOA - YOU GOTTA SERIOUSA PROBLEMA, BUDDY!
  6422 056070  000137  011420                    JMP     START1              ;JUMP TO RESTART PROGRAM
  6423 056074  177777  177777  177777            .WORD   -1,-1,-1,-1         ;TAKE UP SOME SPACE (APT HACK)
  6424 056104  000000                    NOCARE: .WORD   0           ;LOCATION FOR USE WHENEVER CYCLE BIT OF CSR IS USED. THIS
  6425                                                                ;SHOULD *ALWAYS* BE THE LAST WORD LOCATION IN THIS DIAGNOSTIC
  6426         000001                            .END
```

```
ABASE = 172410      AUNIT = 000000      BUT     002536      CY    = 000400      DSA   = 004000
ACDW1 = 000000      AUSWR = 000000      CAPNTR  044650      DAB   = 006000      DSB   = 002000
ACDW2 = 000000      AVECT1= 000300      CAPSTK  044652      DAC   = 005000      DSC   = 001000
ACPUOP= 000000      AVECT2= 000000      CARETN= 000015      DATCHK  003526      DST   = 007000
ADDR    002646      B       037405      CAT   = 157777      DATCHX  003644      DSWR  = 177570
ADDW0 = 000000      BAR     002520      CATCH   006466      DATCH1  003546      DT1     055240
ADDW1 = 000000      BARADR  041554      CBIT0 = 177776      DATCH2  003624      DT14    055350
ADDW10= 000000      BCDONE  036477      CBIT1 = 177775      DATOCK  003716      DT16    055366
ADDW11= 000000      BCFIN   037440      CBIT10= 175777      DATOCX  004062      DT17    055404
ADDW12= 000000      BDFAIL  002666      CBIT11= 173777      DATOC1  003736      DT2     055246
ADDW13= 000000      BDLCR   035712      CBIT12= 167777      DATOC2  004000      DT202   055710
ADDW14= 000000      BDLCRM  037212      CBIT13= 157777      DBC   = 003000      DT203   055726
ADDW15= 000000      BDNERR  036407      CBIT14= 137777      DDISP = 177570      DT207   055744
ADDW2 = 000000      BDNUMB  006122      CBIT15= 077777      DDW     002720      DT210   055760
ADDW3 = 000000      BDR     002524      CBIT2 = 177773      DEVICE  037200      DT211   055772
ADDW4 = 000000      BDVECT  002542      CBIT3 = 177767      DEVMSK  002544      DT23    055420
ADDW5 = 000000      BEGIN   011674      CBIT4 = 177757      DEVPRI  040137      DT26    055434
ADDW6 = 000000      BEGIN1  012356      CBIT5 = 177737      DH1     052446      DT3     055260
ADDW7 = 000000      BITTST  002710      CBIT6 = 177677      DH14    053046      DT34    055450
ADDW8 = 000000      BIT0  = 000001      CBIT7 = 177577      DH16    053161      DT4     055274
ADDW9 = 000000      BIT00 = 000001      CBIT8 = 177377      DH17    053274      DT43    055464
ADEVCT= 000000      BIT01 = 000002      CBIT9 = 176777      DH2     052503      DT5     055306
ADEVM = 000000      BIT02 = 000004      CB1513= 057777      DH202   054645      DT50    055476
ADLCHR  036700      BIT03 = 000010      CCY   = 177377      DH203   054724      DT56    055520
ADRERR  036532      BIT04 = 000020      CDAB  = 171777      DH207   055010      DT57    055536
AENV  = 000000      BIT05 = 000040      CDAC  = 172777      DH210   055064      DT6     055322
AENVM = 000000      BIT06 = 000100      CDBC  = 174777      DH211   055130      DT60    055556
AFATAL= 000000      BIT07 = 000200      CDSA  = 173777      DH23    053350      DT61    055572
AMADR1= 000000      BIT08 = 000400      CDSB  = 175777      DH26    053424      DT62    055606
AMADR2= 000000      BIT09 = 001000      CDSC  = 176777      DH3     052544      DT63    055632
AMADR3= 000000      BIT1  = 000002      CDST  = 170777      DH34    053500      DT64    055646
AMADR4= 000000      BIT10 = 002000      CEIR  = 077777      DH4     052613      DT65    055660
AMAMS1= 000000      BIT11 = 004000      CER   = 077777      DH43    053554      DT66    055674
AMAMS2= 000000      BIT12 = 010000      CFNC  = 177761      DH5     052657      DT7     055334
AMAMS3= 000000      BIT13 = 020000      CF1   = 177775      DH50    053620      DYWTLT  006401
AMAMS4= 000000      BIT14 = 040000      CF2   = 177773      DH56    053717      EBAR    002600
AMSGAD= 000000      BIT15 = 100000      CF3   = 177767      DH57    053776      EBDR    002576
AMSGLG= 000000      BIT2  = 000004      CGO   = 177776      DH6     052726      ECELR   040676
AMSGTY= 000000      BIT3  = 000010      CHARCT  032555      DH60    054143      ECSR    002572
AMTYP1= 000000      BIT4  = 000020      CHKBFF  003330      DH61    054241      EDIT    034572
AMTYP2= 000000      BIT5  = 000040      CHKBUF  002620      DH62    054312      EEIR    002574
AMTYP3= 000000      BIT6  = 000100      CHKCAB  003670      DH63    054421      EIR   = 100000
AMTYP4= 000000      BIT7  = 000200      CIE   = 177677      DH64    054470      EMTVEC= 000030
ANPR1   002606      BIT8  = 000400      CKSWR = 104407      DH65    054527      EM1     047134
ANSWER  002664      BIT9  = 001000      CLENUP  003646      DH66    054576      EM10    047445
APASS = 000000      BOARD   037424      CMA   = 167777      DH7     052772      EM11    047477
APRIOR= 000000      BORW    002610      CNTLC = 000003      DIOMEM  002614      EM12    047542
APTCSU= 000040      BPINIT  004154      CNTRLC  037175      DISPLA  001342      EM13    047574
APTENV= 000001      BPT   = 000003      CNX   = 137777      DISPRE  000174      EM14    047644
APTSIZ= 000200      BPTINT  004216      CPSAVE  032654      DOCTS   040373      EM15    047733
APTSPO= 000100      BPTVCT  000014      CR    = 000015      DOWEPR  026012      EM16    047757
ASIZE   005416      BPTVEC= 000014      CRLF  = 000200      DREG    002550      EM17    050003
ASK4PR  005056      BRVWPC  037574      CRLF2   037435      DRGET   004232      EM2     047162
ASK4VC  004742      BRWAIT  002626      CRY   = 177577      DRINV   002526      EM20    050072
ASWREG= 000000      BUFF    042642      CSR     002522      DRLEV   002552      EM202   052347
AT    = 020000      BUFLEN  002622      CX6   = 177757      DRVS    002530      EM21    050140
ATESTN= 000000      BUSERR= 000004      CX7   = 177737      DR1WOB  040201      EM211   052377
```

```
EM22    050210      EWCR    002602      M1A     041421      RDOCT = 104412      SW9   = 001000
EM23    050251      EXPAND  027516      N       037422      RDYCHK  002632      TABINX  002546
EM24    050320      FIXTBL  003170      NO      037411      READ    002722      TBITVE= 000014
EM25    050351      FLAG    002652      NOBD    006207      REGADR  002416      TIME    002660
EM26    050402      FNC   = 000016      NOBUT   037535      REINIT  012556      TKB     002636
EM27    050441      FNCCNT  002654      NOCARE  056104      REIR    002562      TKS     002634
EM3     047216      F1    = 000002      NODATA  036311      RESVEC= 000010      TKVEC = 000060
EM30    050476      F2    = 000004      NODVPR  041151      RSTRT   026364      TMOPSW= 000006
EM31    050534      F3    = 000010      NOMORE  040775      RWCR    002570      TORNCB  040051
EM32    050600      GO    = 000001      NOTST   006335      RY    = 000200      TOVECT= 000004
EM33    050621      GOAGIN  026344      NOTVEC  005017      R6     =%000006     TPB     002642
EM34    050652      GTSWR = 104406      NPR1    002612      R7     =%000007     TPS     002640
EM35    050712      HAKTPM  032174      NX    = 040000      SCOPE = 000004      TPVEC = 000064
EM36    050773      HEADER  040452      NXTTST  002554      SDADRS  040306      TRAPVE= 000034
EM37    051023      HT    = 000011      N2    = 000400      SDRINV  002532      TRTVEC= 000014
EM4     047264      IBSAVE  033224      OFL     002702      SDRVS   002534      TSNUMB  041576
EM40    051061      IE    = 000100      OLDPC1  002672      SETTUP  006610      TSTCOM  040341
EM41    051111      INBUF   002616      OLDPC2  002676      SPACEC  037400      TSTDEV  012370
EM42    051157      INBUF1  002656      OLDPS1  002674      SPACES  037352      TSTMM   007066
EM43    051213      INDEV   006124      OLDPS2  002700      SPACE3  037355      TST1    012606
EM44    051244      INOOUT  022606      OUTORG  004762      SPACE6  037361      TST10   015112
EM45    051314      INTA    003356      OUTRAN  006255      SPACE7  037370      TST11   015346
EM46    051352      IOTVEC= 000020      PASCNT  002556      STACK = 001300      TST12   015532
EM47    051427      KDPAR2= 172364      PASNUM  041617      STAD    006142      TST13   015716
EM5     047315      KDPDR2= 172324      PATCHS  011220      STAGIN  000210      TST14   016102
EM50    051444      KIPAR0= 172340      PATRNS  007202      START   011424      TST15   016272
EM51    051511      KIPAR2= 172344      PFECH   033516      START1  011420      TST16   016524
EM52    051570      KIPDR0= 172300      PFECH1  033526      STKIFL  036120      TST17   016762
EM53    051631      KIPDR2= 172304      PFECH2  033562      STKLMT= 177774      TST2    013004
EM54    051657      LENCHK  002624      PFECH3  033612      SVADRS  040252      TST20   017360
EM55    051674      LETNCR  037173      PFECH4  033622      SWR     001340      TST21   017764
EM56    051714      LEVEL   002540      PIRQ  = 177772      SWREG   000176      TST22   020300
EM57    051752      LEVELS  004732      PIRQVE= 000240      SW0   = 000001      TST23   020576
EM6     047346      LEVEL3= 000140      PNTPRI  006560      SW00  = 000001      TST24   021334
EM60    052002      LEVEL4= 000200      PREOP   026010      SW01  = 000002      TST25   021636
EM61    052041      LEVEL5= 000240      PROMPT  034244      SW02  = 000004      TST26   022126
EM62    052124      LEVEL6= 000300      PROUT   005107      SW03  = 000010      TST27   022404
EM63    052173      LEVEL7= 000340      PR0   = 000000      SW04  = 000020      TST3    013134
EM65    052233      LF    = 000012      PR1   = 000040      SW05  = 000040      TST30   022622
EM66    052304      LODBUF  003302      PR2   = 000100      SW06  = 000100      TST31   023110
EM7     047377      LOOP    002662      PR3   = 000140      SW07  = 000200      TST32   023240
ENDEV   025622      LRGSTC  002704      PR4   = 000200      SW08  = 000400      TST33   023620
ENDSTK  047132      MA    = 010000      PR5   = 000240      SW09  = 001000      TST34   024124
ENPR1   002604      MAICLR  007220      PR6   = 000300      SW1   = 000002      TST35   024506
EOPLGC  002706      MAISET  010220      PR7   = 000340      SW10  = 002000      TST36   025004
EOPRSM  032504      MANSIZ  002670      PS    = 177776      SW11  = 004000      TST37   025320
ER    = 100000      MBD     034230      PSTATE  006536      SW12  = 010000      TST4    013466
ERCAPT  003126      MBDIAL  040643      PSW   = 177776      SW13  = 020000      TST40 = 025622
ERCHDR  036173      MEMGMT  002712      PWRVEC= 000024      SW14  = 040000      TST5    014172
ERRCHK  004064      MEPITM  033514      QTYBRD  002414      SW15  = 100000      TST6    014366
ERRCNT  002714      MESSAG  002650      RA    = 002416      SW2   = 000004      TST7    014734
ERROR = 104000      MMPS  = 000252      RBAR    002566      SW3   = 000010      TWO     037420
ERRVEC= 000004      MMR0  = 177572      RBDR    002564      SW4   = 000020      TYPCNF  005142
ER200   002274      MMVECT= 000250      RCSR    002560      SW5   = 000040      TYPDE = 104414
ESC   = 000033      MSG     002644      RDCHR = 104410      SW6   = 000100      TYPDS = 104405
ESCAPE  037064      MUSTED  037072      RDDEC = 104413      SW7   = 000200      TYPE  = 104401
ETDEV   036350      M1      041302      RDLIN = 104411      SW8   = 000400      TYPOC = 104402
```

```
TYPON = 104404      $DBLK   027504      $ETEND  001534      $MTYP2  001445      $TMP2   001364
TYPOS = 104403      $DDW0   001474      $FATAL  001412      $MTYP3  001451      $TMP3   001366
UBHANG  056016      $DDW1   001476      $FFLG   034072      $MTYP4  001455      $TMP4   001370
UCAL    037511      $DDW10  001520      $FILLC  001356      $NULL   001354      $TMP5   001372
VA    = 002456      $DDW11  001522      $FILLS  001355      $NUMS   027752      $TMP6   001374
VCLCHR  037003      $DDW12  001524      $GDADR  001320      $NWTST= 000001      $TN   = 000040
VECADR  002456      $DDW13  001526      $GDDAT  001324      $OCNT   027164      $TPB    001352
VECERR  036617      $DDW14  001530      $GET    026310      $OMODE  027166      $TPFLG  001357
W       037407      $DDW15  001532      $GET42  026314      $OVER   032160      $TPS    001350
WCLEN   002630      $DDW2   001500      $GTSWR  030064      $PASS   001416      $TRAP   031112
WCR     002516      $DDW3   001502      $HD   = 000000      $PASS2  002716      $TRAP2  031134
XCHKBU  043646      $DDW4   001504      $HIBTS  001000      $PASTM  001006      $TRP  = 000015
XINBUF  042644      $DDW5   001506      $HIOCT  031110      $POWER  034162      $TRPAD  031146
X6    = 000020      $DDW6   001510      $ICNT   001304      $PWRDN  034074      $TSTM   001004
X7    = 000040      $DDW7   001512      $INTAG  001335      $PWRUP  034112      $TSTNM  001302
YES     037414      $DDW8   001514      $ITEMB  001314      $QUES   001404      $TTYIN  030530
$APTHD  001000      $DDW9   001516      $LF     001406      $RDCHR  030302      $TYPD   027204
$ATYC   033652      $DEVCT  001420      $LFLG   034071      $RDDEC  030574      $TYPDE  027170
$ATY1   033626      $DEVM   001466      $LPADR  001306      $RDLIN  030422      $TYPDS  027200
$ATY3   033634      $DOAGN  026334      $LPERR  001310      $RDOCT  030752      $TYPE   026374
$ATY4   033644      $DTBL   027474      $MADR1  001442      $RDSZ = 000007      $TYPEC  026606
$AUTOB  001334      $ENDAD  026324      $MADR2  001446      $RTNAD  026336      $TYPEX  026740
$BASE   001464      $ENDCT  026102      $MADR3  001452      $SCOPE  031200      $TYPOC  026766
$BDADR  001322      $ENULL  026340      $MADR4  001456      $SETUP= 000137      $TYPON  027002
$BDDAT  001326      $ENV    001430      $MAIL   001410      $STUP = 177777      $TYPOS  026742
$BELL   001400      $ENVM   001431      $MAMS1  001440      $SVLAD  032124      $UNIT   001422
$CDW1   001470      $EOP    026046      $MAMS2  001444      $SVPC = 001000      $UNITM  001010
$CDW2   001472      $EOPCT  026074      $MAMS3  001450      $SWR  = 163400      $USWR   001434
$CHARC  026736      $ERFLG  001303      $MAMS4  001454      $SWREG  001432      $VECT1  001460
$CKSWR  027764      $ERMAX  001315      $MBADR  001002      $SWRMK= 000200      $VECT2  001462
$CMTAG  001300      $ERROR  032656      $MFLG   034070      $SW08T  032556      $XTSTR  031640
$CM3  = 000000      $ERRPC  001316      $MNEW   030562      $TESTN  001414      $$GET4= 000000
$CM4  = 000007      $ERRTB  001534      $MSGAD  001424      $TKB    001346      $$SW08= 000040
$CNTLG  030544      $ERRTY  033226      $MSGLG  001426      $TKS    001344      $OFILL  027165
$CNTLU  030537      $ERTTL  001312      $MSGTY  001410      $TMP0   001360      .SAV    041640
$CPUOP  001436      $ESCAP  001376      $MSWR   030551      $TMP1   001362      .$X   = 001000
$CRLF   001405      $ETABL  001430      $MTYP1  001441

. ABS.  056106      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  57064 WORDS  ( 223 PAGES)
DYNAMIC MEMORY:  20034 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:11:33
CZDRLD.BIN,CZDRLD/CR/-SP/NL:TOC=CZDRLD.MLB/ML,CZDRLD.P11
```

```
                                                                  B 14
CZDRLD     CREATED BY  MACRO  ON 2-NOV-81 AT 16:13      PAGE 1
                                                   SEQUENCE  170
SYMBOL CROSS REFERENCE                                  CREF   V01
SYMBOL  VALUE              REFERENCES
ABASE   = 172410           #43-3051    52-3178     52-3178
ACDW1   = 000000             52-3178    52-3178
ACDW2   = 000000             52-3178    52-3178
ACPUOP  = 000000             52-3178    52-3178
ADDR      002646           #61-3569
ADDW0   = 000000             52-3178    52-3178
ADDW1   = 000000             52-3178    52-3178
ADDW10  = 000000             52-3178    52-3178
ADDW11  = 000000             52-3178    52-3178
ADDW12  = 000000             52-3178    52-3178
ADDW13  = 000000             52-3178    52-3178
ADDW14  = 000000             52-3178    52-3178
ADDW15  = 000000             52-3178    52-3178
ADDW2   = 000000             52-3178    52-3178
ADDW3   = 000000             52-3178    52-3178
ADDW4   = 000000             52-3178    52-3178
ADDW5   = 000000             52-3178    52-3178
ADDW6   = 000000             52-3178    52-3178
ADDW7   = 000000             52-3178    52-3178
ADDW8   = 000000             52-3178    52-3178
ADDW9   = 000000             52-3178    52-3178
ADEVCT  = 000000             52-3178    52-3178
ADEVM   = 000000             52-3178    52-3178
ADLCHR    036700             140-6050  #142-6222
ADRERR    036532             140-6038  #142-6220
AENV    = 000000             52-3178    52-3178
AENVM   = 000000             52-3178    52-3178
AFATAL  = 000000             52-3178    52-3178
AMADR1  = 000000             52-3178    52-3178
AMADR2  = 000000             52-3178    52-3178
AMADR3  = 000000             52-3178    52-3178
AMADR4  = 000000             52-3178    52-3178
AMAMS1  = 000000             52-3178    52-3178
AMAMS2  = 000000             52-3178    52-3178
AMAMS3  = 000000             52-3178    52-3178
AMAMS4  = 000000             52-3178    52-3178
AMSGAD  = 000000             52-3178    52-3178
AMSGLG  = 000000             52-3178    52-3178
AMSGTY  = 000000             52-3178    52-3178
AMTYP1  = 000000             52-3178    52-3178
AMTYP2  = 000000             52-3178    52-3178
AMTYP3  = 000000             52-3178    52-3178
AMTYP4  = 000000             52-3178    52-3178
ANPR1     002606           #61-3553     145-6394
ANSWER    002664           #61-3576    *63-3623    *63-3627    63-3628     63-3632     63-3636     63-3638     63-3640     63-3642
                             63-3654    77-4127     139-5945   139-5981    139-5992    139-5994    140-6011    140-6013    140-6015
                             140-6033   140-6035    140-6041   140-6063    140-6065    140-6067    140-6088    140-6090    140-6092
                             140-6109   140-6111    140-6113   140-6132    140-6134    140-6136    140-6155    140-6157    140-6159
APASS   = 000000             52-3178    52-3178
APRIOR  = 000000             52-3178
APTCSU  = 000040             123-5909  #137-5930
APTENV  = 000001             123-5909   135-5926    137-5930  #137-5930
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                                                                            C 14
CZDRLD      CREATED BY  MACRO  ON 2-NOV-81 AT 16:13         PAGE 2
                                                        SEQUENCE  171
SYMBOL CROSS REFERENCE                                       CREF   V01
SYMBOL  VALUE            REFERENCES
APTSIZ  = 000200          81-4264 #137-5930
APTSPO  = 000100         123-5909  137-5930 #137-5930
ASIZE     005416         #77-4105   87-4428
ASK4PR    005056          75-3975  #75-4035
ASK4VC    004742          75-3961  #75-4032
ASWREG  = 000000          52-3178   52-3178
AT      = 020000         #44-3074   75-4019   96-4902   96-4906   96-4908   96-4910   96-4913  104-5157
ATESTN  = 000000          52-3178   52-3178
AUNIT   = 000000          52-3178   52-3178
AUSWR   = 000000          52-3178   52-3178
AVECT1  = 000300         #43-3052   52-3178   52-3178
AVECT2  = 000000          52-3178   52-3178
B         037405          76-4069  139-5962 #142-6238
BAR       002520         #61-3521   68-3760   89-4598   89-4599   91-4662   92-4718   92-4719   92-4726   92-4727
                          92-4752   93-4775   93-4781   94-4839   94-4840   94-4847   94-4848  104-5177  105-5207
                         106-5253  107-5296  107-5324  107-5339  108-5369  109-5406  110-5444  113-5537  114-5570
                         114-5576  115-5600  115-5620  116-5647  117-5694  117-5719  118-5745  119-5786  120-5828
                         145-6383  145-6390  145-6393
BARADR    041554        #142-6271  146-6409
BCDONE    036477         141-6189 #142-6219
BCFIN     037440        #142-6246
BDFAIL    002666         #61-3577
BDLCR     035712         139-6000 #141-6176
BDLCRM    037212         141-6178 #142-6230
BDNERR    036407         140-6017 #142-6218
BDNUMB    006122          75-4022  *77-4116  *77-4136   77-4141   77-4186  *77-4188  #77-4201
BDR       002524         #61-3523   89-4602   89-4603   92-4733   92-4734   92-4739   92-4740   92-4763   93-4774
                          93-4792   94-4810   94-4811   94-4817   94-4818  100-5004  100-5005  100-5012  100-5013
                         106-5254  107-5297  108-5370  115-5601  115-5622  116-5648  116-5671  117-5696  118-5746
                         119-5787  119-5810  120-5829  145-6384  145-6391
BDVECT    002542         #61-3533  *78-4216  *78-4220  145-6397
BEGIN     011674          87-4427   87-4429  #88-4454
BEGIN1    012356          48-3173   88-4458  #88-4532   88-4539   88-4541  122-5908
BITTST    002710         #61-3586   79-4233 *140-6081 *140-6125 *140-6148
BIT0    = 000001         #43-3049   75-3957   75-4005   75-4007   76-4054   76-4067   77-4110   77-4164   77-4182
                          77-4189   82-4284   87-4422   88-4497   88-4532   94-4842   95-4865   95-4868   95-4870
                          95-4873   95-4877   95-4880   96-4889  100-5000  111-5479  114-5577  114-5580  139-5960
                         140-6081  140-6099  141-6181
BIT00   = 000001         #43-3049   43-3049  133-5924  133-5924  135-5926  135-5926
BIT01   = 000002         #43-3049   43-3049
BIT02   = 000004         #43-3049   43-3049
BIT03   = 000010         #43-3049   43-3049
BIT04   = 000020         #43-3049   43-3049
BIT05   = 000040         #43-3049   43-3049
BIT06   = 000100         #43-3049   43-3049
BIT07   = 000200         #43-3049   43-3049
BIT08   = 000400         #43-3049   43-3049  133-5924
BIT09   = 001000         #43-3049   43-3049  133-5924  133-5924
BIT1    = 000002         #43-3049   75-4011   76-4075   82-4289   88-4501  111-5494  139-5968  140-6125  140-6144
BIT10   = 002000         #43-3049  135-5926
BIT11   = 004000         #43-3049   89-4593   90-4622   91-4643   92-4699   93-4771   94-4804   95-4864   96-4888
                          97-4922   98-4947   99-4972  100-4999  101-5025  102-5058  103-5092  104-5148  105-5203
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SYMBOL CROSS REFERENCE                                     CREF   V01
SYMBOL  VALUE          REFERENCES
                         106-5245  107-5287  108-5360  109-5402  110-5441  111-5478  113-5522  114-5568  115-5588
                         116-5641  117-5682  118-5738  119-5778  120-5820
BIT12    = 010000       #43-3049   75-3959   77-4112   77-4166   77-4184   77-4191
BIT13    = 020000       #43-3049  135-5926
BIT14    = 040000       #43-3049  111-5504  133-5924
BIT15    = 100000       #43-3049
BIT2     = 000004       #43-3049   68-3757   71-3829   75-4021   76-4081   82-4292   88-4505   91-4646  112-5512
                         139-5974  140-6148  140-6168
BIT3     = 000010       #43-3049
BIT4     = 000020       #43-3049
BIT5     = 000040       #43-3049
BIT6     = 000100       #43-3049
BIT7     = 000200       #43-3049   87-4424  136-5928
BIT8     = 000400       #43-3049  111-5498  111-5500  111-5502  111-5504
BIT9     = 001000       #43-3049   92-4714   92-4731   92-4744   94-4822   94-4837   94-4852  135-5926
BOARD      037424        121-5873 #142-6244
BORW       002610       #61-3554  *90-4625  *90-4626   90-4633   95-4865  100-5000  111-5479  145-6381
BPINIT     004154       #74-3905   77-4105   88-4569
BPT      = 000003       #47-3142   74-3912   87-4415
BPTINT     004216        74-3905  #74-3920
BPTVCT     000014       #48-3150   75-3938  *75-3939  *75-3946  *75-3996
BPTVEC   = 000014       #43-3049
BRVWPC     037574        76-4052  #142-6249
BRWAIT     002626       #61-3561
BUFF       042642       #142-6277
BUFLEN     002622       #61-3559   66-3714   67-3730   68-3751   68-3752   69-3805   72-3861 *106-5247  106-5248
                        *107-5290  107-5291 *108-5363  108-5364 *116-5643 *118-5740  118-5742 *119-5781  119-5783
                        *120-5823  120-5825
BUSERR   = 000004       #43-3050  *89-4595  *89-4615
BUT        002536       #61-3531  *71-3832  *91-4677  *95-4868 *113-5554  145-6386  145-6387  145-6403
CAPNTR     044650       *48-3171   64-3667   64-3669  *64-3674  133-5924  133-5924  133-5924 *133-5924 #142-6282
CAPSTK     044652        48-3171  133-5924  133-5924  133-5924  133-5924  142-6282 #142-6283
CARETN   = 000015       #47-3130   63-3654  140-6015  140-6041  140-6067  140-6090  140-6113  140-6136  140-6159
CAT      = 157777       #45-3098
CATCH      006466        48-3150  #78-4215
CBIT0    = 177776       #46-3104   90-4626   90-4628
CBIT1    = 177775       #46-3105  111-5488  111-5490
CBIT10   = 175777       #46-3114
CBIT11   = 173777       #46-3115
CBIT12   = 167777       #46-3116
CBIT13   = 157777       #46-3117
CBIT14   = 137777       #46-3118
CBIT15   = 077777       #46-3119
CBIT2    = 177773       #46-3106
CBIT3    = 177767       #46-3107
CBIT4    = 177757       #46-3108
CBIT5    = 177737       #46-3109
CBIT6    = 177677       #46-3110
CBIT7    = 177577       #46-3111
CBIT8    = 177377       #46-3112
CBIT9    = 176777       #46-3113
CB1513   = 057777       #46-3120   96-4901
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                                                                E 14
CZDRLD      CREATED BY  MACRO  ON 2-NOV-81 AT 16:13         PAGE 4
                                                     SEQUENCE  173
SYMBOL  CROSS REFERENCE                                     CREF   V01
SYMBOL  VALUE                 REFERENCES
CCY       = 177377      #45-3089
CDAB      = 171777      #45-3093
CDAC      = 172777      #45-3094
CDBC      = 174777      #45-3095
CDSA      = 173777      #45-3092
CDSB      = 175777      #45-3091
CDSC      = 176777      #45-3090
CDST      = 170777      #45-3096   97-4936   98-4961   99-4986
CEIR      = 077777      #45-3100
CER       = 077777      #45-3101
CFNC      = 177761      #45-3084   97-4928   98-4953   99-4978  105-5230
CF1       = 177775      #45-3081
CF2       = 177773      #45-3082
CF3       = 177767      #45-3083
CGO       = 177776      #45-3080
CHARCT      032555       63-3621   63-3623  *63-3624  *88-4568  121-5895 *121-5900 *123-5909 *123-5909  123-5909
                       *123-5909 *123-5909  123-5909  127-5915  127-5915 *127-5915 *127-5915 *127-5915  133-5924
                        133-5924 *133-5924 *133-5924 *133-5924  133-5924 *133-5924 *133-5924  133-5924 *133-5924
                        133-5924  133-5924 *133-5924 #133-5924 *139-5941
CHKBFF      003330      #67-3729  106-5251  107-5294  108-5367
CHKBUF      002620      #61-3558   67-3729   69-3791
CHKCAB      003670      #71-3829   92-4758   93-4787   96-4905   96-4914  101-5033  102-5064  103-5108
CIE       = 177677      #45-3087
CKSWR     = 104407     #132-5921  133-5924  135-5926  135-5926
CLENUP      003646      #70-3817   88-4570   91-4644   94-4805   94-4857  100-5018  102-5059  103-5093  104-5149
                        105-5206  107-5288  108-5361  109-5403  110-5442  111-5481  113-5523  114-5569  116-5642
                        119-5779  120-5821  141-6202
CMA       = 167777      #45-3097
CNTLC     = 000003      #47-3129   63-3628  140-6013  140-6035  140-6065  140-6092  140-6111  140-6134  140-6157
CNTRLC      037175       63-3630 #142-6228
CNX       = 137777      #45-3099
CPSAVE      032654      133-5924 *133-5924  133-5924 *133-5924 #134-5924  135-5926 *135-5926 *135-5926  135-5926
                        136-5928
CR        = 000015      #43-3049  123-5909  123-5909
CRLF      = 000200      #43-3049   75-4033   75-4034   75-4036   77-4204   77-4205   77-4206   89-4593   90-4622
                         91-4643   92-4699   93-4771   94-4804   95-4864   96-4888   97-4922   98-4947   99-4972
                        100-4999  101-5025  102-5058  103-5092  104-5148  105-5203  106-5245  107-5287  108-5360
                        109-5402  110-5441  111-5478  113-5522  114-5568  115-5588  116-5641  117-5682  118-5738
                        119-5778  120-5820  123-5909  123-5909  133-5924  133-5924  133-5924  133-5924  133-5924
                        133-5924  133-5924  138-5932  138-5932  142-6213  142-6213  142-6213  142-6214  142-6215
                        142-6215  142-6215  142-6216  142-6216  142-6216  142-6225  142-6230  142-6231  142-6232
                        142-6232  142-6245  142-6245  142-6246  142-6246  142-6247  142-6248  142-6249  142-6249
                        142-6249  142-6250  142-6250  142-6251  142-6252  142-6253  142-6254  142-6255  142-6256
                        142-6258  142-6259  142-6259  142-6260  142-6260  142-6261  142-6261  142-6261  142-6262
                        142-6263  142-6264  142-6265  142-6265  142-6266  142-6267  142-6267  142-6269  142-6269
                        142-6269  142-6270  144-6342  144-6350  144-6352  144-6361  144-6363
CRLF2       037435      139-5979 #142-6245
CRY       = 177577      #45-3088
CSR         002522      #61-3522   68-3750   68-3754   70-3818   70-3819   73-3886   73-3887   89-4600   89-4601
                         90-4623   90-4624   90-4625   91-4654   91-4655   91-4656   91-4663   91-4664   92-4700
                         92-4701   92-4702   92-4716   92-4717   92-4725   92-4746   92-4756   92-4762   93-4772
                         93-4776   93-4777   93-4785   93-4791   94-4809   94-4824   95-4867   95-4869   95-4875
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SYMBOL CROSS REFERENCE
SYMBOL  VALUE           REFERENCES
                           95-4876   96-4891   96-4892   96-4893   96-4898   96-4899   96-4908   96-4909   96-4916
                           97-4923   97-4924   97-4925   97-4932   97-4933   98-4948   98-4949   98-4950   98-4957
                           98-4958   99-4973   99-4974   99-4975   99-4982   99-4983  100-5002  100-5003  100-5010
                          101-5026  101-5027  101-5029  101-5038  101-5040  101-5043  101-5047  102-5060  102-5072
                          102-5073  102-5076  102-5081  102-5082  103-5103  103-5104  103-5106  103-5119  103-5121
                          103-5124  103-5135  104-5156  104-5157  104-5162  104-5164  104-5169  104-5180  104-5185
                          104-5187  104-5192  105-5214  105-5216  105-5219  105-5223  105-5228  106-5246  106-5260
                          106-5261  106-5267  106-5269  107-5302  107-5303  107-5318  107-5321  107-5328  107-5329
                          107-5334  107-5348  107-5353  108-5362  108-5376  108-5378  108-5381  108-5385  109-5404
                          109-5412  109-5413  109-5414  109-5420  109-5422  109-5427  110-5451  110-5452  110-5457
                          110-5463  110-5471  111-5482  111-5483  111-5484  113-5529  113-5530  113-5531  113-5538
                          113-5539  114-5571  114-5572  115-5597  115-5598  115-5603  115-5604  115-5610  115-5613
                          116-5654  116-5655  116-5661  116-5663  116-5664  117-5691  117-5692  117-5697  117-5698
                          117-5704  117-5707  117-5708  118-5739  118-5752  118-5753  118-5759  118-5761  118-5762
                          119-5780  119-5793  119-5794  119-5800  119-5802  119-5803  120-5822  120-5835  120-5836
                          120-5842  120-5844  120-5845 *141-6195 *141-6196  141-6203  141-6205  145-6381  145-6385
                          145-6386  145-6387  145-6388  145-6392  145-6394  145-6395  145-6396  145-6399  145-6400
                          145-6401  145-6402  145-6403  145-6404  145-6405
CX6       = 177757         #45-3085
CX7       = 177737         #45-3086
CY        = 000400         #44-3064   82-4276   82-4278   91-4668   91-4670   91-4680   91-4682  105-5216  106-5261
                          107-5303  107-5329  108-5378  109-5414  113-5543  113-5545  115-5604  116-5655  117-5698
                          118-5753  119-5794  120-5836  141-6205
DAB       = 006000         #44-3069   97-4939
DAC       = 005000         #44-3070   98-4964
DATCHK      003526         #69-3790  106-5277  107-5311  108-5393
DATCHX      003644          69-3804  #69-3809
DATCH1      003546         #69-3794   69-3806
DATCH2      003624          69-3796  #69-3805  106-5279  107-5313  108-5395
DATOCK      003716         #72-3848  118-5769  120-5852
DATOCX      004062          72-3860   72-3871  #72-3874
DATOC1      003736         #72-3852   72-3862
DATOC2      004000          72-3854  #72-3861  118-5771  120-5854
DBC       = 003000         #44-3071   99-4989
DDISP     = 177570         #43-3049   52-3178   81-4264
DDW         002720         #62-3601   68-3757   71-3829  *76-4066   76-4067   76-4075   76-4081   79-4233   80-4245
                          *88-4565   88-4566   90-4627   91-4646   96-4889  103-5094  111-5489  112-5512 *139-5949
                          139-5960  139-5968  139-5974 *140-6080 *140-6102 *140-6124 *140-6147
DEVICE      037200        141-6198 #142-6229
DEVMSK      002544         #61-3534  *88-4532   88-4534   88-4536  *88-4546  *88-4551 *141-6181  141-6185  141-6187
                         *141-6192
DEVPRI      040137        140-6101 #142-6253
DH1         052446       #144-6342
DH14        053046          54-3240   54-3247 #144-6350
DH16        053161          54-3254 #144-6352
DH17        053274          54-3261   54-3267   54-3273   55-3278   55-3284   55-3296   55-3302   56-3331   56-3337
                           56-3343   56-3361   56-3367   60-3500 #144-6354
DH2         052503          53-3181 #144-6344
DH202       054645          59-3453 #144-6372
DH203       054724       #144-6373
DH207       055010       #144-6374
DH210       055064          59-3477 #144-6375
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SYMBOL CROSS REFERENCE
SYMBOL  VALUE           REFERENCES
DH211    055130           59-3495    #144-6376
DH23     053350           59-3465    #144-6355
DH26     053424           57-3390     59-3459     59-3483    #144-6356
DH3      052544           53-3187    #144-6345
DH34     053500           55-3320     55-3326     57-3396     59-3471    #144-6357
DH4      052613           53-3193     53-3217     54-3222    #144-6346
DH43     053554           56-3349     56-3355     56-3379     57-3384    #144-6358
DH5      052657           53-3199     54-3228     54-3234     55-3290    #144-6347
DH50     053620           56-3373    #144-6359
DH56     053717           59-3489    #144-6360
DH57     053776           57-3402     59-3446    #144-6361
DH6      052726           53-3205     55-3308     55-3314    #144-6348
DH60     054143           57-3409    #144-6363
DH61     054241           57-3416    #144-6365
DH62     054312           57-3422    #144-6366
DH63     054421           57-3428    #144-6368
DH64     054470           57-3434    #144-6369
DH65     054527           58-3439    #144-6370
DH66     054576          #144-6371
DH7      052772           53-3211    #144-6349
DIOMEM   002614          #61-3556    109-5406
DISPLA   001342          #52-3178    *81-4264    *81-4264    133-5924    135-5926
DISPRE   000174          #48-3156     81-4264
DOCTS    040373          140-6146   #142-6258
DOWEPR   026012          121-5865   #121-5893    122-5902
DREG     002550          #61-3536    *89-4596    *89-4598    *89-4600    *89-4602    *89-4604    145-6380
DRGET    004232          #75-3932     77-4179
DRINV    002526          #61-3524     89-4604     89-4605    101-5035    101-5037    101-5044    101-5050    102-5067    102-5069
                         102-5077    102-5083    103-5115    103-5117    103-5125    103-5136    104-5150    104-5152    104-5160
                         104-5167    104-5174    104-5176    104-5183    104-5190    105-5208    105-5210    105-5220    105-5226
                         106-5255    106-5257    106-5265    106-5272    107-5298    107-5300    107-5306    107-5316    107-5325
                         107-5327    107-5332    107-5351    108-5371    108-5373    108-5382    108-5388    109-5407    109-5409
                         109-5418    109-5425    110-5445    110-5447    110-5455    110-5461    115-5592    115-5594    115-5608
                         115-5616    116-5649    116-5651    116-5659    116-5667    117-5686    117-5688    117-5702    117-5711
                         118-5747    118-5749    118-5757    118-5765    119-5788    119-5790    119-5798    119-5806    120-5830
                         120-5832    120-5840    120-5848   *141-6197
DRLEV    002552          #61-3537    *88-4566    *88-4567    103-5132    103-5139    145-6399
DRVS     002530          #61-3525    101-5036    101-5045    101-5051    102-5068    102-5070    102-5078    102-5084    103-5116
                         103-5118    103-5126    103-5137    104-5151    104-5153    104-5161    104-5168    104-5175    104-5184
                         104-5191    105-5209    105-5211    105-5221    105-5227    106-5256    106-5258    106-5266    106-5273
                         107-5299    107-5301    107-5307    107-5317    107-5326    107-5333    107-5352    108-5372    108-5374
                         108-5383    108-5389    109-5408    109-5410    109-5419    109-5426    110-5446    110-5448    110-5456
                         110-5462    115-5593    115-5595    115-5609    115-5617    116-5650    116-5652    116-5660    116-5668
                         117-5687    117-5689    117-5703    117-5712    118-5748    118-5750    118-5758    118-5766    119-5789
                         119-5791    119-5799    119-5807    120-5831    120-5833    120-5841    120-5849
DR1WOB   040201          140-6079   #142-6254
DSA    = 004000          #44-3068     99-4987     99-4990
DSB    = 002000          #44-3067     98-4962     98-4965
DSC    = 001000          #44-3066     97-4937     97-4940
DST    = 007000          #44-3072
DSWR   = 177570          #43-3049     52-3178     81-4264
DT1      055240         #145-6379
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SYMBOL CROSS REFERENCE                                       CREF    V01
SYMBOL  VALUE             REFERENCES
DT14      055350             54-3242    54-3249  #145-6386
DT16      055366             54-3256  #145-6387
DT17      055404             54-3262    54-3268    54-3274    55-3279    55-3285    55-3297    55-3303    56-3332    56-3338
                             56-3344    56-3362    56-3368    60-3501  #145-6388
DT2       055246             53-3182  #145-6380
DT202     055710             59-3454  #145-6403
DT203     055726           #145-6404
DT207     055744           #145-6405
DT210     055760             59-3478  #145-6406
DT211     055772             59-3496  #145-6407
DT23      055420             59-3466  #145-6389
DT26      055434             57-3391    59-3460    59-3484  #145-6390
DT3       055260             53-3188  #145-6381
DT34      055450             55-3321    55-3327    57-3397    59-3472  #145-6391
DT4       055274             53-3194    53-3218    54-3223  #145-6382
DT43      055464             56-3350    56-3356    56-3380    57-3385  #145-6392
DT5       055306             53-3200    54-3229    54-3235    55-3291  #145-6383
DT50      055476             56-3374  #145-6393
DT56      055520             59-3490  #145-6394
DT57      055536             57-3404    59-3448  #145-6395
DT6       055322             53-3206    55-3309    55-3315  #145-6384
DT60      055556             57-3411  #145-6396
DT61      055572             57-3417  #145-6397
DT62      055606             57-3423  #145-6398
DT63      055632             57-3429  #145-6399
DT64      055646             57-3435  #145-6400
DT65      055660             58-3440  #145-6401
DT66      055674           #145-6402
DT7       055334             53-3212  #145-6385
DYWTLT    006401             77-4123   #77-4207
EBAR      002600            #61-3550   *68-3762    68-3770   *92-4723   *92-4754   *93-4783   *94-4841   *94-4842    94-4843
                           *107-5346  *114-5579  *114-5580  *115-5621   115-5626  *117-5723   145-6383   145-6390   145-6393
                            145-6398   145-6407
EBDR      002576            #61-3549   *94-4815  *100-5008  *100-5011  *100-5016  *115-5623   115-5628  *116-5674  *119-5813
                            145-6391   145-6407
ECELR     040676            139-5942  #142-6262
ECSR      002572            #61-3547   *68-3763   *68-3764   *68-3765    68-3768   *71-3831   *73-3888   *73-3889   *73-3890
                             82-4280    82-4282    82-4287   *91-4659   *91-4665    91-4666    91-4672   *91-4674    91-4675
                            *92-4757    92-4759   *93-4786    93-4788   *95-4872   *95-4873   *96-4896   *96-4904   *96-4906
                            *96-4912   *96-4913   *97-4926    97-4927   *97-4930   *97-4934    97-4935   *97-4939   *97-4940
                            *98-4951    98-4952   *98-4955   *98-4959    98-4960   *98-4964   *98-4965   *99-4976    99-4977
                            *99-4980   *99-4984    99-4985   *99-4989   *99-4990  *101-5032  *102-5063  *102-5065  *103-5107
                            103-5109  *103-5112  *104-5171  *104-5172  *104-5194  *104-5195  *105-5233  *105-5234  *105-5235
                           *107-5337  *109-5432  *109-5433  *110-5468  *110-5469  *113-5534  *113-5540   113-5541   113-5549
                           *113-5551   113-5552  *114-5574   145-6385   145-6386   145-6388   145-6398   145-6403   145-6404
EDIT      034572            139-5993  #140-6002   140-6018   140-6034
EEIR      002574            #61-3548   *95-4879   *95-4880  *111-5497   111-5498  *111-5500  *111-5502   145-6387   145-6401
EIR     = 100000            #44-3076    75-4000    90-4624    95-4875   100-5010   111-5482
EMTVEC  = 000030            #43-3049   *81-4264   *81-4264
EM1       047134           #143-6286
EM10      047445             53-3216  #143-6293
EM11      047477             54-3221  #143-6294
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CZDRLD      CREATED BY  MACRO  ON 2-NOV-81 AT 16:13        PAGE 8
                                                          SEQUENCE  177
SYMBOL CROSS REFERENCE                                         CREF    V01
SYMBOL  VALUE             REFERENCES
EM12        047542          54-3227    #143-6295
EM13        047574          54-3233    #143-6296
EM14        047644          54-3239    #143-6297
EM15        047733          54-3246    #143-6298
EM16        047757          54-3253    #143-6299
EM17        050003          54-3260    #143-6300
EM2         047162          53-3180    #143-6287
EM20        050072          54-3266    #143-6301
EM202       052347          59-3452    #143-6339
EM21        050140          54-3272    #143-6302
EM211       052377          59-3494    #143-6340
EM22        050210          55-3277    #143-6303
EM23        050251         #143-6304
EM24        050320          55-3283    #143-6305
EM25        050351          55-3289    #143-6306
EM26        050402          59-3458    #143-6307
EM27        050441          59-3464    #143-6308
EM3         047216          53-3186    #143-6288
EM30        050476          55-3295    #143-6309
EM31        050534          55-3301    #143-6310
EM32        050600          55-3307    #143-6311
EM33        050621          55-3313    #143-6312
EM34        050652         #143-6313
EM35        050712          55-3319    #143-6314
EM36        050773          55-3325     59-3470    #143-6315
EM37        051023          56-3330    #143-6316
EM4         047264          53-3192    #143-6289
EM40        051061          56-3336    #143-6317
EM41        051111          56-3342    #143-6318
EM42        051157         #143-6319
EM43        051213          56-3348     57-3433    #143-6320
EM44        051244          56-3354    #143-6321
EM45        051314          56-3360    #143-6322
EM46        051352          60-3499    #143-6323
EM47        051427          56-3366    #143-6324
EM5         047315          53-3198    #143-6290
EM50        051444          56-3372    #143-6325
EM51        051511          56-3378    #143-6326
EM52        051570          57-3383    #143-6327
EM53        051631          59-3476    #143-6328
EM54        051657          57-3389     59-3482    #143-6329
EM55        051674          57-3395    #143-6330
EM56        051714          59-3488    #143-6331
EM57        051752          57-3401     59-3445    #143-6332
EM6         047346          53-3204    #143-6291
EM60        052002          57-3408    #143-6333
EM61        052041          57-3415    #143-6334
EM62        052124          57-3421    #143-6335
EM63        052173          57-3427    #143-6336
EM65        052233          58-3438    #143-6337
EM66        052304         #143-6338
EM7         047377          53-3210    #143-6292
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                                                               J 14
CZDRLD      CREATED BY  MACRO  ON 2-NOV-81 AT 16:13      PAGE 9
                                                    SEQUENCE  178
SYMBOL CROSS REFERENCE                                    CREF    V01
SYMBOL   VALUE                REFERENCES
ENDEV       025622           47-3143   89-4608  112-5514 #121-5858
ENDSTK      047132           64-3667  133-5924 #142-6284
ENPR1       002604          #61-3552 *115-5611 *117-5728  145-6394  145-6402
EOPLOC      002706          *48-3170  #61-3585  *87-4421   88-4571  121-5893  133-5924 *133-5924 *133-5924 *133-5924
                            133-5924  133-5924 *133-5924 *133-5924 *133-5924
EOPRSM      032504          133-5924 #133-5924
ER        = 100000          #44-3077   68-3764   73-3889   91-4674   96-4902   96-4906   96-4910   96-4913  104-5172
                            104-5195  109-5430  109-5433  110-5466  110-5469  113-5551
ERCAPT      003126          #64-3667  121-5884  122-5902
ERCHDR      036173          133-5924 #142-6214
ERRCHK      004064          #73-3886  115-5618  117-5713
ERRCNT      002714          #61-3588  *91-4651  *94-4806 *106-5276 *107-5310 *108-5392 *113-5524 *115-5590 *117-5684
                           *135-5926  136-5928  136-5928 *136-5928
ERROR     = 104000          #43-3049   78-4221   89-4611   90-4635   91-4660   91-4678   92-4713   92-4730   92-4743
                             92-4751   92-4755   92-4761   92-4765   93-4780   93-4784   93-4790   93-4794   94-4821
                             94-4836   94-4851   95-4874   95-4881   96-4897   96-4907   96-4915   97-4931   97-4941
                             98-4956   98-4966   99-4981   99-4991  100-5009  100-5017  101-5034  101-5046  102-5066
                            102-5085  103-5113  103-5131  103-5141  104=5163  104-5173  104-5186  104-5196  105-5222
                            105-5236  106-5268  106-5275  106-5278  107-5309  107-5312  107-5319  107-5338  107-5347
                            107-5354  108-5384  108-5391  108-5394  109-5421  109-5434  110-5458  110-5470  111-5503
                            113-5535  113-5555  114-5575  114-5581  115-5612  115-5619  115-5632  116-5662  116-5670
                            116-5675  117-5706  117-5714  117-5718  117-5725  117-5729  118-5760  118-5768  118-5770
                            118-5772  119-5801  119-5809  119-5814  120-5843  120-5851  120-5853  120-5855
ERRVEC    = 000004          #43-3049   43-3050   81-4264  *81-4264  *81-4264  133-5924 *133-5924 *133-5924 *133-5924
ER200       002274          #59-3442  136-5928  136-5928
ESC       = 000033          #47-3128   63-3632  140-6011  140-6033  140-6063  140-6088  140-6109  140-6132  140-6155
ESCAPE      037064           63-3634 #142-6224
ETDEV       036350          121-5881 #142-6217
EWCR        002602          #61-3551  *68-3761  *94-4830 *107-5345 *115-5625  115-5630  145-6389  145-6393  145-6398
                            145-6407
EXPAND      027516          125-5913 #126-5913
FIXTBL      003170          #65-3684  139-5989  141-6177
FLAG        002652          #61-3571
FNC       = 000016          #44-3059   97-4930   98-4955   99-4980  105-5234
FNCCNT      002654          #61-3572
F1        = 000002          #44-3056   97-4932  109-5413  117-5697  118-5752  120-5835
F2        = 000004          #44-3057   75-3942   75-4015   96-4898   96-4908   98-4957  101-5040  102-5073  103-5121
                            104-5157
F3        = 000010          #44-3058   99-4982  115-5603  117-5697  119-5793  120-5835
GNS       = ******          132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921
                            132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921  132-5921
                            132-5921  132-5921  132-5921  132-5921  132-5922  132-5922
GO        = 000001          #44-3055   75-3942   82-4276   82-4278   91-4668   91-4670   91-4680   91-4682   92-4716
                            101-5040  102-5073  103-5121  104-5156  104-5180  105-5216  106-5261  107-5303  107-5329
                            108-5378  109-5414  113-5543  113-5545  114-5571  115-5604  116-5655  117-5698  118-5753
                            119-5794  120-5836
GOAGIN      026344          122-5902 #122-5903
GTSWR     = 104406         #132-5921
HAKTPM      032174          133-5924 #133-5924
HEADER      040452          139-5947 #142-6259
HT        = 000011          #43-3049  123-5909  123-5909
IBSAVE      033224         *135-5926  135-5926 *135-5926 *135-5926  135-5926  135-5926 #135-5926
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SYMBOL   VALUE          REFERENCES
IE       = 000100        #44-3062   68-3750   73-3886   75-3942  101-5040  102-5073  103-5121  104-5156  105-5216
                         106-5261  107-5303  107-5329  108-5378  109-5414  115-5603  116-5654  117-5697  118-5752
                         119-5793  120-5835
INBUF      002616        #61-3557   66-3713   68-3753   69-3792   72-3850  105-5207  106-5253  107-5296  107-5324
                         107-5342  107-5346  108-5369  116-5647  118-5745  119-5786  120-5828
INBUF1     002656        #61-3573
INDEV      006124         77-4140  #77-4202
INOOUT     022606        111-5480 #112-5512
INTA       003356        #68-3750  106-5274  107-5308  108-5390  116-5669  118-5767  119-5808  120-5850
IOTVEC   = 000020        #43-3049  *81-4264  *81-4264
KDPAR2   = 172364        #47-3137  *88-4495  *88-4499  *88-4503  *88-4515
KDPDR2   = 172324        #47-3134
KIPAR0   = 172340        #47-3135   88-4474
KIPAR2   = 172344        #47-3136  *88-4494  *88-4498  *88-4502  *88-4514
KIPDR0   = 172300        #47-3132   88-4466
KIPDR2   = 172304        #47-3133
LENCHK     002624        #61-3560  *69-3793  *69-3794   69-3805  *72-3851  *72-3852   72-3861
LETNCR     037173        *63-3636   63-3637 #142-6227
LEVEL      002540        #61-3532  *75-3932  *75-3947  *75-3989   75-3995 *103-5127 *103-5132 *103-5138  103-5139
                         105-5211  106-5258  107-5301  108-5374  109-5410  110-5448  115-5595  116-5652  117-5689
                         118-5750  119-5791  120-5833  145-6399
LEVELS     004732         75-3933  #75-4030  103-5102
LEVEL3   = 000140        #47-3123   75-4031  101-5028  104-5153
LEVEL4   = 000200        #47-3124   75-4031
LEVEL5   = 000240        #47-3125   75-4030
LEVEL6   = 000300        #47-3126   75-4030
LEVEL7   = 000340        #47-3127   48-3151   70-3817   75-3932   75-3945   75-3991   78-4215   88-4463   88-4492
                         102-5070  103-5118  138-5932  138-5932  138-5932  140-6121
LF       = 000012        #43-3049  123-5909  123-5909
LODBUF     003302        #66-3713  106-5250  107-5293  108-5366  116-5644  118-5741  119-5782  120-5824
LOOP       002662        #61-3575  *76-4044   76-4056  *76-4087
LRGSTC     002704        #61-3584   63-3640   63-3650  *77-4139 *140-6007 *140-6029
MA       = 010000        #44-3073   68-3755   70-3818   75-3936   75-4003   75-4017   91-4650   91-4654   92-4700
                          92-4702   92-4762   93-4777   93-4791   94-4809   96-4892   96-4894   96-4896   97-4924
                          98-4949   99-4974  100-5003  101-5026  101-5038  102-5072  103-5103  103-5119  104-5156
                         105-5214  106-5260  107-5302  107-5321  107-5328  108-5376  109-5412  110-5451  113-5529
                         115-5597  116-5663  117-5691  117-5707  118-5761  119-5802  120-5844
MAICLR     007220        #84-4321  113-5526
MAISET     010220        #85-4357   91-4649
MANSIZ     002670        #61-3578  *87-4405   87-4426 *139-5990 *141-6176
MBD        034230         48-3164 #139-5938
MBDIAL     040643        139-5940 #142-6261
MEMGMT     002712        #61-3587   82-4274   82-4284   82-4289   82-4292  *88-4459  *88-4465  *88-4497  *88-4501
                         *88-4505  113-5547
MEPITM     033514        136-5928 *136-5928 #136-5928
MESSAG     002650        #61-3570
MMPS     = 000252        #47-3139   88-4491  *88-4492  *88-4518
MMR0     = 177572        #47-3131  *88-4464  *88-4493  *88-4512
MMVECT   = 000250        #47-3138   88-4489  *88-4490  *88-4519
MSG        002644        #61-3568
MUSTED     037072        139-5985 #142-6225
M1         041302         88-4524 #142-6267
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SYMBOL CROSS REFERENCE
SYMBOL  VALUE           REFERENCES
M1A         041421         88-4528  #142-6269
N           037422         76-4077   139-5972  #142-6243
NO          037411         76-4085   139-5978  #142-6240
NOBD        006207         77-4172   #77-4204
NOBUT       037535         76-4049   140-6002  #142-6248
NOCARE      056104         88-4496    88-4500    88-4504    91-4662   113-5537  #146-6424
NODATA      036311        133-5924  #142-6216
NODVPR      041151         88-4542  #142-6265
NOMORE      040775        136-5928  #142-6263
NOTST       006335         77-4160   #77-4206
NOTVEC      005017         75-3972   #75-4034
NPR1        002612         61-3553   #61-3555   115-5600  *115-5602   115-5621   117-5694  *117-5695   117-5720   117-5723
                          117-5726   145-6394
NX        = 040000        #44-3075    91-4674   109-5430   109-5433   110-5466   110-5469   113-5551
NXTTST      002554        #61-3538
N2        = 000400        #44-3065    75-4009
OFL         002702        #61-3583
OLDPC1      002672        #61-3579   *77-4106    77-4197   *88-4460    88-4523   *89-4609    89-4613   145-6380
OLDPC2      002676        #61-3581   *78-4218    78-4223   *88-4489    88-4519   145-6397
OLDPS1      002674        #61-3580   *77-4108    77-4196   *78-4217   *88-4462    88-4522   *89-4610    89-4612
OLDPS2      002700        #61-3582   *78-4219    78-4222   *88-4491    88-4518
OUTORG      004762         75-3968   #75-4033
OUTRAN      006255         77-4155   #77-4205
PASCNT      002556        #61-3539
PASNUM      041617       #142-6273   146-6416
PATCHS      011220        #86-4396
PATRNS      007202        #83-4305    94-4807   115-5591   117-5685
PFECH       033516        136-5928  #136-5928
PFECH1      033526        136-5928  #136-5928
PFECH2      033562        136-5928  #136-5928
PFECH3      033612        136-5928  #136-5928
PFECH4      033622        136-5928  #136-5928
PIRO      = 177772        #43-3049
PIRQVE    = 000240        #43-3049
PNTPRI      006560         76-4073   #80-4245   139-5966   140-6103
PREOP       026010        *87-4407  *121-5859   121-5868  *121-5870  #121-5891   122-5902  *122-5902
PROMPT      034244       #139-5941   139-5980   139-5986   139-5995   140-6037   140-6170   141-6190
PROUT       005107         75-3982   #75-4036
PRO       = 000000        #43-3049
PR1       = 000040        #43-3049
PR2       = 000100        #43-3049
PR3       = 000140        #43-3049
PR4       = 000200        #43-3049
PR5       = 000240        #43-3049
PR6       = 000300        #43-3049
PR7       = 000340        #43-3049
PS        = 177776        #43-3049    43-3049
PSTATE      006536        #79-4232   140-6082   140-6126   140-6149
PSW       = 177776        #43-3049   *70-3817   *75-3940   *75-3945   *75-3991   *78-4215  *101-5028  *103-5105   103-5127
                         *104-5154  *105-5213  *106-5259  *108-5375  *109-5411  *110-5450  *115-5596  *116-5653  *117-5690
                         *118-5751  *119-5792  *120-5834
PWRVEC    = 000024        #43-3049   *81-4264   *81-4264  *138-5932  *138-5932  *138-5932  *138-5932
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                                                                         M 14
CZDRLD      CREATED BY  MACRO  ON 2-NOV-81 AT 16:13       PAGE 12
                                                       SEQUENCE  181
SYMBOL CROSS REFERENCE                                      CREF   V01
SYMBOL  VALUE       REFERENCES
QTYBRD    002414    #61-3510   65-3687   65-3689  *75-3999   76-4050  *77-4114   77-4121  *77-4129  *87-4430
                    *87-4434  121-5861  121-5887  122-5902  122-5904  139-5950  140-6003 *140-6023
RA      = 002416    #65-3695   65-3696  *65-3696  *65-3697
RBAR      002566    #61-3544  *68-3760   68-3770  *92-4719   92-4720  *92-4727   92-4728  *92-4752  *93-4781
                    *94-4840   94-4843  *94-4848   94-4849 *107-5339  107-5342 *114-5576  114-5577  114-5579
                   *115-5620  115-5626 *117-5719  117-5720  145-6383  145-6390  145-6393  145-6398  145-6407
RBDR      002564    #61-3543  *92-4734   92-4735  *92-4740   92-4741  *92-4763  *93-4792  *94-4811   94-4812
                    *94-4818   94-4819 *100-5005  100-5006 *100-5013  100-5014 *115-5622  115-5628 *116-5671
                    116-5672 *119-5810  119-5811  145-6384  145-6391  145-6407
RCSR      002560    #61-3541  *68-3754   68-3755   68-3763   68-3768  *73-3887   73-3888   73-3891  *75-4012
                     75-4013  *75-4016   75-4019  *91-4656   91-4657  *91-4664   91-4666   91-4675  *92-4717
                    *92-4725  *92-4756   92-4759  *93-4785   93-4788  *95-4869   95-4870   95-4872  *96-4893
                     96-4894  *96-4899   96-4900   96-4904  *96-4909   96-4910   96-4912  *97-4925   97-4926
                    *97-4933   97-4934  *98-4950   98-4951  *98-4958   98-4959  *99-4975   99-4976  *99-4983
                     99-4984 *101-5029  101-5030 *101-5043 *102-5060  102-5061 *102-5081 *103-5106  103-5109
                   *104-5162 *104-5169  104-5171 *104-5185 *104-5192  104-5194 *105-5219 *105-5228  105-5229
                    105-5233 *106-5267 *107-5318 *107-5334  107-5335 *107-5353 *108-5381 *109-5420 *109-5427
                    109-5428  109-5432 *110-5457 *110-5463  110-5464  110-5468 *113-5531  113-5532 *113-5539
                    113-5541  113-5552 *114-5572 *115-5610 *116-5661 *117-5704 *118-5759 *119-5800 *120-5842
                    145-6385  145-6386  145-6388  145-6392  145-6398  145-6402  145-6403  145-6404  145-6405
RDCHR   = 104410     63-3626  129-5915 #132-5921
RDDEC   = 104413   #132-5921
RDLIN   = 104411    130-5917  131-5919 #132-5921
RDOCT   = 104412   #132-5921
RDYCHK    002632    #61-3563
READ      002722    #63-3620   75-3963   75-3977   77-4126   77-4148  139-5944  140-6008  140-6030  140-6060
                    140-6085  140-6106  140-6129  140-6152
REGADR    002416    #61-3512   65-3695  *75-4025  *75-4026   76-4046   87-4438   88-4554  139-5953  139-5983
                    139-5996  140-6025 *140-6053  141-6183
REINIT    012556    #88-4568  122-5906
REIR      002562    #61-3542  *75-4001   75-4005   75-4009  *95-4876   95-4877   95-4879 *111-5483  111-5485
                    111-5497  145-6387  145-6401
RESVEC  = 000010    #43-3049
RSTRT     026364    122-5905 #122-5907
RWCR      002570    #61-3545  *68-3766  *92-4704   92-4705  *92-4710   92-4711  *92-4749  *93-4778  *94-4826
                     94-4827  *94-4833   94-4834 *107-5344 *115-5624  115-5630 *117-5715  145-6382  145-6389
                    145-6393  145-6398  145-6406  145-6407
RY      = 000200    #44-3063   68-3765   73-3890   73-3892   73-3894   91-4645   92-4757   93-4786   96-4894
                     96-4896  101-5032  102-5063  102-5065  103-5107  103-5112  109-5430  109-5433  110-5466
                    110-5469  113-5532  113-5534
R6      =%000006    #43-3049  *81-4264  *81-4264   81-4264
R7      =%000007    #43-3049
SCOPE . = 000004    #43-3049   89-4593   90-4622   91-4643   92-4699   93-4771   94-4804   95-4864   96-4888
                     97-4922   98-4947   99-4972  100-4999  101-5025  102-5058  103-5092  104-5148  105-5203
                    106-5245  107-5287  108-5360  109-5402  110-5441  111-5478  113-5522  114-5568  115-5588
                    116-5641  117-5682  118-5738  119-5778  120-5820  121-5858  122-5902
SDADRS    040306    140-6024 #142-6256
SDRINV    002532    #61-3526 *101-5035  101-5044  101-5050 *102-5067  102-5077  102-5083 *103-5115  103-5125
                    103-5136 *104-5150  104-5160  104-5167 *104-5174  104-5183  104-5190 *105-5208  105-5220
                    105-5226 *106-5255  106-5265  106-5272 *107-5298  107-5306  107-5316 *107-5325  107-5332
                    107-5351 *108-5371  108-5382  108-5388 *109-5407  109-5418  109-5425 *110-5445  110-5455
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SYMBOL   VALUE          REFERENCES
                          117-5711  *118-5747   118-5757   118-5765  *119-5788   119-5798   119-5806  *120-5830   120-5840
                          120-5848
SDRVS     002534         #61-3527   *101-5036   101-5045   101-5051  *102-5068   102-5078   102-5084  *103-5116   103-5126
                          103-5137  *104-5151   104-5161   104-5168  *104-5175   104-5184   104-5191  *105-5209   105-5221
                          105-5227  *106-5256   106-5266   106-5273  *107-5299   107-5307   107-5317  *107-5326   107-5333
                          107-5352  *108-5372   108-5383   108-5389  *109-5408   109-5419   109-5426  *110-5446   110-5456
                          110-5462  *115-5593   115-5609   115-5617  *116-5650   116-5660   116-5668  *117-5687   117-5703
                          117-5712  *118-5748   118-5758   118-5766  *119-5789   119-5799   119-5807  *120-5831   120-5841
                          120-5849
SETTUP    006610         #81-4263     87-4417   139-5939
SPACEC    037400          140-6005   140-6027   140-6058   140-6083   140-6104   140-6127   140-6150  #142-6237
SPACES    037352          133-5924   133-5924   133-5924   136-5928  #142-6233
SPACE3    037355          139-5952  #142-6234
SPACE6    037361          76-4058     76-4061   139-5955  #142-6235
SPACE7    037370          76-4065     76-4072   76-4074     76-4080    139-5959   139-5965   139-5967   139-5973  #142-6236
STACK   = 001300         #43-3049     81-4264   87-4416    138-5932   139-5938
STAD      006142          77-4145    #77-4203
STAGIN    000210         #48-3165
START     011424          48-3172    #87-4406   139-5991
START1    011420          48-3163    #87-4405   88-4545    138-5932   146-6422
STKIFL    036120          133-5924  #142-6213
STKLMT  = 177774         #43-3049
SVADRS    040252          140-6054  #142-6255
SWR       001340         #52-3178     75-3959   77-4112     77-4166    77-4184    77-4191    81-4264   *81-4264    81-4264
                         *81-4264    *81-4264   89-4593     90-4622    91-4643    92-4699    92-4714    92-4731    92-4744
                          93-4771     94-4804   94-4822     94-4837    94-4852    95-4864    96-4888    97-4922    98-4947
                          99-4972    100-4999   101-5025   102-5058   103-5092   104-5148   105-5203   106-5245   107-5287
                          108-5360   109-5402   110-5441   111-5478   111-5504   113-5522   114-5568   115-5588   116-5641
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                          133-5924   133-5924   133-5924   133-5924   135-5926   135-5926   135-5926   135-5926   136-5928
SWREG     000176         #48-3157     81-4264   127-5915   127-5915
SW0     = 000001         #43-3049
SW00    = 000001         #43-3049     43-3049
SW01    = 000002         #43-3049     43-3049
SW02    = 000004         #43-3049     43-3049
SW03    = 000010         #43-3049     43-3049
SW04    = 000020         #43-3049     43-3049
SW05    = 000040         #43-3049     43-3049
SW06    = 000100         #43-3049     43-3049
SW07    = 000200         #43-3049     43-3049
SW08    = 000400         #43-3049     43-3049
SW09    = 001000         #43-3049     43-3049
SW1     = 000002         #43-3049
SW10    = 002000         #43-3049
SW11    = 004000         #43-3049
SW12    = 010000         #43-3049
SW13    = 020000         #43-3049
SW14    = 040000         #43-3049
SW15    = 100000         #43-3049
SW2     = 000004         #43-3049
SW3     = 000010         #43-3049
SW4     = 000020         #43-3049
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SYMBOL   VALUE          REFERENCES
SW5      = 000040       #43-3049
SW6      = 000100       #43-3049
SW7      = 000200       #43-3049
SW8      = 000400       #43-3049
SW9      = 001000       #43-3049
TABINX     002546       #61-3535    *88-4535    *88-4547     88-4552    *88-4553
TBITVE   = 000014       #43-3049
TIME       002660       #61-3574    *75-3935    *75-3943   *101-5039   *101-5041   *102-5071   *102-5074   *103-5120   *103-5122
                       *104-5155   *104-5158   *104-5179   *104-5181   *105-5215   *105-5217   *106-5262   *106-5263   *107-5289
                       *107-5304   *107-5322   *107-5330   *108-5377   *108-5379   *109-5415   *109-5416   *110-5449   *110-5453
                       *115-5605   *115-5606   *116-5656   *116-5657   *117-5699   *117-5700   *118-5754   *118-5755   *119-5795
                       *119-5796   *120-5837   *120-5838   *141-6204   *141-6206   *141-6210
TKB        002636       #61-3565    141-6210
TKS        002634       #61-3564
TKVEC    = 000060       #43-3049
TMOPSW   = 000006       #47-3141     77-4108    *77-4109    *77-4196    *87-4415     88-4462    *88-4463    *88-4522
TORNCB     040051       140-6123   #142-6252
TOVECT   = 000004       #47-3140     77-4106    *77-4107    *77-4197     87-4414    *87-4414     88-4460    *88-4461    *88-4468
                        *88-4488    *88-4513    *88-4523
TPB        002642       #61-3567
TPS        002640       #61-3566
TPVEC    = 000064       #43-3049
TRAPVE   = 000034       #43-3049    *81-4264    *81-4264
TRTVEC   = 000014       #43-3049
TSNUMB     041576      #142-6272    146-6412
TSTCOM     040341       121-5875   #142-6257
TSTDEV     012370       #88-4534     88-4549    121-5890
TSTMM      007066       #82-4274     91-4684
TST1       012606        88-4572    #89-4593    134-5924
TST10      015112        95-4866     95-4878    #96-4888    134-5924
TST11      015346        96-4890    #97-4922    134-5924
TST12      015532        97-4938    #98-4947    134-5924
TST13      015716        98-4963    #99-4972    134-5924
TST14      016102        99-4988   #100-4999    134-5924
TST15      016272       100-5001   #101-5025    134-5924
TST16      016524       101-5048   #102-5058    134-5924
TST17      016762       102-5079   #103-5092    134-5924
TST2       013004       #90-4622    134-5924
TST20      017360       103-5133    103-5140   #104-5148    134-5924
TST21      017764       104-5165    104-5188    104-5193   #105-5203    134-5924
TST22      020300       105-5224   #106-5245    134-5924
TST23      020576      #107-5287    134-5924
TST24      021334       107-5320    107-5349   #108-5360    134-5924
TST25      021636      #109-5402    134-5924
TST26      022126       109-5423    109-5431   #110-5441    134-5924
TST27      022404       110-5459    110-5467   #111-5478    134-5924
TST3       013134        90-4634    #91-4643    134-5924
TST30      022622       112-5513   #113-5522    134-5924
TST31      023110      #114-5568    134-5924
TST32      023240       114-5578   #115-5588    134-5924
TST33      023620      #116-5641    134-5924
TST34      024124       116-5665    116-5673   #117-5682    134-5924
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TST37      025320     119-5804  119-5812 #120-5820  134-5924
TST4       013466     #92-4699  134-5924
TST40    = 025622     #47-3143  120-5846
TST5       014172      92-4764  #93-4771  134-5924
TST6       014366      93-4793  #94-4804  134-5924
TST7       014734     #95-4864  134-5924
TWO        037420      76-4079  139-5970 #142-6242
TYPCNF     005142     #76-4044   77-4198
TYPDE    = 104414     121-5878  122-5902 #132-5922  133-5924  146-6419
TYPDS    = 104405      76-4051   76-4057  121-5874  121-5883  122-5902 #132-5921  133-5924  133-5924  139-5951
                      140-6004  141-6200
TYPE     = 104401      63-3630   63-3634   63-3637   63-3657   75-3961   75-3968   75-3972   75-3975   75-3982
                       76-4049   76-4052   76-4058   76-4061   76-4065   76-4069   76-4071   76-4072   76-4074
                       76-4077   76-4079   76-4080   76-4083   76-4085   76-4086   76-4093   77-4123   77-4140
                       77-4145   77-4155   77-4160   77-4172   88-4524   88-4528   88-4542   89-4593   90-4622
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TYPOC    = 104402      76-4060   88-4527  127-5915 #132-5921  136-5928  136-5928  139-5954  140-6026  146-6411
TYPON    = 104404    #132-5921
TYPOS    = 104403      76-4063   77-4142   79-4236   80-4252 #132-5921  139-5957  140-6056  146-6414
UBHANG     056016      88-4526 #146-6409
UCAL       037511     141-6201 #142-6247
VA       = 002456     #65-3698   65-3699  *65-3699  *65-3700
VCLCHR     037003     140-6076 #142-6223
VECADR     002456     #61-3513   65-3698   76-4047   77-4119   77-4138   87-4445   88-4561  139-5956  139-5987
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VECERR     036617     140-6072 #142-6221
W          037407      76-4071  139-5964 #142-6239
WCLEN      002630     #61-3562 *106-5248 *106-5249  106-5252 *107-5291 *107-5292  107-5295  107-5323 *108-5364
                     *108-5365  108-5368 *116-5645  116-5646 *118-5742 *118-5743  118-5744 *119-5783 *119-5784
                      119-5785 *120-5825 *120-5826  120-5827
WCR        002516     #61-3520   68-3766   88-4555   89-4596   89-4597   91-4661   92-4703   92-4704   92-4709
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XCHKBU     043646      61-3558 #142-6280
XINBUF     042644      61-3557 #142-6278
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X7       = 000040     #44-3061   82-4280   82-4282   91-4672  109-5413  113-5549
YES        037414      76-4083  139-5976 #142-6241
$APTHD     001000      49-3176  #49-3176
$ASTAT   = ******     137-5930  137-5930
$ATYC      033652     137-5930 #137-5930
$ATY1      033626    #137-5930
$ATY3      033634     123-5909 #137-5930
$ATY4      033644     135-5926 #137-5930
$AUTOB     001334     #52-3178  127-5915  129-5915  129-5915
$BASE      001464     #52-3178   87-4439
$BDADR     001322     #52-3178
$BDDAT     001326     #52-3178
$BELL      001400     #52-3178  135-5926  135-5926  135-5926
$CDW1      001470     #52-3178
$CDW2      001472     #52-3178
$CHARC     026736    *123-5909 *123-5909  123-5909 *123-5909 #123-5909
$CKSWR     027764    #127-5915  132-5921  132-5921
$CMTAG     001300     #52-3178   81-4264   81-4264   81-4264   81-4264   81-4264   81-4264
$CM3     = 000000     #52-3178   52-3178
$CM4     = 000007     #52-3178   52-3178   52-3178  #52-3178   52-3178   52-3178  #52-3178   52-3178   52-3178
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$CNTLU     030537     127-5915 #129-5915
$CPUOP     001436     #52-3178
$CRLF      001405     #52-3178   63-3657   76-4086   76-4093  121-5872  121-5885  122-5902  123-5909  123-5909
                      123-5909  127-5915  129-5915  129-5915  130-5917  130-5917  131-5919  131-5919  133-5924
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$DBLK      027504     125-5913  125-5913 *125-5913 *125-5913 *125-5913 #125-5913  126-5913  126-5913  126-5913
                      126-5913  126-5913
$DDW0      001474     #52-3178   65-3701  *65-3701   76-4066   77-4118   77-4130   77-4137   88-4565  139-5949
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                      140-6147 *140-6168 *140-6169
$DDW1      001476     #52-3178
$DDW10     001520     #52-3178
$DDW11     001522     #52-3178
$DDW12     001524     #52-3178
$DDW13     001526     #52-3178
$DDW14     001530     #52-3178
$DDW15     001532     #52-3178
$DDW2      001500     #52-3178
$DDW3      001502     #52-3178
$DDW4      001504     #52-3178
$DDW5      001506     #52-3178
$DDW6      001510     #52-3178
$DDW7      001512     #52-3178
$DDW8      001514     #52-3178
$DDW9      001516     #52-3178
$DEVCT     001420     *48-3168  #52-3178  *87-4412  *87-4419 *121-5886  121-5887 *122-5903
$DEVM      001466     #52-3178  *65-3684  *65-3686  *65-3694  *75-3998   76-4045  *77-4115  *77-4135   87-4431
                       88-4534  141-6185
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                                                   SEQUENCE  186
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$DOAGN     026334        122-5902   122-5902  #122-5902
$DTBL      027474        125-5913  #125-5913
$ENDAD     026324         49-3175  #122-5902   135-5926
$ENDCT     026102         81-4264  #122-5902
$ENULL     026340       #122-5902
$ENV       001430        #52-3178    75-3957    77-4110    77-4164    77-4182    77-4189    87-4422   123-5909   135-5926
                         137-5930   137-5930
$ENVM      001431        #52-3178    81-4264    87-4424   123-5909   123-5909   137-5930
$EOP       026046        121-5888  #122-5902
$EOPCT     026074        *81-4264  #122-5902   122-5902
$ERFLG     001303        #52-3178   133-5924  *133-5924   133-5924   133-5924  *135-5926   135-5926   135-5926
$ERMAX     001315        #52-3178   *81-4264  *133-5924   133-5924   133-5924
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$ETEND     001534         49-3176   #52-3178
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$FFLG      034072       *137-5930  *137-5930   137-5930  *137-5930  #137-5930
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$FILLS     001355        #52-3178   123-5909   123-5909
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$GDDAT     001324        #52-3178
$GET       026310        122-5902  #122-5902
$GET42     026314        122-5902   122-5902  #122-5902
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$INTAG     001335        #52-3178   127-5915   129-5915   129-5915
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                        *107-5287  *108-5360  *109-5402  *110-5441  *111-5478  *113-5522  *114-5568  *115-5588  *116-5641
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$MAMS3   001450       #52-3178
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$MSGLG   001426       #52-3178  *137-5930
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$MTYP2   001445       #52-3178
$MTYP3   001451       #52-3178
$MTYP4   001455       #52-3178
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$TYPON      027002       124-5911  #124-5911   132-5921
$TYPOS      026742      #124-5911   132-5921
$UNIT       001422       *48-3167   #52-3178    64-3670   *87-4413   *87-4418   *88-4548   121-5874  *121-5889  *122-5907
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MSG10           #91-4693     92-4699
MSG25           #94-4858    #95-4864
MSG26           #95-4882    #96-4888
MSG3            #89-4616     90-4622
MSG32           #93-4795    #94-4804
MSG340          #96-4917    #97-4922
MSG341          #97-4942    #98-4947
MSG342          #98-4967     99-4972
MSG4            #92-4766    #93-4771
MSG40           #99-4992    #100-4999
MSG43           #100-5019   #101-5025
MSG44           #101-5052   #102-5058
MSG450          #102-5086    103-5092
MSG46           #103-5142    104-5148
MSG47           #104-5197    105-5203
MSG50           #105-5240   #106-5245
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MSG52           #107-5355   #108-5360
MSG53           #108-5396    109-5402
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MSG55           #114-5582   #115-5588
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MSG60           #117-5733    118-5738
MSG61           #118-5773   #119-5778
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MSG710          #90-4636     91-4643
MULT            #43-3049
NEWTST          #32-1239    #43-3049    #88-4593    #89-4622    #90-4643    #91-4699    #92-4771    #93-4804    #94-4864    #95-4888
                #96-4922    #97-4947    #98-4972    #99-4999    #100-5025   #101-5058   #102-5092   #103-5148   #104-5203   #105-5245
                #106-5287   #107-5360   #108-5402   #109-5441   #110-5478   #112-5522   #113-5568   #114-5588   #115-5641   #116-5682
                #117-5738   #118-5778   #119-5820
POP             #41-3027    #43-3049    #125-5913   #130-5917   #131-5919   #137-5930   #137-5930
PUSH            #41-3027    #43-3049    #125-5913   #130-5917   #131-5919   #137-5930   #137-5930   #137-5930
REPORT          #43-3049
SETPRI          #43-3049
SETTRA          #132-5921    132-5921    132-5921    132-5921    132-5921    132-5921    132-5921    132-5921    132-5921    132-5921
                 132-5921    132-5921    132-5922
SETUP           #41-3027    #43-3049    #81-4264
SKIP            #41-3014    #43-3049     90-4634     92-4764     93-4793     95-4866     95-4878     96-4890     97-4938     98-4963
                 99-4988     100-5001    101-5048    102-5079    103-5133    103-5140    104-5165    104-5188    104-5193    105-5224
                 107-5320    107-5349    109-5423    109-5431    110-5459    110-5467    112-5513    114-5578    116-5665    116-5673
                 118-5763    119-5804    119-5812    120-5846
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CZDRLD     CREATED BY  MACRO  ON 2-NOV-81 AT 16:13      PAGE 23
                                                  SEQUENCE  192
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                #48-3158   #48-3162   #49-3175   #49-3176   #49-3176   #49-3176   #52-3178   #52-3178   #52-3178   #61-3504
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                #65-3677   #65-3683   #66-3707   #66-3712   #67-3723   #67-3728   #68-3739   #68-3749   #69-3775   #69-3789
                #70-3811   #70-3816   #71-3822   #71-3828   #72-3835   #72-3847   #73-3876   #73-3885   #74-3899   #74-3904
                #75-3923   #75-3931   #75-3950   #75-3956   #76-4039   #76-4043   #77-4096   #77-4104   #78-4210   #78-4214
                #79-4226   #79-4231   #80-4240   #80-4244   #81-4256   #81-4262   #82-4268   #82-4273   #83-4297   #83-4302
                #84-4314   #84-4319   #86-4390   #86-4395   #87-4399   #87-4403   #88-4573   #88-4578   #88-4581   #88-4585
                #89-4593   #89-4593   #90-4622   #90-4622   #91-4643   #91-4643   #92-4699   #92-4699   #93-4771   #93-4771
                #94-4804   #94-4804   #95-4864   #95-4864   #96-4888   #96-4888   #97-4922   #97-4922   #98-4947   #98-4947
                #99-4972   #99-4972   #100-4999  #100-4999  #101-5025  #101-5025  #102-5058  #102-5058  #103-5092  #103-5092
                #104-5148  #104-5148  #105-5203  #105-5203  #106-5245  #106-5245  #107-5287  #107-5287  #108-5360  #108-5360
                #109-5402  #109-5402  #110-5441  #110-5441  #111-5478  #111-5478  #113-5522  #113-5522  #114-5568  #114-5568
                #115-5588  #115-5588  #116-5641  #116-5641  #117-5682  #117-5682  #118-5738  #118-5738  #119-5778  #119-5778
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                #127-5915  #129-5915  #130-5917  #131-5919  #132-5921  #133-5924  #135-5926  #136-5928  #137-5930  #138-5932
                #139-5935  #139-5937  #141-6172  #141-6174
SWRSU           #43-3049   #81-4264   #81-4264
TRACK           #41-3010   #89-4593   #90-4622   #91-4643   #92-4699   #95-4864   #96-4888   #97-4922   #98-4947   #99-4972
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TRMTRP          #132-5921
TYPBIN          #43-3049
TYPDEC          #43-3049    121-5874   122-5902
TYPNAM          #43-3049
TYPNUM          #43-3049
TYPOCS          #43-3049
TYPOCT          #43-3049    127-5915   136-5928
TYPTXT          #32-1009   #43-3049    122-5902   122-5902
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$$CMTM          #51-3178    52-3178    52-3178    52-3178    52-3178    52-3178    52-3178    52-3178
$$ESCA          #43-3049
$$NEWT          #32-1271   #43-3049   #88-4593   #89-4622   #90-4643   #91-4699   #92-4771   #93-4804   #94-4864   #95-4888
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                #117-5738  #118-5778  #119-5820
$$SET           #132-5921  #132-5921  #132-5921  #132-5921  #132-5921  #132-5921  #132-5921  #132-5921  #132-5921  #132-5921
                #132-5921  #132-5921  #132-5922
$$SETM          #81-4264   #81-4264
$$SKIP          #41-3017   #43-3049    90-4634    92-4764    93-4793    95-4866    95-4878    96-4890    97-4938    98-4963
                 99-4988    100-5001   101-5048   102-5079   103-5133   103-5140   104-5165   104-5188   104-5193   105-5224
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                 118-5763   119-5804   119-5812   120-5846
.EQUAT          #41-3027    43-3049
.EQUIV          #41-3004   #41-3029   #43-3049   #43-3049   #43-3049   #43-3049   #43-3049   #43-3049   #43-3049   #43-3049
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.SETUP          #41-3027    48-3152
.SWRHI          #41-3028   #42-3034
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.$APTH            #41-3028      49-3176
.$APTY            #41-3028     137-5930
.$CMTA            #41-3028    #50-3178
.$EOP             #32-1016     122-5902
.$ERRO            #32-1679     135-5926
.$ERRT            #33-1880     136-5928
.$POWE            #41-2983    #138-5932
.$RDDE            #40-2910     130-5917
.$RDOC            #39-2830     131-5919
.$READ            #38-2432    #127-5915
.$SCOP            #32-1334    #133-5924
.$TRAP            #41-3027    #132-5921
.$TYPB            #37-2345
.$TYPD            #36-2202     125-5913
.$TYPE            #34-1986    #123-5909
.$TYPO            #35-2113    #124-5911
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