DL11-C,D,E

OFF LINE TEST

MD-11-DZDLC-A

EP DZDLC A DL A

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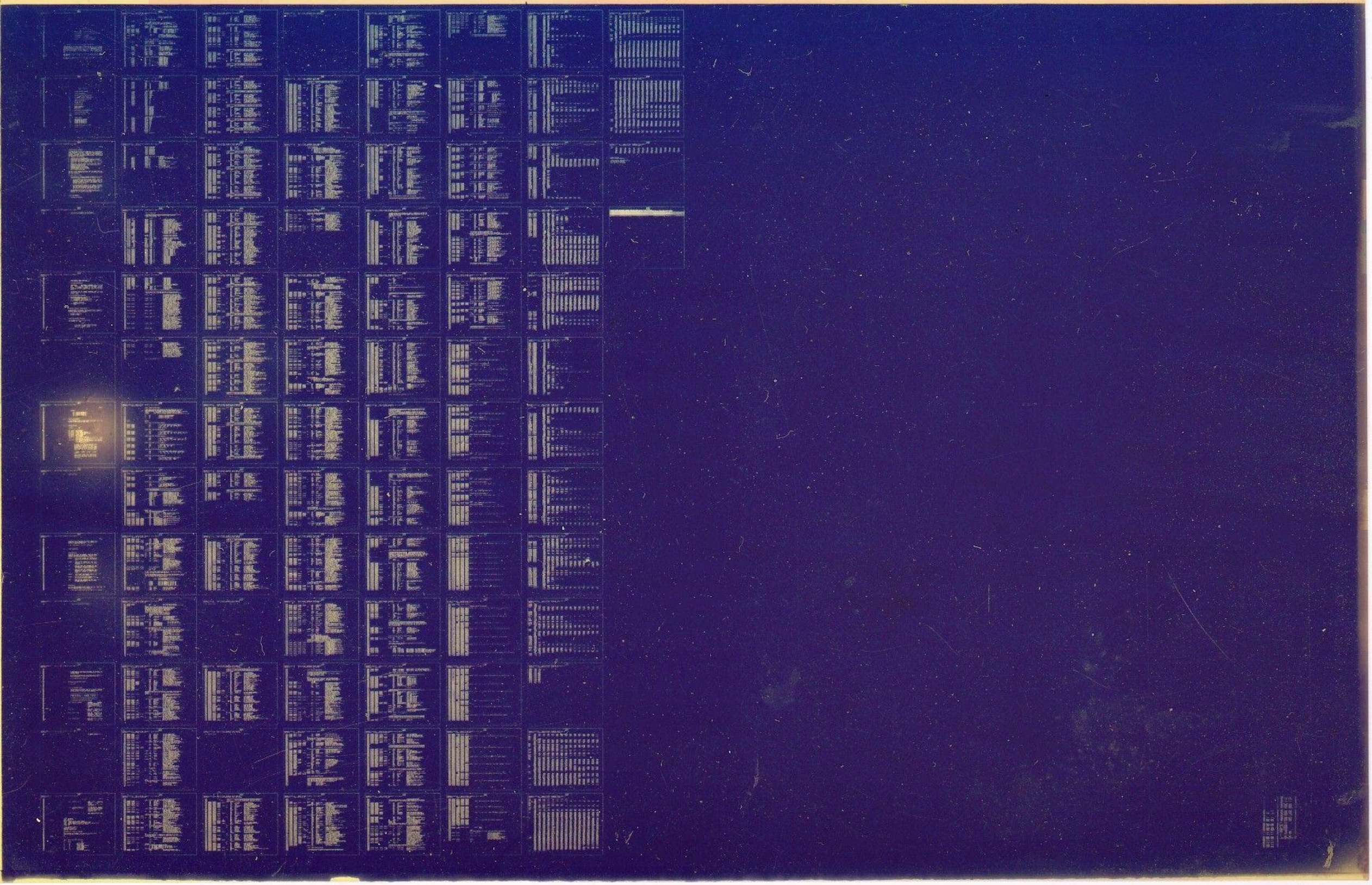
MADE IN USA



.REM *

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDLC-A-D
PRODUCT NAME: DL11-C,-D, OR -E OFF LINE TEST
DATE CREATED: JULY 1975
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: E. CROWLEY/B. BURGESS

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1.0 PROGRAM PURPOSE (ABSTRACT)

THIS PROGRAM HAS THE ABILITY TO TEST THE DL11 (ASYNCHRONOUS MODEM INTERFACE), OFF LINE. MODELS ABLE TO BE TESTED ARE C, D, AND E ONLY. THE USE OF A MODEM IS NOT REQUIRED FOR TESTING; HOWEVER, A SPECIAL CABLE CONNECTOR BCO5C AND A SPECIAL MODEM TEST CONNECTOR H315A IS REQUIRED. THIS PROGRAM IS CAPABLE OF THE FOLLOWING:

A. VERIFICATION OF MAINTENANCE BIT
B. VERIFICATION THAT TRANSMITTER CAN CAUSE AN INTERRUPT
C. VERIFICATION THAT RECEIVER 'DONE' CAN CAUSE AN INTERRUPT
D. CHECKS THAT 'REQ TO SEND' ASSERTS 'RING'
E. CHECKS THAT 'SEC XMIT' ASSERTS 'SEC REC' AND 'DATA SET INT'
F. CHECKS THAT 'DTR' CAN ASSERT 'CLR TO SEND' AND 'CAR DET'
G. VERIFIES THAT 'DATA SET I.E.' CAN CAUSE A RECVR INTR
H. CHECKS THE 'BREAK' FEATURE
I. PERFORMS NULL-DEL-NULL PATTERN
J. PERFORMS BINARY UP COUNT PATTERN
K. PERFORMS BINARY DOWN COUNT PATTERN
L. RUNS A WORSE CASE PATTERN

INCLUDED IN THE PROGRAM ARE SPECIAL USER ROUTINES - PRG #2, PRG #3, PRG #4, AND PRG #5 (WHICH WILL BE DESCRIBED FURTHER INTO THIS DOCUMENT).

NOTE WELL TWO(2) POINTS:

1. THIS PROGRAM IS CAPABLE OF TESTING SIXTEEN(16) DL11'S AND ASSUMES CONTIGUOUS ADDRESSING FROM 1ST DEVICE TO LAST.

   A. IF MULTIPLE DEVICES ARE NOT BEING TESTED, THUS NOT REQUIRING A PASS THRU THE PROGRAM ONCE PER DEVICE, THEN THE PROGRAM WILL DEFAULT TO TESTING THE 1ST POSSIBLE DL11-E DEVICE I.E., RCSR ADDRESS = 775610, AND TEST THIS DEVICE ONLY.

   B. IF MULTIPLE DEVICE TESTING IS NOT BEING CONDUCTED, AND THE DEVICE EXISTING IS NOT THE DEFAULT DL11-E, THEN THE USER ON STARTING THE PROGRAM WILL HAVE TO SET SW(0)=1 TO ENTER THE QUESTION & ANSWER MODE.

2. THIS PROGRAM HAS PROVISION FOR CHARACTER LENGTH I.E., IT ASSUMES DATA IS 8 BITS, BUT ALSO HAS THE ABILITY TO HANDLE 5, 6, OR 7 BITS OF DATA AS WELL.

2.0 SYSTEM REQUIREMENTS

A. HARDWARE REQUIREMENTS

```
;54                                     PDP-11 FAMILY PROCESSOR WITH 8K OF MEMORY
;55                                     M7800 DL11 ASYNCHRONOUS LINE INTERFACE MODULE
```

BC05C SPECIAL CABLE CONNECTOR
H315A SPECIAL MODEM TEST CONNECTOR

B. SOFTWARE REQUIREMENTS

THIS PROGRAM WAS SPECIFICALLY DESIGNED FOR THE 11/40 FRONT END OF THE 1080 CONSOLE PROCESSOR SYSTEM. IN THIS ENVIRONMENT IT WOULD BE LOADED BY THE TCDP (DECTAPE) DIAGNOSTIC MONITOR. HOWEVER, ANY 11/40 USER WITH 8K OF MEMORY CAN RUN THIS PROGRAM TO TEST ONE(1) OR MULTIPLE DL11'S.

THE PROGRAM HAS THE PROPER INTERFACE CODE TO ALLOW RUNNING UNDER THE AUTOMATED MANUFACTURING TEST LINE SYSTEM - ACT11.

3.0 RELATED DOCUMENTS AND STANDARDS

A. PROGRAMMING PRACTICES - DOCUMENT NO. 175-003-009-00
B. PDP11/40 PROCESSOR HANDBOOK
C. DL11 ASYNCHRONOUS LINE INTERFACE MANUAL
   DOCUMENT NO. DEC-11-HDLAA
D. PDP-11 MAINDEC SYSMAC* UTILITY PACKAGE
   -
   MAINDEC-11-DZQAC-A1
E. APPLICABLE CIRCUIT SCHEMATIC
   M7800

4.0 DIAGNOSTIC HIERARCHY PREREQUISITES

BEFORE RUNNING THIS PROGRAM, THE FOLLOWING TWO(2) DIAGNOSTIC PROGRAMS SHOULD BE RUN FOR VERIFICATION OF FUNCTIONALITY OF THE 11-INSTRUCTION SET AND MEMORY:

1. MAINDEC-11-DBQEA AND,
2. MAINDEC-11-DZQMC

5.0 LOADING AND STARTING PROCEDURE

LOAD PROGRAM IN MEMORY USING ABS LOADER
LOAD ADDRESS 200.

NOTE

IN THE CASE OF A 1080 SYSTEM ENVIRONMENT LOAD THE PROGRAM USING THE TCDP (DECTAPE) DIAGNOSTIC MONITOR.

PRESS START.

```
212
213                                 A.  THERE ARE ALSO THREE(3) OPTIONAL START ADDRESSES FOR THE
```

PROGRAM:

204 - SELECTS PROGRAM #2
210 - SELECTS PROGRAM #3
214 - SELECTS PROGRAM #4
220 - SELECTS PROGRAM #5

6.0 SPECIAL ENVIRONMENTS

IF THIS PROGRAM IS RUN IN QUICK VERIFY MODE UNDER ACT11 THE PROGRAM IS DONE AFTER THE FIRST PASS.

7.0 PROGRAM OPTIONS

SWITCH	USE
15=1 OR UP	HALT ON ERROR
14=1 OR UP	LOOP ON TEST
13=1 OR UP	INHIBIT ERROR TYPEOUTS
12=1 OR UP	/C OR /D MODEL BEING TESTED
11=1 OR UP	INHIBIT ITERATIONS
10=1 OR UP	BELL ON ERROR
9=1 OR UP	LOOP ON ERROR
8=1 OR UP <7:0>	LOOP ON TEST IN SWR<7:0> HOLDS TEST NO. OF TEST TO BE LOOPED ON. USED IN CONJUNCTION WITH SW<8>.
0=1 OR UP	USED IN DEVICE TABLE CREATION (1 TO 16 DEVICES) I.E., DEFAULT DEVICE NOT DESIRED. ALSO USED FOR CHARACTER LENGTH SETTING. !! NOTE WELL !!

IF SW<08> IS SET THE USER CAN ONLY 'LOOP ON A TEST' OF THE DEFALLT DEVICE I.E. - DL11/E RCSR = 775610. IF THE USER DESIRES TO 'LOOP ON A TEST' OF OTHER THAN THE DEFAULT DEVICE HE MUST FIRST PATCH THE FIVE (5) LOCATIONS LABELED

DLRCSR: DLRDBR: DLXCSR: DLXDBR:
DLVECT:

THAT APPEAR UNDER 'DL11 DEFINITIONS' HEADING AT THE FRONT OF THE LISTING. I.E. - WITH SW<08> SET SW<00> IS NOT FUNCTIONAL.

```
270
271                             8.0     EXECUTION TIMES
```

EXECUTION TIME IS DEPENDENT ON TYPE OF MEMORY AND NUMBER OF DL11'S BEING TESTED. A REPRESENTATIVE TIME FOR 1 ERROR FREE PASS IS:

11/40 - CORE MEMORY - 1 DL11/E - 20 SECONDS

9.0 ERROR INFORMATION

9.1 ERROR REPORTING

THERE ARE A TOTAL OF SEVEN(7) TYPES OF ERROR REPORTS GENERATED BY THE PROGRAM. THE KEY COLUMN HEADINGS WILL BE DESCRIBED BELOW FOR CLARITY -

DEVADR - THIS IS THE ADDRESS OF THE RECEIVER CONTROL STATUS REGISTER FOR THE FAILING DL11

REGADR - THIS IS THE ADDRESS OF THE DL11 REGISTER ON WHICH TESTING IS BEING CONDUCTED

WAS - THIS IS WHAT THE CONTENTS OF THE REGISTER OF THE DL11 UNDERGOING TEST WAS (ADDRESS IS UNDER COLUMN '(R2)')

S/B - THIS IS WHAT THE CONTENTS OF THE REGISTER OF THE DL11 UNDERGOING TEST SHOULD BE (ADDRESS IS UNDER COLUMN '(R2)')

WASADR - THIS IS WHAT THE MEMORY ADDRESS WAS (INPUT DATA BUFFER ADDRESS)

SHBADR - THIS IS WHAT THE MEMORY ADDRESS SHOULD BE (OUTPUT DATA BUFFER ADDRESS)

(REG) - THIS IS THE CONTENTS OF THE DL11 RECEIVER DATA BUFFER IN ERROR (ADDRESS IS UNDER COLUMN '(R2)')

9.2 ERROR HALTS

WITH THE 'HALT ON ERROR' SWITCH (SW15) NOT SET THERE ARE FOUR(4) PROGRAMMED 'HALTS' IN THE PROGRAM:

A. IN THE CASE OF ERROR REPORTING AND THERE IS NO TERMINAL

328 TO ALLOW THE INFORMATION TRANSFER.

B. IN THE POWER FAIL ROUTINE IF THE POWER UP SEQUENCE WAS STARTED BEFORE THE POWER DOWN SEQUENCE HAD A CHANCE TO COMPLETE ITSLEF.

C. IN THE END OF PASS ROUTINE IF MULTIPLE DEVICE TESTING IS BEING CONDUCTED BUT NO DEVICES ARE SHOWN AS ACTIVE.

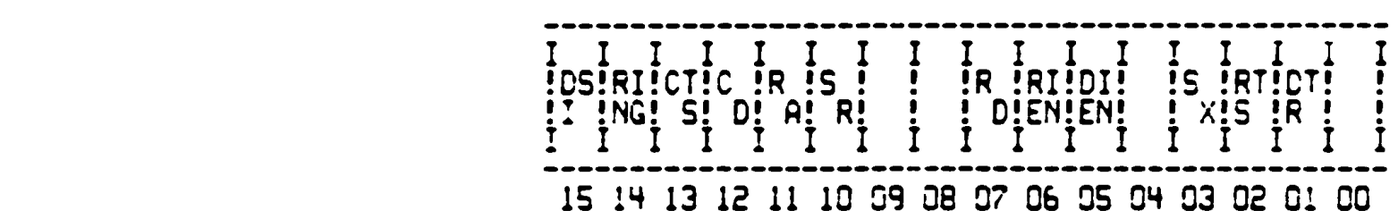
D. IN THE CASE OF SW<08> BEING SET.

10.0 PERFORMANCE AND PROGRESS REPORTS

NOT APPLICABLE.

11.0 DEVICE INFORMATION TABLES

A. THE FOLLOWING IS A PICTURE VIEW OF A DL11-E RECEIVER CONTROL STATUS REGISTER, WHICH WILL SHOW BIT ASSIGNMENTS AND DEFINITIONS, TO PROVIDE A HANDY REFERENCE:



BIT ASSIGNMENTS ARE DEFINED AS FOLLOWS:

BIT15	DATA SET INTERRUPT	1. INTERRUPT SEQUENCE INITIATED WHEN BIT05 SET. 2. SETS WHENEVER BITS 10, 11, 12 OR 14 CHANGE STATE 3. CLEARED BY INIT OR READING RCSR
BIT14	RING	1. WHEN SET, INDICATES A CONTROL SIGNAL BEING RECEIVED FROM DATASET.
BIT13	CLEAR TO SEND	1. WHEN SET INDICATES ON CONDITION; WHEN CLEAR INDICATES OFF CONDITION. 2. DEPENDENT ON STATE OF 'CTS' SIGNAL FROM DATASET
BIT12	CARRIER DETECT	1. SETS WHEN DATA CARRIER RECEIVED 2. WHEN CLEAR INDICATES END

```
   385                                                    OF CURRENT TRANSMISSION OR
   386                                                    AN ERROR CONDITION.
```

```
                                BIT11  RECEIVER ACTIVE          1. WHEN SET INDICATES
                                                                   RECEIVER INTERFACE IS
                                                                   ACTIVE.
                                                                2. CLEARED BY INIT OR RCVR
                                                                   DONE (BIT07).

                                BIT10  SECONDARY RECEIVE OR      1. PROVIDES RECEIVE CAPABIL-
                                       SUPERVISORY RECEIVED         ITY, WHEN SET, FOR REVERSE
                                       DATA                         CHANNEL OF REMOTE STATION.
                                                                    SETS WHEN BIT03 IS SET.
                                                                2. CLEARED BY INIT

                                BIT07  RECEIVER DONE             1. SETS WHEN CHARACTER HAS
                                                                    BEEN RECEIVED.  WILL INITI

                                                                %

                        .NLIST  CND,MD,MC
                        .LIST   ME,SEQ,BIN
167400                  $SWR=167400
                        .MCALL  .HEADER,.$CMTAG,.SETUP,.$ERROR
                        .MCALL  .SWRHI,.SWRLO,.$CATCH,.EQUATE,SETUP,.$EOP
                        .MCALL  .$SCOPE,.$ERRTYP,.$TYPOCT,.$TYPDEC,.$TYPE,.$POWER,.$TRAP
                        .MCALL  .$RDOCT,.$READ,PUSH,POP,STARS,.$RDDEC
                        .ENABLE ABS

                        .TITLE  MAINDEC-11-DZDLC-A
                        ;*COPYRIGHT (C) 1975
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY E. CROWLEY/B. BURGESS
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C2), SEPT 14, 1976.
                        ;*
000001                  $TN=1


                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            /C OR /D MODEL
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>
```

```
                                 ;*         0          CREATION OF DEVICE S TABLE
                                 ;*                    OR CHANGE CHARACTER LENGTH

                                 .SBTTL  TRAP CATCHER

         000000                       .=0
                                 ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                 ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                 ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
         000174                       .=174
000174   000000                  DISPREG: .WORD  0             ;;SOFTWARE DISPLAY REGISTER
000176   000000                  SWREG:   .WORD  0             ;;SOFTWARE SWITCH REGISTER
                                 .SBTTL  STARTING ADDRESS(ES)
000200   000137   001446              JMP     @#BEGIN ;;JUMP TO STARTING ADDRESS OF PROGRAM
[illegible]                           JMP     @#PRG2         ;JUMP TO USER PROGRAM NO. 2
[illegible]                           JMP     @#PRG3         ;JUMP TO USER PROGRAM NO. 3
[illegible]                           JMP     @#PRG4         ;JUMP TO USER PROGRAM NO. 4
[illegible]                           JMP     @#PRG5         ;JUMP TO USER PROGRAM NO. 5

         000052                       .=52          ;INFORMATION LOCATION FOR ACT11
000052   000000                       .WORD   0     ;NO POWER FAIL REQUIRED (BIT15=0)
                                                    ;IS NOT MEMORY SIZE DEPENDENT (BIT14=0)
                                                    ;IS SUITABLE FOR AUTOMATIC OPERATION (BIT13=0

                                 .SBTTL  BASIC DEFINITIONS

                                 ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
         001100                  STACK=  1100
                                 .EQUIV  EMT,ERROR        ;;BASIC DEFINITION OF ERROR CALL
                                 .EQUIV  IOT,SCOPE        ;;BASIC DEFINITION OF SCOPE CALL

                                 ;*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
                                 .EQUIV  PS,PSW
         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
PR0=        0           ;;PRIORITY LEVEL 0
PR1=        40          ;;PRIORITY LEVEL 1
PR2=        100         ;;PRIORITY LEVEL 2
PR3=        140         ;;PRIORITY LEVEL 3
PR4=        200         ;;PRIORITY LEVEL 4
PR5=        240         ;;PRIORITY LEVEL 5
PR6=        300         ;;PRIORITY LEVEL 6
PR7=        340         ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
SW15=       100000
SW14=       040000
SW13=       020000
SW12=       010000
SW11=       004000
SW10=       002000
SW09=       001000
SW08=       000400
SW07=       000200
SW06=       000100
SW05=       000040
SW04=       000020
SW03=       000010
SW02=       000004
SW01=       000002
SW00=       000001

                        ;*DATA BIT DEFINITIONS  BIT00 TO BIT15
BIT15=      100000
BIT14=      040000
BIT13=      020000
BIT12=      010000
BIT11=      004000
BIT10=      002000
BIT09=      001000
BIT08=      000400
BIT07=      000200
BIT06=      000100
BIT05=      000040
BIT04=      000020
BIT03=      000010
BIT02=      000004
BIT01=      000002
BIT00=      000001
BIT09,BIT8
```

D02


```
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*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
```

```
                                .SBTTL  COMMON TAGS

                                ;;**************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

001100                                  .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000          $PASS:  .WORD   0               ;;CONTAINS PASS COUNT
001102  000             $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103  000             $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000          $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000          $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000          $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000          $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114  000             $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115  001             $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000          $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000          $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000          $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000          $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000          $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                  .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                  .WORD   0
001134  000             $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001135  000             $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001136  000000                  .WORD   0
001140  177570          SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001142  177570          DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001144  177560          $TKS:   177560                  ;;TTY KBD STATUS
001146  177562          $TKB:   177562                  ;;TTY KBD BUFFER
001150  177564          $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566          $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000             $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002             $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012             $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000             $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG .BIT.07 =0=YES
001160  000000          $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001162  000000          $REG0:  .WORD   0               ;;CONTAINS ((($REGAD))+0)
001164  000000          $REG1:  .WORD   0               ;;CONTAINS ((($REGAD))+2)
001166  000000          $REG2:  .WORD   0               ;;CONTAINS ((($REGAD))+4)
001170  000000          $REG3:  .WORD   0               ;;CONTAINS ((($REGAD))+6)
001172  000000          $REG4:  .WORD   0               ;;CONTAINS ((($REGAD))+10)
001174  000000          $REG5:  .WORD   0               ;;CONTAINS ((($REGAD))+12)
001176  000000          $REG6:  .WORD   0               ;;CONTAINS ((($REGAD))+14)
001200  000000          $REG7:  .WORD   0               ;;CONTAINS ((($REGAD))+16)
001202  000000          $TMP0:  .WORD   0               ;;USER DEFINED
001204  000000          $TMP1:  .WORD   0               ;;USER DEFINED
001206  000000          $TMP2:  .WORD   0               ;;USER DEFINED
001210  000000          $TMP3:  .WORD   0               ;;USER DEFINED
001212  000000          $TMP4:  .WORD   0               ;;USER DEFINED
001214  000000          $TMP5:  .WORD   0               ;;USER DEFINED
001216  000000          $TMP6:  .WORD   0               ;;USER DEFINED
001220  000000          $TMP7:  .WORD   0               ;;USER DEFINED
001222  000000          $TMP10: .WORD   0               ;;USER DEFINED
```

```
  535  001224  000000                $TMP11: .WORD   0               ;;USER DEFINED
  536  001226  000000                $TMP12: .WORD   0               ;;USER DEFINED
  537  001230  000000                $TMP13: .WORD   0               ;;USER DEFINED
  538  001232  000000                $TMP14: .WORD   0               ;;USER DEFINED
  539  001234  000000                $TMP15: .WORD   0               ;;USER DEFINED
  540  001236  000000                $TMP16: .WORD   0               ;;USER DEFINED
  541  001240  000000                $TMP17: .WORD   0               ;;USER DEFINED
  542  001242  000000                $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
  543  001244  000000                $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
  544  001246  177607  000377        $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
  545  001252     077                $QUES:  .ASCII  /?/             ;;QUESTION MARK
  546  001253     015                $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
  547  001254  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
  548                                ;;**************************************************
  549
  550                                ;THE FOLLOWING TAG(S) ARE USER SUPPLIED BY CALLING THE MACRO
  551                                ;'MORETAGS' AS ONE OF THE ARGUMENTS TO THE SYSMAC ROUTINE .$CMTAG
  552
  553  001256  000000                TABFLG: .WORD   0                ;AN INDICATOR TO SHOW THAT THE
  554                                                                 ;INFORMATION FOR MULTIPLE DEVICE
  555                                                                 ;TESTING HAS ALREADY TRANSPIRED
  556                                                                 ;& 'MAINDEC' NAME HAS BEEN PRINTED
  557  001260  000000                DLBASE: .WORD   0                ;STORAGE & WORKING LOCATION FOR A DEVICE
  558                                                                 ;RECEIVER STATUS REGISTER ADDRESS
  559  001262  000000                KEEPAD: .WORD   0                ;STORAGE LOCATION FOR THE 1ST
  560                                                                 ;DEVICE RCSR FROM WHICH
  561                                                                 ;'BASEADD' IS RESTORED AT THE
  562                                                                 ;END OF A COMPLETE PROGRAM PASS.
  563  001264  000000                BASEADD:.WORD   0                ;STORAGE LOCATION WHICH HOLDS
  564                                                                 ;THE RCSR ADDRESS OF THE 'NEXT'
  565                                                                 ;DEVICE DURING MULTIPLE TESTING
  566  001266  000000                KEEPIV: .WORD   0                ;STORAGE LOCATION FOR THE 1ST
  567                                                                 ;DEVICE RECEIVER VECTOR FROM
  568                                                                 ;WHICH 'BASEIV' IS RESTORED AT THE
  569                                                                 ;END OF A COMPLETE PROGRAM PASS
  570  001270  000000                BASEIV: .WORD   0                ;STORAGE LOCATION WHICH HOLDS
  571                                                                 ;THE VECTOR ADDRESS OF THE 'NEXT'
  572                                                                 ;DEVICE DURING MULTIPLE TESTING
  573  001272  000000                MULTD:  .WORD   0                ;FLAG TO INDICATE TO 'END OF PASS'
  574                                                                 ;ROUTINE THAT MULTIPLE DEVICE
  575                                                                 ;TESTING IS BEING CONDUCTED
  576                                                                 ;0=NO, 1=YES
  577  001274  000000                ACTREG: .WORD   0                ;THIS IS THE DEVICE ACTIVE REGISTER
  578                                                                 ;A BIT IS SET (STARTING AT
  579                                                                 ;BIT0)FOR EACH CONTIGUOUS DEVICE
  580                                                                 ;(A MAX. OF 16) THAT IS TO UNDERGO
  581                                                                 ;TESTING.  THIS LOCATION IS
  582                                                                 ;AUTOMATICALLY FILLED BASED ON
  583                                                                 ;USER RESPONSE TO PROGRAM QUESTIONS
  584  001276  000000                ROTADD: .WORD   0                ;A ROTATING POINTER TO SIGNAL
  585                                                                 ;THE LAST DEVICE TESTED (IF
  586                                                                 ;MULTIPLE DEVICE TESTING WAS BEING
  587                                                                 ;DONE) IF LESS THAN A FULL COMPLE-
  588                                                                 ;MENT OF DEVICES (16)WAS SELECTED
  589  001300  000000                LASTADD:.WORD   0                ;STORAGE LOCATION FOR THE
  590                                                                 ;RCSR ADDRESS OF THE LAST DEVICE
```

```
                                                        ;TESTED (IF MULTIPLE DEVICE
                                                        ;TESTING WAS SELECTED BY USER)
001302  000000          DLPRI:  .WORD   0             ;STORAGE LOCATION FOR THE DEVICE
                                                        ;INTERRUPT PRIORITY LEVEL
001304  000000          LESS1:  .WORD   0             ;THE PRIORITY LEVEL THE CPU
                                                        ;MUST BE AT TO ALLOW DEVICE INTERRUPTS.
                                                        ;THIS WILL BE 1 LEVEL LESS THAN
                                                        ;THE DEVICE LEVEL (BASED ON &
                                                        ;CALCULATED FROM USER RESPONSE TO
                                                        ;DEVICE PRIORITY LEVEL QUESTION)
001306  177740          STLMSK: 177740                ;THIS MASK IS USED BY THE 'STALL'
                                                        ;ROUTINE WHICH WAITS A RANDOM NO.
                                                        ;OF MILLISECONDS.  ITS' USE PREVENTS
                                                        ;A STALL > 37 MSEC.  THIS LOCATION
                                                        ;HOWEVER, CAN BE PATCHED BY THE
                                                        ;USER TO ALLOW LARGER 'STALLS'.

                        ;END OF USER SUPPLIED TAGS.
```

```
                                .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


001310                          $ERRTB:

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 1

001310  015132                          EM1             ;"DL11 REGISTER REFERENCE CAUSED TIMEOUT"
001312  015201                          DH1             ;"  (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  "
001314  015260                          DT1             ; (R7)  (PSW)  (R6)  (R0)  (R1)  (R2)
001316  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 2

001320  015276                          EM2             ;" DL11 REGISTER ERROR "
001322  015322                          DH2             ;"  (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B  "
001324  015420                          DT2             ;" (R7)  (PSW)  (R6)  (R0)  (R1)  (R2)  (R3)  (R4)  "
001326  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 3

001330  015442                          EM3             ;" DL11 DATA COMPARE ERROR "
001332  015472                          DH3             ;" (PC)  (PS)  (SP)  TEST  WASADR  SHBADR  WAS  S/B  "
001334  015570                          DT3             ;"  (R7)  (PSW)  (R6)  (R0)  (R1)  (R2)  (R3)  (R4)  "
001336  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 4

001340  015612                          EM4             ;" UNEXPECTED TRAP TO VECTOR AT LOCATION XXX "
001342  015664                          DH4             ;"  (PC)  (PS)  (SP)  TEST  "
001344  015722                          DT4             ;" (R7)  (PSW)  (R6)  (R0)  "
001346  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 5

001350  015734                          EM5             ;" DL11 SOFT ERROR (PARITY,FRAMING, OR OVERRUN)
001352  016011                          DH5             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  (REG)  "
001354  016100                          DT5             ;"  (R7)  (PSW)  (R6)  (R0)  (R1)  (R2)  (R3)  "
001356  000000                          0

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 6

001360  015132                          EM1             ;"DL11 REGISTER REFERENCE CAUSED TIMEOUT"
001362  016120                          DH6             ;"  (PC)    (PS)    (SP)    REGADR"
001364  016160                          DT6             ;$ERRPC,$TMPO,$REG6,$REG2
```

```
001366  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 7

001370  015734                          EM5             ;" DL11 SOFT ERROR (PARITY,FRAMING, OR OVERRUN) "
001372  016172                          DH7             ;" (PC)  DEVADR  REGADR  (REG)"
001374  016232                          DT7             ;$ERRPC,$REG1,$REG2,$REG3
001376  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 10

001400  015442                          EM3             ;" DL11 DATA COMPARE ERROR "
001402  016244                          DH10            ;" (PC)  DEVADR  REGADR  (REG)  S/B"
001404  016312                          DT10            ;$ERRPC,$REG1,$REG2,$REG3,$REG4
001406  000000                          0               ;PRINT ALL OCTAL

                                ;;*****************************************************************
                                        ;DL11 DEFINITIONS
                                ;;*****************************************************************

001410  175610                  DLRCSR: 175610          ;CONTAINS ADDRESS OF RCVR CSR
001412  175612                  DLRDBR: 175612          ;CONTAINS ADDRESS OF RCVR DBR
001414  175614                  DLXCSR: 175614          ;CONTAINS ADDRESS OF XMIT CSR
001416  175616                  DLXDBR: 175616          ;CONTAINS ADDRESS OF XMIT DBR
001420  000300                  DLVECT: 300             ;CONTAINS VECTOR ADDRESS OF CURRENT DL11
001422  000000                  XFLG0:  0               ;FLAG FOR HARD XMIT ERRORS
001424  000000                  RFLG0:  0               ;FLAG FOR HARD RCVR ERRORS
001426  000000                  RFLG1:  0               ;FLAG FOR SOFT RCVR ERRORS
001430  000000                  RTRY:   0               ;COUNTS NO. OF RETRIES ON SOFT ERRORS
001432  000000                  OPTR:   0               ;CONTAINS POINTER TO OUTPUT BUFFER
001434  000000                  IPTR:   0               ;CONTAINS POINTER TO INPUT BUFFER
001436  000000                  LDOUT:  0               ;CONTAINS POINTER TO LOAD BUFFER ROUTINE
001440  000000                  TIMR1:  0               ;TIMERS FOR 256. BYTE BLOCK TRANSFERS
001442  000000                  TIMR2:  0
001444  000000                  INTFLG: 0               ;SOFTWARE INTR. FLAG


001446  000240          BEGIN:  NOP                     ;PROGRAM WILL START HERE
                        .SBTTL  INITIALIZE THE COMMON TAGS
                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
001450  012706  001100          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
001454  005026                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
001456  022706  001140          CMP     #SWR,R6 ;;DONE?
001462  001374                  BNE     .-6             ;;LOOP BACK IF NO
001464  012706  001100          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                        ;;INITIALIZE A FEW VECTORS
001470  012737  010462  000020  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
001476  012737  000340  000022  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
001504  012737  010732  000030  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
001512  012737  000340  000032  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
001520  012737  013052  000034  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
001526  012737  000340  000036  MOV     #340,@#TRAPVEC+2;LEVEL 7
001534  012737  013132  000024  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
001542  012737  000340  000026  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
```

```
                                                CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
                                                CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
                                                MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
                                                MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
                                                MOV     #.,$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.
                                                MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
                                                MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
                                                MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
                                                MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
                                                CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
                                                BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
                                                BR      65$             ;;BRANCH IF NO TIMEOUT
                                        64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
                                                RTI
                                        65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
                                                MOV     #DISPREG,DISPLAY
                                        66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

                                                CLR     MULTD           ;CLEAR MULTIPLE DEVICE
                                                                        ;TESTING FLAG
                                                CLR     TABFLG          ;CLEAR TABLE CREATION FLAG
                                                MOV     #8.,$TMP15      ;SET CHARACTER LENGTH DESIGNATOR
                                                                        ;FOR 8 BITS --- THIS IS THE DEFAULT
                                                                        ;LENGTH ASSUMED BY THE PROGRAM
                                                                        ;UNLESS THE USER CHANGES IT THRU
                                                                        ;THE QUESTION AND ANSWER CYCLE
                                                                        ;INITIATED BY SETTING SW<0> TO A 1
                                                MOV     #200,DLPRI      ;SET STANDARD PRIORITY LEVEL
                                                                        ;FOR DEVICE
                                                BIT #SW8,SWR            ;IS THE 'LOOP ON TEST' SWITCH SET?
                                                BEQ     1$              ;BRANCH IF NOT
                                        ;
                                        ;IF THE 'LOOP ON TEST' SWITCH WAS SET WE WILL TAKE THE NEXT BRANCH
                                        ;INSTRUCTION THUS BYPASSING TABLE CREATION
                                        ;
                                        ;IF THE USER DESIRED TO LOOP ON A TEST OF OTHER THAN THE DEFAULT DEVICE
                                        ;THEN HE SHOULD HAVE PREVIOUSLY FILLED THE FOLLOWING PROGRAM LOCATIONS
                                        ;WITH THE DESIRED DEVICE REGISTER VALUES:
                                        ;
                                        ;                       ********************************
                                        ;               UNDER   ;DL11 DEFINITIONS                ABOVE
                                        ;                       ********************************
                                        ;
                                        ;       DLRCSR:         PATCH THE ADDRESS OF THE RCVR CSR
                                        ;       DLRDBR:         PATCH THE ADDRESS OF THE RCVR DBR
                                        ;       DLXCSR:         PATCH THE ADDRESS OF THE XMIT CSR
                                        ;       DLXDBR:         PATCH THE ADDRESS OF THE XMIT DBR
                                        ;       DLVECT:         PATCH THE VECTOR ADDRESS OF THIS DL11
                                        ;
                                                TYPE,   $TMES           ;PRINT OUT 'MAINDEC' NAME
                                                TYPE,   FAILSA          ;TYPE FAILSAFE MESSAGE
                                                ERROR   +0              ;TYPE OUT THE PC VALUE
                                                TYPE,   PCMSG           ;FOLLOWED BY =PC
```

```
                                        HALT                    ;WAIT FOR USER TO RESPOND
                                        BR      ONCE            ;GO TO TEST DEVICE PATCHED IN BY JSER
                                1$:
                                ;ENSURE THAT IF MULTIPLE DEVICE TESTING WAS BEING DONE
                                ;AND THE USER 'HALTED' THE PROGRAM BEFORE ALL DEVICES
                                ;WERE COMPLETED AND WENT BACK TO 'LOAD ADDRESS 200'
                                ;TO RESTART THE PROGRAM THAT AS A BARE MINIMUM
                                ;HE CAN RUN THE DEFAULT DEVICE (1ST RECEIVER
                                ;STATUS REGISTER ADDRESS 175610)
                                ;NOTE:  IF THIS IS NOT SUITABLE THE USER WILL
                                ;       HAVE TO SET SW0=1 (OR UP) IN ORDER TO
                                ;       RECREATE THE TABLE HE DESTROYED FROM
                                ;       ABOVE
001746  012767  175610  177304          MOV     #175610,DLBASE  ;1ST POSSIBLE RECEIVER CSR
001754  004767  006074                  JSR     PC,DLADDR       ;FORM DL ADDRESSES FOR
                                                                ;1ST POSSIBLE DEVICE
001760  012767  000300  177432          MOV     #300,DLVECT     ;1ST POSSIBLE INTERRUPT VECTOR
001766  005067  177264                  CLR     TABFLG          ;CLEAR TABLE CREATION FLAG

001772  012706  001100          RESTRT: MOV     #STACK,SP               ;SET UP STACK POINTER
001776  012737  015020  000004          MOV     #BUSERR,@#ERRVEC        ;SET UP BUS ERROR VECTOR
002004  012737  000340  000006          MOV     #340,@#ERRVEC+2
002012  012737  015044  000010          MOV     #RSVERR,@#RESVEC        ;SET UP RSVD INSTR. VECTOR
002020  012737  000340  000012          MOV     #340,@#RESVEC+2

                                ;THIS  NEXT SECTION WILL CHECK TO SEE IF MULTIPLE DEVICE TESTING
                                ;WILL TAKE PLACE I.E.-
                                ;       A)  HAS FREE RUNNING DEVICE TABLE ALREADY BEEN CREATED, AND/OR
                                ;       B)  IF IT HAS, DOES USER WISH TO CHANGE IT, OR DO WE TEST DEFAULT DEVICE?
002026  105767  177224                  TSTB    TABFLG          ;HAS TABLE CREATION BEEN PERFORMED?
002032  001010                          BNE     ONCE            ;BRANCH IF YES TO SKIP 'MAINDEC
                                                                ;TITLE' MESSAGE
002034  104401  016635                  TYPE    ,STMES          ;OTHERWISE, PRINT OUT 'MAINDEC'
                                                                ;NAME
002040  105167  177212                  COMB    TABFLG          ;IF TABLE CREATION HAS NOT BEEN
                                                                ;PERFORMED, THEN SET FLAG, AND DO SO
002044  032767  000001  177066          BIT     #SW0,SWR        ;THE PROGRAM HAS OBVIOUSLY BEEN
                                                                ;RESTARTED - DOES USER WISH TO
                                                                ;RESELECT VECTOR AND CONTROL REGISTER
                                                                ;ADDRESSES I.E. - CREATE A NEW TABLE?
002052  001012                          BNE     GO              ;BRANCH IF YES
002054  005077  177334          ONCE:   CLR     @DLXCSR         ;CLEAR OUT BOTH CSR'S
002060  005077  177324                  CLR     @DLRCSR
002064  005777  177322                  TST     @DLRDBR         ;FLUSH RCVR "DONE" BIT
002070  005777  177316                  TST     @DLRDBR
002074  000167  000670                  JMP     TST1            ;OTHERWISE, GO WITH EXISTING
                                                                ;TABLE OR NOT USE ANY TABLE AT
                                                                ;ALL WHICHEVER THE CASE MAY BE
                                                                ;.DEFAULT CASE IS 1ST POSSIBLE
                                                                ;DEVICE)
                                ;IF WE COME THIS PATH THE USER HAS DECIDED 1 OF 2 ALTERNATIVES:
                                ;       A)  TO RUN MULTIPLE DEVICES
                                ;       B)  TO CREATE A NEW TABLE TO RUN FROM, OR
                                ;       C)  TO CHANGE THE CHARACTER LENGTH
002100  104401  017217          GO:     TYPE,   LENGTH          ;ASK USER FOR THE CHARACTER LENGTH
                                                                ;FOR WHICH HIS DEVICE IS SET
```

```
                                        RUDEC                   ;ACCEPT THE ANSWER TYPED BY USER
                                ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
                                        MOV     (SP)+,R0        ;GET THE ANSWER TYPED
                                        CMP     R0,#8.          ;IS THE NUMBER TOO HIGH?
                                        BHI     RETRY           ;IF YES - GO TO RETRY SITUATION
                                        CMP     R0,#5.          ;IS THE NUMBER TOO LOW?
                                        BLO     RETRY           ;IF YES - GO TO RETRY SITUATION
                                        MOV     R0,$TMP15       ;THE VALUE TYPED IS OK
                                                                ;STORE FOR FUTURE USE
                                        TYPE,   DEFAULT         ;ASK USER IF HE WISHES TO TEST OTHER
                                                                ;THAN THE DEFAULT DEVICE
                                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
                                        TST     (SP)+           ;LOOK AT THE ANSWER
                                        BNE     1$              ;BRANCH IF REPLY WAS YES
                                        JMP     @#FLUSH         ;OTHERWISE, SKIP REST OF INTERROGATION
                                1$:     MOV     #300,R0         ;START RESTORATION OF TRAPCATCHER
                                        MOV     #302,R1         ;AREA FROM LOCATIONS 300 TO 776
                                        MOV     #4,R2           ;SO THAT WE CREATE THE MULTIPLE
                                2$:     MOV     R1,(R0)         ;DEVICES TABLE WITH A CLEAN SLATE
                                        CLR     (R1)            ;       .
                                        ADD     R2,R0           ;       .
                                        ADD     R2,R1           ;       .
                                        CMP     #1000,R1        ;       .
                                        BLT     2$              ;       .
                                ;THE TRAPCATCHER VECTOR AREA FROM 300 - 776 SHOULD NOW BE RESTORED.
                                ;PROCEED TO FIND OUT THE 1ST DEVICE RECEIVER CONTROL REGISTER
                                ;ADDRESS
                                FIRSTD: TYPE    ,MFIRSTD        ;ASK USER FOR THE RECEIVER CONTROL
                                                                ;REGISTER ADDRESS OF HIS FIRST
                                                                ;DEVICE
                                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
                                                                ;AND STORE ON TOP OF STACK
                                ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
                                        MOV     (SP)+,R0        ;GET THE ANSWER TYPED
                                        CMP     R0,#176170      ;IS THE NUMBER TOO HIGH?
                                        BHI     RETRY0          ;IF YES-GO TO RETRY SITUATION
                                        CMP     R0,#175610      ;IS THE NUMBER TOO LOW?
                                        BLO     RETRY0          ;IF YES - GO TO RETRY SITUATION
                                        BITB    #BIT0,R0        ;NUMBER IS IN RANGE BUT IS IT
                                                                ;ON AN EVEN BOUNDARY?
                                        BNE     RETRY0          ;IF NO - GO TO RETRY SITUATION
                                ;CHECK TO SEE IF USER RESPONSE WAS TRULY A RCVR STATUS REGISTER
                                        BIT #7,R0               ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
                                                                ;USER RESPONSE EQUAL TO A ZERO?
                                        BNE     RETRY0          ;BRANCH IF NOT
                                        MOV     R0,DLBASE       ;THE 1ST ADDRESS VALUE TYPED IS OK
                                                                ;STORE FOR FUTURE USE
                                ;NOW WE ARE READY TO FIND OUT THE DEVICE INTERRUPT VECTOR
                                        MOV     DLBASE,KEEPADD  ;GET 1ST ADDRESS VALUE
                                        JSR     PC,DLADDR       ;GO FORM DL ADDRESSES FOR
                                                                ;1ST DEVICE SELECTED
                                        MOV     KEEPADD,BASEADD ;RESTORE 1ST DEVICE ADDRESS
                                VECT:   TYPE    ,MVECT          ;ASK USER FOR A VECTOR ADDRESS
                                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
                                                                ;AND STORE ON TOP OF STACK
                                ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
```

```
  989  002272  012600                        MOV     (SP)+,R0        ;GET THE ANSWER TYPED
  990  002274  020027  000776                CMP     R0,#776         ;IS THE NUMBER TOO HIGH?
  991  002300  101032                        BHI     RETRY1          ;IF YES - GO TO RETRY SITUATION
  992  002302  020027  000300                CMP     R0,#300         ;IS THE NUMBER TOO LOW?
  993  002306  103427                        BLO     RETRY1          ;IF YES - GO TO RETRY SITUATION
  994  002310  132700  000001                BITB    #BIT0,R0        ;NUMBER IS IN RANGE BUT IS IT
  995                                                                 ;ON AN EVEN BOUNDARY?
  996  002314  001024                        BNE     RETRY1          ;IF NO - GO TO RETRY SITUATION
  997                                ;CHECK TO SEE IF THE USER RESPONSE WAS TRULY A RCVR VECTOR ADDRESS
  998  002316  032700  000007                BIT     #7,R0           ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
  999                                                                 ;USER RESPONSE EQUAL TO A ZERO?
 1000  002322  001021                        BNE     RETRY1          ;BRANCH IF NOT
 1001  002324  010067  177070                MOV     R0,DLVECT       ;THE VECTOR VALUE TYPED IS OK
 1002                                                                 ;STORE FOR FUTURE USE
 1003  002330  016767  177064  176730        MOV     DLVECT,KEEPIV   ;GET THE FIRST VECTOR VALUE
 1004  002336  016767  177056  176724        MOV     DLVECT,BASEIV   ;SAVE FIRST VECTOR VALUE
 1005  002344  000414                        BR      HOWMANY         ;GO TO SEE IF USER WANTS MORE
 1006                                                                 ;THAN 1 DEVICE
 1007  002346  104401  001252        RETRY:  TYPE,   $QUES           ;TYPE '?' INDICATING USER TYPED
 1008                                                                 ;SOMETHING WRONG FOR CHARACTER LENGTH
 1009  002352  000167  177522                JMP     GO              ;GO BACK TO REISSUE QUESTION
 1010  002356  104401  001252        RETRY0: TYPE    .$QUES          ;TYPE '?' INDICATING USER TYPE
 1011                                                                 ;SOMETHING WRONG FOR 1ST ADDRESS
 1012  002362  000167  177612                JMP     FIRSTD          ;GO BACK TO REISSUE QUESTION
 1013  002366  104401  001252        RETRY1: TYPE    .$QUES          ;TYPE '?' INDICATING USER TYPED
 1014                                                                 ;SOMETHING WRONG FOR VECTOR
 1015  002372  000167  177666                JMP     VECT            ;GO BACK TO REISSUE QUESTION
 1016  002376  104401  017552        HOWMANY:TYPE    .MULDEV         ;ASK USER IF HE WISHES TO RUN
 1017                                                                 ;MULTIPLE DEVICES
 1018  002402  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
 1019                                                                 ;AND STORE ON TOP OF STACK
 1020  002404  012600                        MOV     (SP)+,R0        ;GET THE ANSWER TYPED
 1021  002406  005700                        TST     R0              ;WAS THE ANSWER YES?
 1022  002410  001003                        BNE     1$              ;BRANCH IF IT WAS
 1023  002412  005067  176654                CLR     MULTD           ;OTHERWISE, INITIALIZE FLAG TO
 1024                                                                 ;INDICATE NON-MULTIPLE DEVICES
 1025  002416  000402                        BR      2$              ;SKIP NEXT INSTRUCTION
 1026  002420  105167  176646        1$:     COMB    MULTD           ;INITIALIZE FLAG TO INDICATE
 1027                                                                 ;RUNNING OF MULTIPLE DEVICES
 1028  002424                        2$:
 1029  002424  105767  176642                TSTB    MULTD           ;ARE THERE MULTIPLE DEVICES ON
 1030                                                                 ;THE SYSTEM?
 1031  002430  100406                        BMI     LASTD   ;IF SO, GO TO ASK NEXT QUESTION
 1032  002432  005067  176636                CLR     ACTREG          ;CLEAR DEVICE ACTIVE FLAG TO
 1033                                                                 ;INDICATE NO RUNNING OF MULTIPLE
 1034                                                                 ;DEVICES
 1035  002436  005067  176634                CLR     ROTADD          ;CLEAR DEVICE ADDRESS POINTER IN
 1036                                                                 ;USE WHEN RUNNING MULTIPLE DEVICES
 1037  002442  000167  000160                JMP     CONQUES         ;SKIP ASKING NEXT QUESTION
 1038  002446                        LASTD:
 1039                                ;WE WILL NOW BEGIN TO SET UP THE DEVICE ACTIVE REGISTER FOR RUNNING
 1040                                ;MULTIPLE DL11 DEVICES
 1041  002446  104401  017637                TYPE    ,MLASTD         ;ASK USER FOR THE RECEIVER
 1042                                                                 ;CONTROL REGISTER ADDRESS OF
 1043                                                                 ;HIS LAST DEVICE
 1044  002452  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY
```

```
                                                        ;USER AND STORE ON TOP OF STACK
                                ;CHECK TO SEE IF THE USER RESPONSE WAS WITHIN LIMITS
002454  012600                1$:     MOV     (SP)+,R0        ;GET THE ANSWER TYPED
002456  020027  176170                CMP     R0,#176170      ;IS THE NUMBER TOO HIGH?
002462  101132                        BHI     RETRY2          ;IF YES - GO TO RETRY SITUATION
002464  020027  175610                CMP     R0,#175610      ;IS THE NUMBER TOO LOW?
002470  103527                        BLO     RETRY2          ;IF YES - GO TO RETRY SITUATION
002472  132700  000001                BITB    #BIT0,R0        ;NUMBER IS IN RANGE BUT IS IT
                                                        ;ON AN EVEN BOUNDARY?
002476  001124                        BNE     RETRY2          ;IF NOT - GO TO RETRY SITUATION
                                ;CHECK TO SEE IF USER RESPONSE WAS TRULY A RCVR STATUS REGISTER
002500  032700  000007                BIT     #7,R0           ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
                                                        ;USER RESPONSE EQUAL TO A ZERO?
002504  001121                        BNE     RETRY2          ;BRANCH IF NOT
002506  010067  176566                MOV     R0,LASTADD      ;THE LAST ADDRESS VALUE TYPED IS OK
                                                        ;STORE FOR FUTURE USE
                                ;NOW WE BEGIN TO ACTUALLY INITIALIZE THE DEVICE ACTIVE REGISTER
                                ;FROM WHICH THE PROGRAM WILL CYCLE UNTIL ALL DEVICES HAVE BEEN TESTED
002512  012767  000001  176556        MOV     #1,ROTADD       ;SET UP POINTER FOR 'ACTREG'
002520  005067  176550                CLR     ACTREG          ;CLEAR DEVICE ACTIVE REGISTER
002524  056767  176546  176542  2$:   BIS     ROTADD,ACTREG   ;MAKE 1ST DEVICE ACTIVE
002532  000241                        CLC                     ;CLEAR CARRY BIT FOR POINTER
                                                        ;ROTATION
002534  006167  176536                ROL     ROTADD          ;ARE WE PAST 16 LINE RANGE?
002540  103422                        BCS     3$              ;BRANCH IF YES
002542  062767  000010  176514        ADD     #10,BASEADD     ;STEP UP BASE ADDRESS
002550  026767  176524  176506        CMP     LASTADD,BASEADD ;IS THIS THE LAST DEVICE?
002556  101362                        BHI     2$              ;BRANCH IF NOT
                                ;NOTE:  IF THIS PATH IS TAKEN IT IS ASSUMED THAT AT LEAST 2 DEVICES
                                ;       EXIST AND THAT ALL ADDRESSING IS CONTIGUOUS
002560  056767  176512  176506        BIS     ROTADD,ACTREG   ;INDICATE NEXT DEVICE ACTIVE
002566  012767  000001  176502        MOV     #1,ROTADD       ;RESET POINTER FOR 'ACTREG' FOR
                                                        ;LATER USE IN END OF PASS ROUTINE
002574  016767  176462  176462        MOV     KEEPAD,BASEADD  ;RESET 1ST DEVICE RECEIVER
                                                        ;CONTROLLER REGISTER ADDRESS FOR
                                                        ;LATER USE IN END OF PASS ROUTINE
002602  000167  000020                JMP     CONQUES         ;GO TO CONTINUE QUESTIONING OF USER
002606                          3$:
                                ;IF WE TAKE THIS PATH IT APPEARS THAT THERE ARE NOT AT LEAST
                                ;TWO DEVICES PRESENT - IN RESPONSE TO USER TYPING 'YES' TO MULTIPLE
                                ;DEVICES QUESTION
002606  016767  176450  176450        MOV     KEEPADD,BASEADD ;RESET 1ST DEVICE RECEIVER
                                                        ;CONTROLLER REGISTER ADDRESS
002614  104401  017735                TYPE    .MRANGE         ;INFORM USER TO CHECK AND RETYPE
                                                        ;THE LAST DEVICE RCSR ADDRESS
002620  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
                                                        ;AND STORE ON TOP OF STACK
002622  000167  177626                JMP     1$
002626                          CONQUES:
                                ;IF WE HAVE REACHED THIS PORTION WE KNOW:
                                ;       A)  THE 'RXCSR' ADDRESS OF THE 1ST DEVICE
                                ;       B)  THE 'RXCSR' ADDRESS OF THE LAST DEVICE, SAND
                                ;       C)  THE INTERRUPT VECTOR OF THE 1ST DEVICE
                                ;NOW LET'S FIND THE PRIORITY LEVEL
002626  104401  020021                TYPE    .PLEVEL         ;ASK USER FOR PRIORITY LEVEL
002632  104410                        RDOCT                   ;ACCEPT ANSWER TYPED BY USER AND
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                                                        ;STORE ON TOP OF STACK
                        MOV     @SP)+,R0                ;GET THE ANSWER TYPED
                        CMP     R0,#7                   ;IS THE NUMBER TOO HIGH?
                        BHI     RETRY3                  ;IF YES - GO TO RETRY SITUATION
                        CMP     R0,#4                   ;IS THE NUMBER TOO LOW?
                        BLO     RETRY3                  ;IF YES GO TO RETRY SITUATION
                        MOV     R0,DLPRI                ;THE PRIORITY TYPED IN IS OK
                                                        ;STORE FOR FUTURE USE

                ;THIS SECTION WILL CALCULATE THE PRIORITY LEVEL FOR THE
                ;PROCESSOR BASED ON THE USER RESPONSE FOR PRIORITY LEVEL OF THE
                ;DEVICE
                        ASL     DLPRI                   ;FORM BITS 7-5  OF PSW
                        ASL     DLPRI                   ;       .
                        ASL     DLPRI                   ;       .
                        ASL     DLPRI                   ;       .
                        ASL     DLPRI                   ;       .
                        MOV     DLPRI,LESS1             ;START TO FORM LEVEL TO ALLOW
                                                        ;INTERRUPTS
                        SUB     #1,LESS1                ;DROP DEVICE LEVEL PRIORITY
                                                        ;BY 1 LEVEL FOR PSW
                        BIC     #37,LESS1               ;MAKE SURE THE T,N,Z,V & C
                                                        ;BITS FOR THE PROCESSOR ARE CLEAR
FLUSH:  CLR     @DLXCSR                 ;CLEAR OUT BOTH CSR'S
                        CLR     @DLRCSR
                        TST     @DLRDBR                 ;FLUSH RCVR "DONE" BIT
                        TST     @DLRDBR
                        JMP     TST1                    ;BEGIN TESTING
RETRY2: TYPE    .SQUES                  ;TYPE "?" INDICATING USER TYPED
                                        ;SOMETHING WRONG FOR LAST ADDRESS
                        JMP     LASTD   ;GO BACK TO REISSUE QUESTION
RETRY3: TYPE    .SQUES                  ;TYPE "?" INDICATING USER TYPED
                                        ;SOMETHING WRONG FOR PRIORITY
                        JMP     CONGLES                 ;GO BACK TO REISSUE QUESTION


                ;;*******************************************************************
                ;*TEST 1         TEST THAT REFERENCE TO RCSR DOES NOT CAUSE TIMEOUT
                ;;*******************************************************************
TST1:   SCOPE
                        MOV     ERRVEC,-(SP)            ;SAVE THE TIMEOUT VECTOR
                        MOV     #1$,ERRVEC              ;GO TO 1$ IF TIMEOUT
                        MOV     DLRCSR,R2               ;REGADR = RCSR ADR
                        TST     (R2)                    ;USE REGADR ON BUS
                        BR      3$                      ;GO TO NEXT TEST IF NO TIMEOUT
1$:     JSR     PC,SUERT1               ;GO SET UP EPROR INFO
                        MOV     #2$,$ESCAPE             ;RETURN TO 2$ AFTER ERROR PRINT
                        ERROR+1                         ;DL REFERENCE CAUSED BUS TIMEOUT
2$:     CMP     (SP)+,(SP)+             ;CLEAN STACK FROM TIMEOUT
3$:     MOV     (SP)+,ERRVEC            ;RESTORE TIMEOUT VECTOR

                ;;*******************************************************************
                ;*TEST 2         TEST THAT REFERENCE TO XCSR DOES NOT CAUSE TIMEOUT
                ;;*******************************************************************
TST2:   SCOPE
                        MOV     ERRVEC,-(SP)            ;SAVE THE TIMEOUT VECTOR
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                                                MOV     #1$,ERRVEC      ;GO TO 1$ IF TIMEOUT
                                                MOV     DLXCSR,R2       ;REGADR = XCSR ADR
                                                TST     (R2)            ;USE REGADR ON BUS
                                                BR      3$              ;(GO TO NEXT TEST IF NO TIMEOUT)
                                        1$:     JSR     PC,SUERT1       ;GO SET UP ERROR INFO
                                                MOV     #2$,$ESCAPE     ;RETURN TO 2$ AFTER ERROR PRINT
                                                ERROR+1                 ;DL REFERENCE CAUSED BUS TIMEOUT
                                        2$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
                                        3$:     MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR

                                        ;;**************************************************************
                                        ;*TEST 3        TEST THAT REFERENCE TO RDBR DOES NOT CAUSE TIMEOUT
                                        ;;**************************************************************
                                        TST3:   SCOPE
                                                MOV     ERRVEC,-(SP)    ;SAVE THE TIMEOUT VECTOR
                                                MOV     #1$,ERRVEC      ;GO TO 1$ IF TIMEOUT
                                                MOV     DLRDBR,R2       ;REGADR = RDBR ADR
                                                TST     (R2)            ;USE REGADR ON BUS
                                                BR      3$              ;(GO TO NEXT TEST IF NO TIMEOUT)
                                        1$:     JSR     PC,SUERT1       ;GO SET UP ERROR INFO
                                                MOV     #2$,$ESCAPE     ;RETURN TO 2$ AFTER ERROR PRINT
                                                ERROR+1                 ;DL REFERENCE CAUSED BUS TIMEOUT
                                        2$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
                                        3$:     MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR

                                        ;;**************************************************************
                                        ;*TEST 4        TEST THAT REFERENCE TO XDBR DOES NOT CAUSE TIMEOUT
                                        ;;**************************************************************
                                        TST4:   SCOPE
                                                MOV     ERRVEC,-(SP)    ;SAVE THE TIMEOUT VECTOR
                                                MOV     #1$,ERRVEC      ;GO TO 1$ IF TIMEOUT
                                                MOV     DLXDBR,R2       ;REGADR = XDBR ADR
                                                TST     (R2)            ;USE REGADR ON BUS
                                                BR      3$              ;(GO TO NEXT TEST IF NO TIMEOUT)
                                        1$:     JSR     PC,SUERT1       ;GO SET UP ERROR INFO
                                                MOV     #2$,$ESCAPE     ;RETURN TO 2$ AFTER ERROR PRINT
                                                ERROR+1                 ;DL REFERENCE CAUSED BUS TIMEOUT
                                        2$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
                                        3$:     MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR

                                        ;;**************************************************************
                                        ;*TEST 5        TEST THAT RCSR IS ALL ZEROES ON ENTRY
                                        ;;**************************************************************
                                        TST5:   SCOPE
                                                CLR     R4              ;RESULT IN RCSR S B = 0
                                                MOV     DLRCSR,R2       ;REGADR = RCSR ADR
                                                CMP     R4,(R2)         ;[RCSR]=000000 ??
                                                BEQ     TST6            ;(BR IF YES)
                                                JSR     PC,SUER2        ;GO SET UP ERROR INFO
                                                ERROR+2                 ;RCSR NOT CLEAR ON START UP

                                        ;;**************************************************************
                                        ;*TEST 6        TEST THAT "READY" BIT IS ONLY BIT SET IN XCSR
                                        ;;**************************************************************
                                        TST6:   SCOPE
                                                MOV     #200,R4         ;RESULT IN XCSR S B = 000200
                                                MOV     DLXCSR,R2       ;REGADR = XCSR ADR
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 1213  003254  020412                    CMP     R4,(R2)         ;[XCSR]=000200 ??
 1214  003256  001403                    BEQ     TST7            ;(BR IF YES)
 1215  003260  004767  010552            JSR     PC,SUER2        ;GO SETUP ERROR INFO
 1216  003264  104002                    ERROR+2                 ;[XCSR] INCORRECT ON START UP
                                ;;**************************************************************
                                ;*TEST 7         TEST THAT "MAINT" BIT CAN BE SET AND CLEARED
                                ;;**************************************************************
 1220  003266  000004            TST7:   SCOPE
 1221  003270  012704  000204            MOV     #204,R4         ;RESULT IN XCSR S/B = 000204
 1222  003274  016702  176114            MOV     DLXCSR,R2       ;REGADR = XCSR ADR
 1223  003300  052712  000004            BIS     #BIT2,(R2)      ;SET THE "MAINT" BIT
 1224  003304  020412                    CMP     R4,(R2) ;RESULT IN XCSR OK ??
 1225  003306  001403                    BEQ     1$              ;(BR IF YES)
 1226  003310  004767  010522            JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1227  003314  104002                    ERROR+2                 ;MAINT. BIT FAILED TO SET PROPERLY
 1230  003316  012704  000200    1$:     MOV     #200,R4         ;RESULT IN XCSR S/B = 000200
 1231  003322  042712  000004            BIC     #BIT2,(R2)      ;NOW CLEAR THE "MAINT" BIT
 1232  003326  020412                    CMP     R4,(R2)         ;RESULT IN XCSR OK ??
 1233  003330  001403                    BEQ     TST10           ;(BR IF YES)
 1234  003332  004767  010500            JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1235  003336  104002                    ERROR+2                 ;MAINT BIT FAILED TO CLEAR PROPERLY
                                ;;**************************************************************
                                ;*TEST 10        TEST THAT XMIT I.E. CAN CAUSE AN INTR
                                ;;**************************************************************
 1237  003340  000004            TST10:  SCOPE
 1238  003342  005067  176076            CLR     INTFLG          ;INIT SOFTWARE INTR FLAG
 1239  003346  016705  176046            MOV     DLVECT,R5       ;GET VECTOR ADDRESS
 1240  003352  012765  003440  000004    MOV     #2$,4(R5)       ;GO TO 4$ ON INTR
 1241  003360  016765  175716  000006    MOV     DLPRI,6(R5)     ;PRIORITY LEVEL 4
 1242  003366  005005                    CLR     R5              ;INIT INTR. TIMER
 1243  003370  012704  000200            MOV     #200,R4         ;RESULT IN XCSR S/B = 000200
 1244  003374  016702  176014            MOV     DLXCSR,R2       ;REGADR = XCSR ADR
 1245  003400  052712  000100            BIS     #100,(R2)       ;SET INTR. ENABLE BIT C6
 1246  003404  005767  176034    1$:     TST     INTFLG          ;DID INTR OCCUR YET ??
 1247  003410  001020                    BNE     3$              ;BR IF IT DID
 1250  003412  005305                    DEC     R5              ;COUNT THE TIMER
 1251  003414  001373                    BNE     1$              ;BR IF NO TIMEOUT
 1252  003416  012704  000300            MOV     #300,R4         ;RESULT IN XCSR S/B = 000300
 1253  003422  004767  010410            JSR     PC,SUER2        ;GO SETUP ERROR INFO
 1254  003426  012767  003436  175610    MOV     #4$,$ESCAPE     ;RETURN TO 4$ AFTER ERROR PRINT
 1255  003434  104002                    ERROR+2                 ;INTR.  FAILED
 1256  003436                    4$:
 1257  003436  000412                    BR      TST11           ;(GO TO NEXT TEST)
 1260  003440  005167  176030    2$:     COM     INTFLG          ;SET THE SOFTWARE FLAG
 1261  003444  042712  000100            BIC     #100,(R2)       ;TURN OFF I.E. BIT
 1262  003450  000002                    RTI                     ;RETURN CONTROL TO INTR. ROUTINE
 1263  003452  020412            3$:     CMP     R4,(R2)         ;RESULT IN XCSR OK ??
 1264  003454  001403                    BEQ     TST11           ;(BR IF YES)
 1265  003456  004767  010354            JSR     PC,SUER2        ;GO SET UP ERROR INFO.
 1266  003462  104002                    ERROR+2                 ;XMIT INTR. NOT SERVICED PROPERLY
                                ;;**************************************************************
                                ;*TEST 11        TEST THAT RCVR I.E. BIT CAN BE SET AND CLEARED
                                ;;**************************************************************
 1270  003464  000004            TST11:  SCOPE
 1271  003466  012704  000100            MOV     #100,R4         ;RESULT IN RCSR S/B = 000100
 1272  003472  016702  175712            MOV     DLRCSR,R2       ;REGADR = RCSR ADR
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1269  003476  052712  000100              BIS     #BIT6,(R2)      ;SET I.E. BIT
1270  003502  020412                      CMP     R4,(R2)         ;DID IT SET PROPERLY ??
1271  003504  001403                      BEQ     1$              ;;<BR IF YES>
1272  003506  004767  013324              JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1273  003512  104002                      ERROR+2                 ;RCVR I.E. BIT FAILED TO SET PROPERLY
1274  003514  005004              1$:     CLR     R4              ;RESULT IN RCSR S/B = 000000
1275  003516  042712  000100              BIC     #BIT6,(R2)      ;CLEAR THE I.E. BIT
1276  003522  020412                      CMP     R4,(R2)         ;DID IT CLEAR PROPERLY ??
1277  003524  001403                      BEQ     TST12           ;;<BR IF YES>
1278  003526  004767  010304              JSR     PC,SUER2        ;GO SET UP ERROR INFO
1279  003532  104002                      ERROR+2                 ;RCVR I.E. BIT FAILED TO CLEAR PROPERLY
1280                                      ;;**************************************************************
1281                                      ;*TEST 12        TEST THAT RCVR "DONE" CAN GENERATE AN INTR.
1282                                      ;;**************************************************************
1283  003534  000004              TST12:  SCOPE
1284  003536  016705  175656              MOV     DLVECT,R5       ;GET THE VECTOR ADDRESS
1285  003542  012725  003702              MOV     #3$,(R5)+       ;GO TO 3$ ON RCVR INTR.
1286  003546  016715  175530              MOV     DLPRI,(R5)      ;AT LEVEL 4
1287  003552  005067  175666              CLR     INTFLG          ;INIT THE SOFTWARE FLAG
1288  003556  005005                      CLR     R5              ;INIT INTR. TIMER
1289  003560  105067  175420              CLRB    $TMP1           ;INIT WHERE DATA WILL BE STORED
1290  003564  016702  175620              MOV     DLRCSR,R2       ;REGADR = RCSR ADR
1291  003570  005012                      CLR     (R2)            ;INIT THE RCSR TO 000000
1292  003572  052712  000100              BIS     #BIT6,(R2)      ;ENABLE RCVR INTERRUPTS
1293  003576  052762  000004  000004      BIS     #BIT2,4(R2)     ;NOW TURN ON MAINT MODE
1294  003604  112762  000252  000006      MOVB    #252,6(R2)      ;LOAD XMIT BUFFER REG.
1295  003612  005767  175626      1$:     TST     INTFLG          ;DID RCVR INTR. YET ??
1296  003616  001044                      BNE     4$              ;BR IF IT DID
1297  003620  005305                      DEC     R5              ;COUNT THE TIMER
1298  003622  001373                      BNE     1$              ;BR IF NO TIMEOUT
1299  003624  013767  177776  175350      MOV     @#PSW,$TMPC     ;SAVE ERROR PSW
1300  003632  042762  000004  000004      BIC     #BIT2,4(R2)     ;DISABLE MAINT MODE
1301  003640  042712  000100              BIC     #100,(R2)       ;DISABLE RCVR INTR.
1302  003644  010667  175326              MOV     SP,$REG6        ;SAVE THE ERROR SP
1303  003650  010201                      MOV     R2,R1           ;DEVADR = RCSR ADR
1304  003652  011203                      MOV     (R2),R3         ;GET THE WAS DATA
1305  003654  012704  000200              MOV     #200,R4         ;[RCSR] S/B = 000200
1306  003660  004767  010200              JSR     PC,SUERR1       ;GO SET UP ERROR INFO.
1307  003664  012767  003674  175352      MOV     #2$,$ESCAPE     ;RETURN TO 2$ AFTER ERROR ALWAYS
1308  003672  104002                      ERROR+2                 ;RCVR INTERRUPT FAILED
1309  003674  005762  000002      2$:     TST     2(R2)           ;REFERENCE RCVR DATA BUFFER
1310                                                              ;TO CLEAR RCSR IN CASE RCVR
1311                                                              ;INTERRUPTS COULD NOT BE ENABLED
1312  003700  000440                      BR      TST13           ;;<GO TO NEXT TEST>
1313  003702  042762  000004  000004  3$: BIC     #BIT2,4(R2)     ;DISABLE THE MAINT MODE
1314  003710  116267  000002  175266      MOVB    2(R2),$TMP1     ;GET THE RECEIVED DATA
1315  003716  042712  000100              BIC     #BIT6,(R2)      ;TURN OFF RCVR INTR. ENAB
1316  003722  005167  175516              COM     INTFLG          ;SET THE SOFTWARE FLAG
1317  003726  000002                      RTI                     ;RETURN TO MAINLINE
1318  003730  005004              4$:     CLR     R4              ;[RCSR] S/B=0
1319  003732  005712                      TST     (R2)            ;IS IT ALL ZEROES ??
1320  003734  001403                      BEQ     5$              ;;<BR IF YES>
1321  003736  004767  010074              JSR     PC,SUER2        ;GO SET UP ERROR INFO
1322  003742  104002                      ERROR+2                 ;RCVR INTR NOT SERVICED PROPERLY
1323  003744  016701  175442      5$:     MOV     DLRDBR,R1       ;SAVE WAS ADDRESS
1324  003750  016702  175442              MOV     DLXDBR,R2       ;SAVE THE S B ADDRESS
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1325  003754  016703  175224              MOV     $TMP1,R3        ;GET THE WAS DATA
1326  003760  042703  177400              BIC     #177400,R3      ;REMOVE JUNK FROM HI BYTE
1327  003764  012704  000252              MOV     #252,R4         ;DATA S/B = 252
1328  003770  020403                      CMP     R4,R3           ;WAS = S/B ??
1329  003772  001403                      BEQ     TST13           ;;<BR IF YES>
1330  003774  004767  010064              JSR     PC,SUERR1       ;GO SET UP THE ERROR INFO
1331  004000  104003                      ERROR+3                 ;DATA COMPARE ERROR
1332                                ;;**************************************************************
1333                                ;*TEST 13       TEST THAT "REQ TO SEND" ASSERTS "RING"
1334                                ;;**************************************************************
1335  004002  000004                TST13:  SCOPE
1336  004004  032767  010000  175126        BIT     #SW12,SWR       ;ARE WE TESTING /C OR /D MODEL?
1337  004012  001047                        BNE     TST14           ;;<BRANCH IF YES>
1338  004014  012704  140004                MOV     #140004,R4      ;RESULT IN RCSR S/B = 140004
1339  004020  016702  175364                MOV     DLRCSR,R2       ;REGADR = RCSR ADR
1340  004024  005012                        CLR     (R2)            ;INIT THE RCSR TO 000000
1341  004026  052712  000004                BIS     #BIT2,(R2)      ;SET "REQ TO SEND"
1342  004032  032777  100000  175350        BIT     #BIT15,@DLRCSR  ;DID "RING" SET "DATA SET INT" ?
1343  004040  001003                        BNE     1$              ;;<BR IF YES>
1344  004042  004767  007770                JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1345  004046  104002                        ERROR+2                 ;"RING" TRANSITION FAILED TO SET "DATA SET INT"
1346                                                                ;NOTE: "BIT  #BIT15,(R2)" RESETS BIT15
1347  004050  012704  040004        1$:     MOV     #40004,R4       ;RESULT IN RCSR S/B = 40004
1348  004054  020412                        CMP     R4,(R2)         ;BOTH "RING" AND "REQ TO SEND" ASSERTED ?
1349  004056  001403                        BEQ     2$              ;;<BR IF YES>
1350  004060  004767  007752                JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1351  004064  104002                        ERROR+2                 ;"RING" OR "REQ TO SEND" FAILED TO SET
1352  004066  005004                2$:     CLR     R4              ;RESULT IN RCSR S/B = 000000
1353  004070  042712  000004                BIC     #BIT2,(R2)      ;CLEAR "REQ TO SEND"
1354  004074  032777  100000  175306        BIT     #BIT15,@DLRCSR  ;DID "DATA SET INT" GET SET ??
1355  004102  001403                        BEQ     3$              ;;<BR IF NOT>
1356  004104  004767  007726                JSR     PC,SUER2        ;GO SET UP ERROR INFO
1357  004110  104002                        ERROR+2                 ;CLEARING "RING" SET "DATA SET INT"
1358  004112  020412                3$:     CMP     R4,(R2)         ;RCSR CONTAIN ALL ZEROES ??
1359  004114  001406                        BEQ     TST14           ;;<BR IF YES>
1360  004116  004767  007714                JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1361  004122  016767  000002  175050        MOV     .+6,$REG7       ;SAVE THE ERROR PC
1362  004130  104002                        ERROR+2                 ;CLEARING  "REQ TO SEND" FAILED TO CLEAR "RING"
1363                                ;;**************************************************************
1364                                ;*TEST 14       TEST THAT "SEC XMIT" ASSERTS "SEC REC" AND "DATA SET INT"
1365                                ;;**************************************************************
1366  004132  000004                TST14:  SCOPE
1367  004134  032767  010000  174776        BIT     #SW12,SWR       ;ARE WE TESTING /C OR /D MODEL?
1368  004142  001046                        BNE     TST15           ;;<BRANCH IF YES>
1369  004144  016702  175240                MOV     DLRCSR,R2       ;REGADR = RCSR ADR
1370  004150  005012                        CLR     (R2)            ;INIT RCSR TO 000000
1371  004152  012704  102010                MOV     #102010,R4      ;CONTENTS OF RCSR S/B = 102010
1372  004156  052712  000010                BIS     #BIT3,(R2)      ;SET "SEC XMIT" BIT
1373  004162  032777  100000  175220        BIT     #BIT15,@DLRCSR  ;DID "DATA SET INT" SET ??
1374  004170  001003                        BNE     1$              ;;<BR IF YES>
1375  004172  004767  007640                JSR     PC,SUER2        ;GO SET UP ERROR INFO
1376  004176  104002                        ERROR+2                 ;"DATA SET INT" FAILED TO SET-NOTE THAT
1377                                                                ;"BIT  #BIT15,(R2)" RESETS BIT15
1378  004200  012704  002010        1$:     MOV     #2010,R4        ;RESULT IN RCSR S/B = 2010
1379  004204  020412                        CMP     R4,(R2)         ;ARE "SEC XMIT" AND "SEC REC" BOTH SET ?
1380  004206  001403                        BEQ     2$              ;;<BR IF YES
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1381  004210  004767  007622                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
1382  004214  104002                            ERROR+2                 ;"SEC XMIT" OR "SEC REC" FAILED TO SET
1383                                                                    ;OR "DATA SET INT" FAILED TO BE CLEARED
1384                                                                    ;WHEN REFERENCING RCSR
1385  004216  012704  100000          2$:       MOV     #BIT15,R4       ;RESULT IN RCSR S/B = 100000
1386  004222  042712  000010                    BIC     #BIT3,(R2)      ;CLEAR "SEC XMIT" BIT
1387  004226  032777  100000  175154            BIT     #BIT15,@DLRCSR  ;DID CLEARING IT SET "DATA SET INT"??
1388  004234  001003                            BNE     3$              ;<BR IF YES>
1389  004236  004767  007574                    JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1390  004242  104002                            ERROR+2                 ;CLEARING "SEC XMIT" FAILED TO SET "DATA
1391                                                                    ;SET INT. (NOTE THAT REFERENCING RCSR
1392                                                                    ; CLEARS "DATA SET INT"
1393  004244  005004                  3$:       CLR     R4              ;RESULT IN RCSR S/B = 000000
1394  004246  020412                            CMP     R4,(R2)         ;"SEC XMIT" AND "SEC REC" CLEAR ?
1395  004250  001403                            BEQ     TST15           ;<BR IF YES>
1396  004252  004767  007560                    JSR     PC,SUER2        ;GO SETUP ERROR INFO
1397  004256  104002                            ERROR+2                 ;"SEC XMIT" OR "SEC REC" FAILED TO CLEAR
1398                                                                    ;OR REFERENCING RCSR  FAILED TO CLEAR "DATA SET INT"
1399                                  ;;********************************************************************
1400                                  ;*TEST 15       TEST THAT "DTR" CAN ASSERT "CLR TO SEND" AND "CAR DET"
1401                                  ;;********************************************************************
1402  004260  000004                  TST15:  SCOPE
1403  004262  032767  010000  174650            BIT     #SW12,SWR       ;ARE WE TESTING /C OR /D MODEL?
1404  004270  001046                            BNE     TST16           ;<BRANCH IF YES>
1405  004272  016702  175112                    MOV     DLRCSR,R2       ;REGADR = RCSR ADR
1406  004276  005012                            CLR     (R2)            ;INIT RCSR TO 000000
1407  004300  012704  130002                    MOV     #130002,R4      ;RESULT IN RCSR S/B = 130002
1408  004304  052712  000002                    BIS     #BIT1,(R2)      ;SET "DTR" BIT
1409  004310  032777  100000  175072            BIT     #BIT15,@DLRCSR  ;DID "DATA SET INT" SET ??
1410  004316  001003                            BNE     1$              ;<BR IF YES>
1411  004320  004767  007512                    JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1412  004324  104002                            ERROR+2                 ;"DATA SET INT" FAILED TO SET -
1413                                                                    ;NOTE: THE REFERENCE TO RCSR  ABOVE WILL
1414                                                                    ;WILL UNCONDITIONALLY CLEAR RCSR BIT 15.
1415  004326  012704  030002          1$:       MOV     #30002,R4       ;RESULT IN RCSR S/B = 30002
1416  004332  020412                            CMP     R4,(R2)         ;"DTR" "CLR TO SEND", AND "CAR DET" ALLSET
1417  004334  001403                            BEQ     2$              ;<BR IF ALL SET>
1418  004336  004767  007474                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
1419  004342  104002                            ERROR+2                 ;"DTR" "CLR TO SEND" OR "CAR DET" FAILED
1420                                                                    ;TO SET OR "DATA SET INT" FAILED TO CLEAR
1421  004344  012704  100000          2$:       MOV     #BIT15,R4       ;RESULT IN RCSR S/B = 100000
1422  004350  042712  000002                    BIC     #BIT1,(R2)      ;NOW CLEAR "DTR"
1423  004354  032777  100000  175026            BIT     #BIT15,@DLRCSR  ;DID "DATA SET INT" SET ??
1424  004362  001003                            BNE     3$              ;<BR IF YES>
1425  004364  004767  007446                    JSR     PC,SUER2        ;GO SETUP ERROR INFO
1426  004370  104002                            ERROR+2                 ;"DATA SET INT" FAILED TO SET WHEN "DTR"
1427                                                                    ;WENT TO A ZERO.
1428  004372  005004                  3$:       CLR     R4              ;RESULT IN RCSR S/B = 000000
1429  004374  020412                            CMP     R4,(R2)         ;DID ALL BITS CLEAR??
1430  004376  001403                            BEQ     TST16           ;<BR IF YES>
1431  004400  004767  007432                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
1432  004404  104002                            ERROR+2                 ;"DTR" "CLR TO SEND" OR "CAR DET" FAILED
1433                                                                    ;TO CLEAR PROPERLY
1434                                  ;;********************************************************************
1435                                  ;*TEST 16       TEST THAT "DATA SET INT ENAB" CAN SET AND CLEAR
1436                                  ;;********************************************************************
```

```
 1437  004406  000004                    TST16:  SCOPE
 1438  004410  032767  010000  174522            BIT     #SW12,SWR       ;ARE WE TESTING /C OR /D MODEL?
 1439  004416  001023                            BNE     TST17           ;;<BRANCH IF YES>
 1440  004420  016702  174764                    MOV     DLRCSR,R2       ;REGADR = RCSR ADR
 1441  004424  012704  000040                    MOV     #40,R4          ;RESULT IN RCSR S/B = 000040
 1442  004430  052712  000040                    BIS     #BIT5,(R2)      ;SET THE "DATA SET I.E." BIT
 1443  004434  020412                            CMP     R4,(R2)         ;DID IT SET OK ??
 1444  004436  001403                            BEQ     1$              ;;<BR IF YES>
 1445  004440  004767  007372                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1446  004444  104002                            ERROR+2                 ;"DAT SET I. E." FAILED TO SET
 1447  004446  005004                    1$:     CLR     R4              ;MAKE S/B DATA = 000000
 1448  004450  042712  000040                    BIC     #BIT5,(R2)      ;NOW CLEAR THE "DATA SET I.E." BIT
 1449  004454  020412                            CMP     R4,(R2)         ;DID IT CLEAR OK ??
 1450  004456  001403                            BEQ     1$T17           ;;<BR IF YES>
 1451  004460  004767  007352                    JSR     PC,SUER2        ;GO SET UP ERROR INFO.
 1452  004464  104002                            ERROR+2                 ;"DATA SET I.E." FAILED TO CLEAR
 1453                                    ;;**********************************************************************
 1454                                    ;*TEST 17        TEST THE "DATA SET I.E." CAN CAUSE A RCVR INTR
 1455                                    ;;**********************************************************************
 1456  004466  000004                    TST17:  SCOPE
 1457  004470  032767  010000  174442            BIT     #SW12,SWR       ;ARE WE TESTING A /C OR /D MODEL?
 1458  004476  001054                            BNE     TST20           ;;<BRANCH IF YES>
 1459  004500  016705  174714                    MOV     DLVECT,R5       ;GET THE VECTOR ADDR
 1460  004504  012725  004572                    MOV     #3$,(R5)+       ;GO TO 3$ ON RCVR INTR.
 1461  004510  016715  174566                    MOV     DLPRI,(R5)      ;AT LEVEL 4
 1462  004514  005005                            CLR     R5              ;INIT INTR. TIMER
 1463  004516  005067  174722                    CLR     INTFLG          ;INIT SOFTWARE FLAG
 1464  004522  005004                            CLR     R4              ;RESULT IN RCSR S/B = 0 AFTER INTR.
 1465  004524  016702  174660                    MOV     DLRCSR,R2       ;REGADR = RCSR ADR
 1466  004530  052712  000040                    BIS     #BIT5,(R2)      ;SET THE "DATA SET I.E." BIT
 1467  004534  052712  000002                    BIS     #BIT1,(R2)      ;NOW SET "DTR" TO GEN INTR.
 1468  004540  005767  174700            1$:     TST     INTFLG          ;DID INTR OCCUR YET ??
 1469  004544  001016                            BNE     4$              ;BR IF YES
 1470  004546  005305                            DEC     R5              ;COUNT THE TIMER
 1471  004550  001[??                            BNE     1$              ;BR IF NO TIMEOUT
 1472  004552  004[   007260                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1473  004556  005012                            CLR     (R2)            ;TURN IT ALL OFF
 1474  004560  012767  004570  174456            MOV     #2$,$ESCAPE     ;COME BACK TO 2$ IN ALL CASES
 1475  004566  104002                            ERROR+2                 ;"DATA SET" INTR FAILED TO OCCUR
 1476  004570                            2$:
 1477  004570  000417                            BR      TST20           ;;<GO TO NEXT TEST>
 1478  004572  005012                    3$:     CLR     (R2)            ;ZERO THE RCSR
 1479  004574  005167  174644                    COM     INTFLG          ;SET THE SOFTWARE FLAG
 1480  004600  000002                            RTI                     ;RETURN TO SENDER
 1481  004602  032712  100000            4$:     BIT     #BIT15,(R2)     ;DID "DATA SET INT" GET SET BY INTR. SERVICE ??
 1482  004606  001003                            BNE     5$              ;;<BR IF YES>
 1483  004610  004767  007222                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1484  004614  104002                            ERROR+2                 ;DATA SET INTR. NOT SERVICED PROPERLY
 1485  004616  020412                    5$:     CMP     R4,(R2)         ;ALL BITS IN RCSR CLEAR ??
 1486  004620  001403                            BEQ     TST20           ;;<BR IF YES>
 1487  004622  004767  007210                    JSR     PC,SUER2        ;GO SET UP ERROR INFO
 1488  004626  104002                            ERROR+2                 ;INTR. SERVICE FAILED TO CLEAR RCSR
 1489                                    ;;**********************************************************************
 1490                                    ;*TEST 20        TEST THAT THE "BREAK" BIT CAN BE SET AND CLEARED
 1491                                    ;;**********************************************************************
 1492  004630  000004                    TST20:  SCOPE
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1493  004632  032767  010000  174300          BIT     #SW12,SWR       ;ARE WE TESTING /C OR /D MODEL?
1494  004640  001024                          BNE     TST21           ;<BRANCH IF YES>
1495  004642  012704  000201                  MOV     #201,R4         ;RESULT S/B = 201 IN XCSR
1496  004646  016702  174542                  MOV     DLXCSR,R2       ;SET UP REGADR
1497  004652  052712  000001                  BIS     #BIT0,(R2)      ;SET THE "BREAK" BIT
1498  004656  C20412                          CMP     R4,(R2)         ;DID IT SET PROPERLY ??
1499  004660  001403                          BEQ     1$              ;<BR IF YES>
1500  004662  004767  007150                  JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1501  004666  104002                          ERROR+2                 ;"BREAK" BIT FAILED TO SET PROPERLY
1502  004670  012704  000200          1$:     MOV     #200,R4         ;RESULT S/B = 200 IN XCSR
1503  004674  042712  000001                  BIC     #BIT0,(R2)      ;CLEAR THE "BREAK" BIT
1504  004700  020412                          CMP     R4,(R2)         ;DID IT CLEAR PROPERLY ??
1505  004702  001403                          BEQ     TST21           ;<BR IF YES>
1506  004704  004767  007126                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
1507  004710  104002                          ERROR+2                 ;"BREAK" FAILED TO CLEAR PROPERLY
1508
1509
1510                                  ;;*****************************************************************
1511                                  ;*TEST 21        TEST THAT A "RESET" CLEARS THE "BREAK" BIT
1512                                  ;;*****************************************************************
1513  004712  000004          TST21:  SCOPE
1514  004714  012704  000200                  MOV     #200,R4         ;RESULT S/B = 200
1515  004720  016702  174470                  MOV     DLXCSR,R2       ;SET UP REGADR
1516  004724  052712  000001                  BIS     #BIT0,(R2)      ;SET THE "BREAK" BIT
1517  004730  000005                          RESET                   ;CLEAR IT WITH A "RESET"
1518  004732  020412                          CMP     R4,(R2)         ;DID IT CLEAR ??
1519  004734  001403                          BEQ     TST22           ;<BR IF YES>
1520  004736  004767  007074                  JSR     PC,SUER2        ;GO SET UP ERROR INFO.
1521  004742  104002                          ERROR+2                 ;RESET INSTR. FAILED TO CLEAR "BREAK"
1522
```

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1523                                    ;;*****************************************************************
1524                                    ;*TEST 22       TEST TO TURN AROUND NULL-DEL-NULL PATTERN
1525                                    ;;*****************************************************************
1526  004744  000004                    TST22:  SCOPE
1527  004746  012767  000001  174266            MOV     #1,$TIMES       ;;DO 1 ITERATION
1528  004754  004767  00?.?12                  JSR     PC,SUVEC        ;G. SET UP VECTORS
1529  004760  005067  174444                  CLR     RTRY            ;INITIALIZE RETRY FLAG
1530  004764  012767  014346  174444  1$:     MOV     #LDOUT1,LDOUT   ;SET POINTER TO LOAD ROUTINE
1531  004772  004767  007222                  JSR     PC,PRIME        ;GO SET UP BUFFERS AND DEVICE
1532  004776  005767  174420          2$:     TST     XFLGO           ;ANY HARD XMIT ERRORS ??
1533  005002  001040                          BNE     5$              ;BR IF YES
1534  005004  005767  174414                  TST     RFLGO           ;ANY HARD RECEIVEP ERROR ??
1535  005010  001053                          BNE     7$              ;BR IF YES
1536  005012  005767  174410                  TST     RFLG1           ;ANY SOFT RECEIVER ERRORS ??
1537  005016  001065                          BNE     9$              ;BR IF YES
1538  005020  022767  022322  174406          CMP     #BUFEND,IPTR    ;RECEIVED 256. BYTES ??
1539  005026  001003                          BNE     3$              ;BR IF NOT
1540  005030  004767  007456                  JSR     PC,CHKDAT       ;GO CHECK THE DATA BUFFERS
1541  005034  000500                          BR      TST23           ;;<GO TO NEXT TEST>
1542  005036  005367  174376          3$:     DEC     TIMR1           ;DEC TIMEOUT COUNTER 1
1543  005042  001355                          BNE     2$              ;BR IF NO TIMEOUT
1544  005044  005367  174372                  DEC     TIMR2           ;DEC TIMEOUT COUNTER 2
1545  005050  001352                          BNE     2$              ;BR IF NO TIMEOUT
1546  005052  042777  000100  174330          BIC     #100,@DLRCSR    ;TURN OFF THE INTRS.
1547  005060  042777  000104  174326          BIC     #104,@DLXCSR
1548  005066  104401  016325                  TYPE    ,XMSG1          ;GO TYPE TIMEOUT MESSAGE
1549  005072  012767  005102  174144          MOV     #4$,$ESCAPE     ;GO TO 4$ AFTER ERROR PRINT
1550  005100  104000                          ERROR                   ;PRINT ERROR PC
1551  005102                          4$:
1552  005102  000455                          BR      TST23           ;;<GO TO NEXT TEST>
1553  005104  016701  174300          5$:     MOV     DLRCSR,R1       ;PUT DEVADR IN R1
1554  005110  016702  174300                  MOV     DLXCSR,R2       ;PUT REGADR IN R2
1555  005114  011203                          MOV     (R2),R3         ;GET THE WAS DATA
1556  005116  012704  000204                  MOV     #204,R4         ;PUT S/B DATA IN R4
1557  005122  004767  006736                  JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1558  005126  012767  005136  174110          MOV     #6$,$ESCAPE     ;GO TO 6$ AFTER PRINTING ERROR
1559  005134  104002                          ERROR+2                 ;TRANSMITTER FALSE INTERRUPT
1560  005136                          6$:
1561  005136  000437                          BR      TST23           ;;<GO TO NEXT TEST>
1562  005140  016701  174244          7$:     MO.     DLRCSR,R1       ;SAVE THE DE.ADR
1563  005144  010102                          MOV     R1,R2           ;SAVE THE REGADR
1564  005146  011203                          MOV     (R2),R3         ;GET THE WAS DATA
1565  005150  012704  000200                  MOV     #200,R4         ;RESULT S/B = 200
1566  005154  004767  006704                  JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1567  005160  012767  005170  174056          MOV     #8$,$ESCAPE     ;GO TO 8$ AFTER ERROR PRINT
1568  005166  104002                          ERROR+2                 ;RECEIVER FALSE INTERRUPT
1569  005170                          8$:
1570  005170  000422                          BR      TST23           ;;<GO TO NEXT TEST>
1571  005172  016701  174212          9$:     MOV     DLRCSR,R1       ;SAVE THE DEVADR
1572  005176  016702  174210                  MOV     DLRDBR,R2       ;SAVE REGADR
1573  005202  016703  173776                  MOV     $TMP1,R3        ;GET CONTENTS OF ERROR RDBR
1574  005206  004767  006652                  JSR     PC,SUERR1       ;GO SETUP ERROR INFO
1575  005212  012767  005222  174024          MOV     #10$,$ESCAPE    ;GO TO 10$ AFTER ERROR PRINT
1576  005220  .?4005                          ERROR+5                 ;REPORT SOFT ERROR (PARITY,FRAMING, OR OVERR..
1577  005222  005267  174202          10$:    INC     RTRY            ;COUNT ONE TRY
1578  005226  022767  000003  174174          CMP     #3,RTRY         ;TRIED THREE TIMES
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  1579  005234  001253                    BNE     1$              ;BR IF NOT
```

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1580                                        ;;*****************************************************************
1581                                        ;*TEST 23       TEST TO TURN AROUND BINARY UP COUNT PATTERN
1582                                        ;;*****************************************************************
1583  005236  000004                TST23:  SCOPE
1584  005240  012767  000001  173774        MOV     #1,$TIMES       ;;DO 1 ITERATION
1585  005246  004767  006720                JSR     PC,SUVEC        ;GO SET UP VECTORS
1586  005252  005067  174152                CLR     RTRY            ;INITIALIZE RETRY FLAG
1587  005256  012767  014370  174152  1$:   MOV     #LDOUT2,LDOUT   ;SET POINTER TO LOAD ROUTINE
1588  005264  004767  006730                JSR     PC,PRIME        ;GO SET UP BUFFERS AND DEVICE
1589  005270  005767  174126          2$:   TST     XFLGO           ;ANY HARD XMIT ERRORS ??
1590  005274  001040                        BNE     5$              ;BR IF YES
1591  005276  005767  174122                TST     RFLGO           ;ANY HARD RECEIVER ERROR ??
1592  005302  001053                        BNE     7$              ;BR IF YES
1593  005304  005767  174116                TST     RFLG1           ;ANY SOFT RECEIVER ERRORS ??
1594  005310  001065                        BNE     9$              ;BR IF YES
1595  005312  022767  022322  174114        CMP     #BUFEND,IPTR    ;RECEIVED 256. BYTES ??
1596  005320  001003                        BNE     3$              ;BR IF NOT
1597  005322  004767  007164                JSR     PC,CHKDAT       ;GO CHECK THE DATA BUFFERS
1598  005326  000500                        BR      TST24           ;;<GO TO NEXT TEST>
1599  005330  005367  174104          3$:   DEC     TIMR1           ;DEC TIMEOUT COUNTER 1
1600  005334  001355                        BNE     2$              ;BR IF NO TIMEOUT
1601  005336  005367  174100                DEC     TIMR2           ;DEC TIMEOUT COUNTER 2
1602  005342  001352                        BNE     2$              ;BR IF NO TIMEOUT
1603  005344  042777  000100  174036        BIC     #100,@DLRCSR    ;TURN OFF THE INTRS.
1604  005352  042777  000104  174034        BIC     #104,@DLXCSR
1605  005360  104401  016405                TYPE    ,XMSG2          ;GO TYPE TIMEOUT MESSAGE
1606  005364  012767  005374  173655        MOV     #4$,$ESCAPE     ;GO TO 4$ AFTER ERROR PRINT
1607  005372  104000                        ERROR                   ;PRINT ERROR PC
1608  005374                          4$:
1609  005374  000455                        BR      TST24           ;;<GO TO NEXT TEST>
1610  005376  016701  174006          5$:   MOV     DLRCSR,R1       ;PUT DEVADR IN R1
1611  005402  016702  174006                MOV     DLXCSR,R2       ;PUT REGADR IN R2
1612  005406  011203                        MOV     (R2),R3         ;GET THE WAS DATA
1613  005410  012704  000204                MOV     #204,R4         ;PUT S/B DATA IN R4
1614  005414  004767  006444                JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1615  005420  012767  005430  173616        MOV     #6$,$ESCAPE     ;GO TO 6$ AFTER PRINTING ERROR
1616  005426  104002                        ERROR+2                 ;TRANSMITTER FALSE INTERRUPT
1617  005430                          6$:
1618  005430  000437                        BR      TST24           ;;<GO TO NEXT TEST>
1619  005432  016701  173752          7$:   MOV     DLRCSR,R1       ;SAVE THE DEVADR
1620  005436  010102                        MOV     R1,R2           ;SAVE THE REGADR
1621  005440  011203                        MOV     (R2),R3         ;GET THE WAS DATA
1622  005442  012704  000200                MOV     #200,R4         ;RESULT S/B = 200
1623  005446  004767  006412                JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1624  005452  012767  005462  173564        MOV     #8$,$ESCAPE     ;GO TO 8$ AFTER ERROR PRINT
1625  005460  104002                        ERROR+2                 ;RECEIVER FALSE INTERRUPT
1626  005462                          8$:
1627  005462  000422                        BR      TST24           ;;<GO TO NEXT TEST>
1628  005464  016701  173720          9$:   MOV     DLRCSR,R1       ;SAVE THE DEVADR
1629  005470  016702  173716                MOV     DLRDBR,R2       ;SAVE REGADR
1630  005474  016703  173504                MOV     $TMP1,R3        ;GET CONTENTS OF ERROR RDBR
1631  005500  004767  006360                JSR     PC,SUERR1       ;GO SETUP ERROR INFO
1632  005504  012767  005514  173532        MOV     #10$,$ESCAPE    ;GO TO 10$ AFTER ERROR PRINT
1633  005512  104005                        ERROR+5                 ;REPORT SOFT ERROR (PARITY,FRAMING, OR OVERRUN
1634  005514  005267  173710          10$:  INC     RTRY            ;COUNT ONE TRY
1635  005520  022767  000003  173702        CMP     #3,RTRY         ;TRIED THREE TIMES
```

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  1636  005526  001253                    BNE     1$              ;BR IF NOT
```

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1637                                    ;;*****************************************************************
1638                                    ;*TEST 24       TEST TO TURN AROUND BINARY DOWN COUNT PATTERN
1639                                    ;;*****************************************************************
1640  005530  000004                    TST24:  SCOPE
1641  005532  012767  000001  173502            MOV     #1,$TIMES       ;;DO 1 ITERATION
1642  005540  004767  006426                    JSR     PC,SUVEC        ;GO SET UP VECTORS
1643  005544  005067  173660                    CLR     RTRY            ;INITIALIZE RETRY FLAG
1644  005550  012767  014410  173660  1$:       MOV     #LDOUT3,LDOUT   ;SET POINTER TO LOAD ROUTINE
1645  005556  004767  006436                    JSR     PC,PRIME        ;GO SET UP BUFFERS AND DEVICE
1646  005562  005767  173634          2$:       TST     XFLGO           ;ANY HARD XMIT ERRORS ??
1647  005566  001040                    BNE     5$              ;BR IF YES
1648  005570  005767  173630                    TST     RFLGO           ;ANY HARD RECEIVER ERROR ??
1649  005574  001053                    BNE     7$              ;BR IF YES
1650  005576  005767  173624                    TST     RFLG1           ;ANY SOFT RECEIVER ERRORS ??
1651  005602  001065                    BNE     9$              ;BR IF YES
1652  005604  022767  022322  173622            CMP     #BUFEND,IPTR    ;RECEIVED 256. BYTES ??
1653  005612  001003                    BNE     3$              ;BR IF NOT
1654  005614  004767  006672                    JSR     PC,CHKDAT       ;GO CHECK THE DATA BUFFERS
1655  005620  000500                    BR      TST25           ;;<GO TO NEXT TEST>
1656  005622  005367  173612          3$:       DEC     TIMR1           ;DEC TIMEOUT COUNTER 1
1657  005626  001355                    BNE     2$              ;BR IF NO TIMEOUT
1658  005630  005367  173606                    DEC     TIMR2           ;DEC TIMEOUT COUNTER 2
1659  005634  001352                    BNE     2$              ;BR IF NO TIMEOUT
1660  005636  042777  000100  173544            BIC     #100,@DLRCSR    ;TURN OFF THE INTRS.
1661  005644  042777  000104  173542            BIC     #104,@DLXCSR
1662  005652  104401  016466                    TYPE    ,XMSG3          ;GO TYPE TIMEOUT MESSAGE
1663  005656  012767  005666  173360            MOV     #4$,$ESCAPE     ;GO TO 4$ AFTER ERROR PRINT
1664  005664  104000                    ERROR                   ;PRINT ERROR PC
1665  005666                          4$:
1666  005666  000455                    BR      TST25           ;;<GO TO NEXT TEST>
1667  005670  016701  173514          5$:       MOV     DLRCSR,R1       ;PUT DEVADR IN R1
1668  005674  016702  173514                    MOV     DLXCSR,R2       ;PUT REGADR IN R2
1669  005700  011203                    MOV     (R2),R3         ;GET THE WAS DATA
1670  005702  012704  000204                    MOV     #204,R4         ;PUT S/B DATA IN R4
1671  005706  004767  006152                    JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1672  005712  012767  005722  173324            MOV     #6$,$ESCAPE     ;GO TO 6$ AFTER PRINTING ERROR
1673  005720  104002                    ERROR+2                 ;TRANSMITTER FALSE INTERRUPT
1674  005722                          6$:
1675  005722  000437                    BR      TST25           ;;<GO TO NEXT TEST>
1676  005724  016701  173460          7$:       MOV     DLRCSR,R1       ;SAVE THE DEVADR
1677  005730  010102                    MOV     R1,R2           ;SAVE THE REGADR
1678  005732  011203                    MOV     (R2),R3         ;GET THE WAS DATA
1679  005734  012704  000200                    MOV     #200,R4         ;RESULT S/B = 200
1680  005740  004767  006120                    JSR     PC,SUERR1       ;GO SET UP ERROR INFO
1681  005744  012767  005754  173272            MOV     #8$,$ESCAPE     ;GO TO 8$ AFTER ERROR PRINT
1682  005752  104002                    ERROR+2                 ;RECEIVER FALSE INTERRUPT
1683  005754                          8$:
1684  005754  000422                    BR      TST25           ;;<GO TO NEXT TEST>
1685  005756  016701  173426          9$:       MOV     DLRCSR,R1       ;SAVE THE DEVADR
1686  005762  016702  173424                    MOV     DLRDBR,R2       ;SAVE REGADR
1687  005766  016703  173212                    MOV     $TMP1,R3        ;GET CONTENTS OF ERROR RDBR
1688  005772  004767  006066                    JSR     PC,SUERR1       ;GO SETUP ERROR INFO
1689  005776  012767  006006  173240            MOV     #10$,$ESCAPE    ;GO TO 10$ AFTER ERROR PRINT
1690  006004  104005                    ERROR+5                 ;REPORT SOFT ERROR (PARITY,FRAMING, OR OVERRUN
1691  006006  005267  173416          10$:      INC     RTRY            ;COUNT ONE TRY
1692  006012  022767  000003  173410            CMP     #3,RTRY         ;TRIED THREE TIMES
```

B04


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1693 006020 001253                BNE     1$              ;BR IF NOT
```

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                                        ;;**********************************************************************
                                        ;*TEST 25    TEST TO TURN AROUND WORST CASE PATTERN
                                        ;;**********************************************************************
006022  000004                  TST25:  SCOPE
006024  012767  000001  173210          MOV     #1,$TIMES       ;;DO 1 ITERATION
006032  004767  006134          1$:     JSR     PC,SUVEC        ;GO SET UP VECTORS
006036  005067  173366                  CLR     RTRY            ;INITIALIZE RETRY FLAG
006042  012767  014444  173366          MOV     #LDOUT4,LDOUT   ;SET POINTER TO LOAD ROUTINE
006050  004767  006144                  JSR     PC,PRIME        ;GO SET UP BUFFERS AND DEVICE
006054  005767  173342          2$:     TST     XFLGC           ;ANY HARD XMIT ERRORS ??
006060  001042                  BNE     5$              ;BR IF YES
006062  005767  173336          TST     RFLGC           ;ANY HARD RECEIVER ERROR ??
006066  001056                  BNE     7$              ;BR IF YES
006070  005767  173332          TST     RFLG1           ;ANY SOFT RECEIVER ERRORS ??
006074  001071                  BNE     9$              ;BR IF YES
006076  022767  022322  173330  CMP     #BUFEND,IPTR    ;RECEIVED 256. BYTES ??
006104  001004                  BNE     3$              ;BR IF NOT
006106  004767  006400          JSR     PC,CHKDAT       ;GO CHECK THE DATA BUFFERS
006112  000167  000012          JMP     $EOP                    ;GO TO NEXT TEST
006116  005367  173316          3$:     DEC     TIMR1           ;DEC TIMEOUT COUNTER 1
006122  001354                  BNE     2$              ;BR IF NO TIMEOUT
006124  005367  173312          DEC     TIMR2           ;DEC TIMEOUT COUNTER 2
006130  001351                  BNE     2$              ;BR IF NO TIMEOUT
006132  042777  000100  173250  BIC     #100,@DLRCSR    ;TURN OFF THE INTRS.
006140  042777  000104  173246  BIC     #104,@DLXCSR
006146  104401  016551          TYPE    ,XMS34          ;GO TYPE TIMEOUT MESSAGE
006152  012767  006162  173064  MOV     #4$,$ESCAPE     ;GO TO 4$ AFTER ERROR PRINT
006160  104000                  ERROR                   ;PRINT ERROR PC
006162  000167  001742          4$:     JMP     $EOP            ;GO TO NEXT TEST
006166  016701  173216          5$:     MOV     DLRCSR,R1       ;PUT DEVADR IN R1
006172  016702  173216          MOV     DLXCSR,R2       ;PUT REGADR IN R2
006176  011203                  MOV     (R2),R3         ;GET THE WAS DATA
006200  012704  000204          MOV     #204,R4         ;PUT S/B DATA IN R4
006204  004767  005654          JSR     PC,SUERR1       ;GO SET UP ERROR INFO
006210  012767  006220  173026  MOV     #6$,$ESCAPE     ;GO TO 6$ AFTER PRINTING ERROR
006216  104002                  ERROR+2                 ;TRANSMITTER FALSE INTERRUPT
006220  000167  001704          6$:     JMP     $EOP            ;GO TO NEXT TEST
006224  016701  173160          7$:     MOV     DLRCSR,R1       ;SAVE THE DEVADR
006230  010102                  MOV     R1,R2           ;SAVE THE REGADR
006232  011203                  MOV     (R2),R3         ;GET THE WAS DATA
006234  012704  000200          MOV     #200,R4         ;RESULT S B = 200
006240  004767  005620          JSR     PC,SUERR1       ;GO SET UP ERROR INFO
006244  012767  006254  172772  MOV     #8$,$ESCAPE     ;GO TO 8$ AFTER ERROR PRINT
006252  104002                  ERROR+2                 ;RECEIVER FALSE INTERRUPT
006254  000167  001650          8$:     JMP     $EOP            ;GO TO NEXT TEST
006260  016701  173124          9$:     MOV     DLRCSR,R1       ;SAVE THE DEVADR
006264  016702  173122          MOV     DLRDBR,R2       ;SAVE REGADR
006270  016703  172710          MOV     STMP1,R3        ;GET CONTENTS OF ERROR RDBR
006274  004767  005664          JSR     PC,SUERR1       ;GO SETUP ERROR INFO
006300  012767  006310  172736  MOV     #10$,$ESCAPE    ;GO TO 10$ AFTER ERROR PRINT
006306  104005                  ERROR+5                 ;REPORT SOFT ERROR (PARITY,FRAMING, OR OVERRUN
006310  005267  173114          10$:    INC     RTRY            ;COUNT ONE TRY
006314  022767  000003  173106  CMP     #3,RTRY         ;TRIED THREE TIMES
006322  001247                  BNE     1$              ;BR IF NOT
006324  000167  001600          JMP     $EOP            ;GO TO END OF PASS ROUTINE
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                                        ;THIS IS PROGRAM #2
                                        ;THE FOLLOWING USER UTILITY PROGRAM WILL ALLOW:
                                        ;       A)  SELECTION OF A TRANSMITTER DATA BUFFER
                                        ;       B)  SELECTION OF A CHARACTER FOR CONTINUOUS TRANSFER
                                        ;       C)  SELECTION OF AN EXPIRATION TIME IN MILLISECONDS
                                        ;           BETWEEN EACH TRANSMITTER DATA BUFFER CHARACTER TRANSFER
                                        ;       D)  A TIGHT SCOPE LOOP LOCK ON A SPECIFIC CHARACTER
                                        ;
006330  012706  001100          PRG2:   MOV     #STACK,SP       ;INITIALIZE THE STACK POINTER
006334  012737  013052  000034          MOV     #$TRAP,@#TRAPVEC        ;TRAP VECTOR FOR TRAP CALLS
006342  012737  000340  000036          MOV     #340,@#TRAPVEC+2        ;LEVEL 7
006350  012737  010732  000030          MOV     #$ERROR,@#EMTVEC        ;EMT VECTOR FOR ERROR ROUTINE
006356  012737  000340  000032          MOV     #340,@#EMTVEC+2         ;LEVEL 7
006364  104401  016664                  TYPE    ,PRG2M          ;INDICATE THAT USER SELECTED
                                                                ;PROGRAM #2
006370  104401  020306          PRG2A:  TYPE    ,LINTAD         ;ASK USER FOR THE TRANSMITTER
                                                                ;DATA BUFFER ADDRESS OF THE DEVICE
                                                                ;HE WISHES TO TEST
006374  104410                          RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
                                                                ;AND STORE ON TOP OF STACK
                                        ;CHECK TO SEE IF THE USER RESPONSE WAS WITHIN LIMITS
006376  012602                          MOV     (SP)+,R2        ;GET THE ANSWER TYPED
006400  020227  176176                  CMP     R2,#176176      ;IS THE NUMBER TOO HIGH?
006404  101065                          BHI     REDO1           ;IF YES - GO TO RETRY SITUATION
006406  020227  175616                  CMP     R2,#175616      ;IS THE NUMBER TOO LOW?
006412  103462                          BLO     REDO1           ;IF YES - GO TO RETRY SITUATION
006414  132702  000001                  BITB    #BIT0,R2        ;NUMBER IS IN RANGE BUT IS IT
                                                                ;ON AN EVEN BOUNDARY?
006420  001357                          BNE     REDO1           ;IF NOT GO TO RETRY SITUATION
                                        ;CHECK TO SEE IF USER RESPONSE WAS TRULY A XMIT BUFFER REGISTER
006422  010203                          MOV     R2,R3           ;GET THE USER RESPONSE
006424  142703  000370                  BICB    #370,R3         ;MASK OFF LOWER BYTE EXCEPT FOR
                                                                ;LEAST SIGNIFICANT DIGIT
006430  122703  000006                  CMPB    #6,R3           ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
                                                                ;USER RESPONSE EQUAL TO A SIX?
006434  001051                          BNE     REDO1           ;BRANCH IF NOT
006436  010267  172540                  MOV     R2,$TMP0        ;THE TRANSMITTER ADDRESS
                                                                ;TYPED IS OK - STORE FOR
                                                                ;FUTURE USE
                                        ;NOW CHECK TO MAKE SURE THE DEVICE IS PRESENT
006442  016746  171336                  MOV     ERRVEC,-(SP)    ;SAVE THE TIMEOUT VECTOR
006446  012767  006460  171330          MOV     #2$,ERRVEC      ;SET UP TIMEOUT SERVICE ADDRESS
006454  005712                          TST     (R2)            ;IF PRESENT WE WILL EXECUTE THE
                                                                ;NEXT INSTRUCTION - IF NOT
                                                                ;WE GO TO 2$:
006456  000412                          BR      4$              ;BRANCH IF PRESENT
006460  004767  005460          2$:     JSR     PC,SUERT2       ;GO SET UP FOR ERROR INFORMATION
006464  012767  006474  172552          MOV     #3$,$ESCAPE     ;POINT OF RETURN AFTER ERROR REPORT
006472  104006                          ERROR   +6              ;XDBR REFERENCE CAUSED TIMEOUT
006474  022626                  3$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
006476  012667  171302                  MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR
006502  000426                          BR      REDO1           ;GO TO RETRY SITUATION
006504  012667  171274          4$:     MOV     (SP)+,ERRVEC    ;DEVICE REGISTER IS PRESENT!
                                                                ;RESTORE TIMEOUT VECTOR
                                        ;WE ARE NOW READY FOR THE CHARACTER TO BE TRANSMITTED, AND THE
```

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MAINDEC-11-D2DLC-A     MACY11 27(732)  20-SEP-76  09:19  PAGE 43
D2DLCA.P11      T25    TEST TO TURN AROUND WORST CASE PATTERN

                                        ;DELAY TIME (IN MILLISECONDS) THAT IS TO TRANSPIRE BETWEEN
                                        ;SUCCESSIVE CHARACTER TRANSFERS
006510  104401  020367        PRG2B:  TYPE    .SELCAR         ;ASK USER FOR THE CHAPACTER HE
                                                              ;WISHES TO TRANSFER
006514  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY
                                                              ;USER AND STORE ON TOP OF STACK
006516  012667  172462                MOV     (SP)+,$TMP1     ;GET THE ANSWER TYPED
                                ;NOTE:  THE USER RESPONSE FOR THE CHARACTER WAS TO BE THE
                                ;       OCTAL ASCII EQUIVALENT OF THE CHARACTER E.G. A=101
006522  104401  020475                TYPE    .SELDLY         ;ASK THE USER FOR THE DELAY
                                                              ;IN MSEC (OCTAL NO.) BETWEEN
                                                              ;CHARACTER TRANSFERS
006526  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY
                                                              ;USER AND STORE ON TOP OF STACK
006530  012667  172452                MOV     (SP)+,$TMP2     ;GET THE ANSWER TYPED
006534  116767  172446  000012  1$:   MOVB    $TMP2,2$        ;SET THE DELAY COUNT ARGUMENT
                                                              ;FOR TIMER ROUTINE
006542  116777  172436  172432        MOVB    $TMP1,@$TMPC    ;LOAD THE TRANSMITTER DATA
                                                              ;BUFFER WITH THE CHARACTER
006550  004767  004750                JSR     PC,DELAY        ;GO OFF TO WAIT THE SPECIFIED
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                                                                ;NO. OF MSEC. BEFORE ISSUING
                                                                ;ANOTHER CHARACTER
006554  000000          2$:     .WORD   0                       ;THIS IS WHERE THE DELAY COUNT RESIDES
006556  000766                  BR      1$                      ;GO BACK TO ISSUE ANOTHER CHARACTER
006560  104401  001252  REDO1:  TYPE    ,$QUES                  ;TYPE A QUESTION MARK(?)
006564  000167  177600          JMP     PRG2A                   ;REITERATE THE XDBR QUESTION TO USER
                        ;THIS IS PROGRAM #3
                        ;THE FOLLOWING USER UTILITY PROGRAM WILL ALLOW:
                        ;       A)  SELECTION OF A RECEIVER DATA BUFFER
                        ;       B)  SELECTION OF A CHARACTER FOR CONTINUOUS TRANSFER
                        ;       C)  SELECTION OF AN EXPIRATION TIME IN MILLISECONDS
                        ;           BETWEEN EACH RECEIVER DATA BUFFER CHARACTER TRANSFER
                        ;       D)  A TIGHT SCOPE LOOP LOCK ON A SPECIFIC CHARACTER
                        ;
006570  012706  001100  PRG3:   MOV     #STACK,SP               ;INITIALIZE THE STACK POINTER
006574  012737  013052  000034          MOV     #$TRAP,@#TRAPVEC        ;TRAP VECTOR FOR TRAP CALLS
006602  012737  000340  000036          MOV     #340,@#TRAPVEC+2        ;LEVEL 7
006610  012737  010732  000030          MOV     #$ERROR,@#EMTVEC        ;EMT VECTOR FOR ERROR ROUTINE
006616  012737  000340  000032          MOV     #340,@#EMTVEC+2         ;LEVEL 7
006624  104401  016730                  TYPE    .PRG3M                  ;INDICATE THAT USER SELECTED
                                                                ;PROGRAM #3
006630  104401  020570  PRG3A:  TYPE    .LINRAD                 ;ASK USER FOR THE RECEIVER DATA
                                                                ;BUFFER ADDRESS OF THE DEVICE
                                                                ;HE WISHES TO TEST
006634  104410                  RDOCT                           ;ACCEPT THE ANSWER TYPED BY
                                                                ;USER AND STORE ON TOP OF STACK
                        ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
006636  012602                  MOV     (SP)+,R2                ;GET THE ANSWER TYPED
006640  020227  176172          CMP     R2,#176172              ;IS THE NUMBER TOO HIGH?
006644  101071                  BHI     REDO2                   ;IF YES - GO TO RETRY SITUATION
006646  020227  175612          CMP     R2,#175612              ;IS THE NUMBER TOO LOW?
006652  103466                  BLO     REDO2                   ;IF YES - GO TO RETRY SITUATION
006654  132702  000001          BITB    #BIT0,R2                ;NUMBER IS IN RANGE BUT IS IT
                                                                ;ON AN EVEN BOUNDARY?
006660  001063                  BNE     REDO2                   ;IF NOT - GO TO RETRY SITUATION
                        ;CHECK TO SEE IF USER RESPONSE WAS TRULY A RCVR DBR ADDRESS
006662  010203                  MOV     R2,R3                   ;GET THE USER RESPONSE
006664  142703  000370          BICB    #370,R3                 ;MASK OFF LOWER BYTE EXCEPT FOR
                                                                ;LEAST SIGNIFICANT DIGIT
005670  122703  000002          CMPB    #2,R3                   ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
                                                                ;USER RESPONSE EQUAL TO A TWO?
006674  001055                  BNE     REDO2                   ;BRANCH IF NOT
006676  010267  172300          MOV     R2,$TMP0                ;THE RECEIVER ADDRESS TYPED IS
                                                                ;OK - STORE FOR FUTURE USE
                        ;NOW CHECK TO MAKE SURE THE DEVICE IS PRESENT
006702  016746  171076          MOV     ERRVEC,-(SP)            ;SAVE THE TIMEOUT VECTOR
006706  012767  006720  171070  MOV     #2$,ERRVEC              ;SET UP TIMEOUT SERVICE ADDRESS
006714  005712                  TST     (R2)                    ;IF PRESENT WE WILL EXECUTE THE
                                                                ;NEXT INSTRUCTION - IF NOT WE
                                                                ;GO TO 2$:
006716  000412                  BR      4$                      ;BRANCH IF PRESENT
006720  004767  005220  2$:     JSR     PC,SUERT2               ;GO SET UP FOR ERROR INFORMATION
006724  012767  005734  172312  MOV     #3$,$ESCAPE             ;POINT OF RETURN AFTER ERROR REPORT
006732  104006                  ERROR   +6                      ;RDBR REFERENCE CAUSED TIMEOUT
006734  022626          3$:     CMP     (SP)+,(SP)+             ;CLEAN STACK FROM TIMEOUT
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1882  006736  012567  171042                  MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR
1883  006742  000432                          BR      REDO2           ;GO TO RETRY SITUATION
1884  006744  012667  171034          4$:     MOV     (SP)+,ERRVEC    ;DEVICE REGISTER IS PRESENT!
1885                                                                  ;RESTORE TIMEOUT VECTOR
1886                                  ;WE ARE NOW READY FOR THE CHARACTER TO BE TRANSMITTED, AND THE
1887                                  ;DELAY TIME (IN MILLISECONDS) THAT IS TO TRANSPIRE BETWEEN SUCCESSIVE
1888                                  ;CHARACTER TRANSFERS
1889  006750  104401  020367          PRG3B:  TYPE    ,SELCAR         ;ASK USER FOR THE CHARACTER
1890                                                                  ;HE WISHES TO TRANSFER
1891  006754  104410                          RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
1892                                                                  ;AND STORE ON TOP OF STACK
1893  006756  012667  172222                  MOV     (SP)+,$TMP1     ;GET THE ANSWER TYPED
1894                                  ;NOTE:  THE USER RESPONSE FOR THE CHARACTER WAS TO BE THE
1895                                  ;       OCTAL ASCII EQUIVALENT OF THE CHARACTER E.G. B=102
1896  006762  104401  020475                  TYPE    ,SELDLY         ;ASK THE USER FOR THE DELAY
1897                                                                  ;IN MSEC (OCTAL NO.) BETWEEN
1898                                                                  ;CHARACTER TRANSFERS
1899  006766  104410                          RDOCT                   ;ACCEPT THE ANSWER TYPED BY
1900                                                                  ;USER AND STORE ON TOP OF STACK
1901  006770  012667  172212                  MOV     (SP)+,$TMP2     ;GET THE ANSWER TYPED
1902  006774  062702  000002                  ADD     #2,R2           ;GET THE CORRESPONDING XCSR
1903                                                                  ;ADDRESS FOR RECEIVER UNDER-
1904                                                                  ;GOING TEST
1905  007000  052712  000004          1$:     BIS     #BIT2,(R2)      ;SET MAINTENANCE BIT IN XCSR
1906  007004  116767  172176  000012          MOVB    $TMP2,2$        ;SET THE DELAY COUNT ARGUMENT
1907                                                                  ;FOR TIMER ROUTINE
1908  007012  116777  172166  172162          MOVB    $TMP1,@$TMP0    ;LOAD THE RECEIVER DATA BUFFER
1909                                                                  ;WITH THE CHARACTER
1910  007020  004767  004500                  JSR     PC,DELAY        ;GO OFF TO WAIT THE SPECIFIED
1911                                                                  ;NO. OF MSEC. BEFORE ISSUING
1912                                                                  ;ANOTHER CHARACTER
1913  007024  000000          2$:     .WORD   0               ;THIS IS WHERE THE DELAY COUNT RESIDES
1914  007026  000764                  BR      1$              ;GO BACK TO ISSUE ANOTHER CHARACTER
1915  007030  104401  001252  REDO2:  TYPE    ,$QUES          ;TYPE A QUESTION MARK(?)
1916  007034  000167  177570          JMP     PRG3A           ;REITERATE THE RDBR QUESTION TO
1917                                                          ;USER
1918
1919                                  ;THIS IS PROGRAM #4
1920                                  ;THE FOLLOWING USER UTILITY PROGRAM WILL ALLOW:
1921                                  ;       A)  SELECTION OF A TRANSMITTER DATA BUFFER
1922                                  ;       B)  SELECTION OF A SINGLE CHARACTER TO BE SENT, RECEIVED
1923                                  ;           AND CHECKED WITH MAINTENANCE BIT SET
1924                                  ;
1925
1926  007040  012706  001100  PRG4:   MOV     #STACK,SP       ;INITIALIZE THE STACK POINTER
1927  007044  012737  013052  000034          MOV     #$TRAP,@#TRAPVEC        ;TRAP VECTOR FOR TRAP CALLS
1928  007052  012737  000340  000036          MOV     #340,@#TRAPVEC+2        ;LEVEL 7
1929  007060  012737  010732  000030          MOV     #$ERROR,@#EMTVEC        ;EMT VECTOR FOR ERROR ROUTINE
1930  007066  012737  000340  000032          MOV     #340,@#EMTVEC+2         ;LEVEL 7
1931  007074  104401  016774                  TYPE    ,PROG4M         ;INDICATE THAT USER SELECTED
1932                                                                  ;PROGRAM #4
1933  007100  104401  020306  PRG4A:  TYPE    ,LINTAD         ;ASK USER FOR THE TRANSMITTER
1934                                                                  ;DATA BUFFER ADDRESS OF THE
1935                                                                  ;DEVICE HE WISHES TO TEST
1936  007104  104410                          RDOCT                   ;ACCEPT THE ANSWER TYPED BY
1937                                                                  ;USER AND STORE ON TOP OF STACK
```

```
                                        ;CHECK TO SEE IF THE USER RESPONSE WAS WITHIN LIMITS
1938
1939  007106  012602                    MOV     (SP)+,R2        ;GET THE ANSWER TYPED
1940  007110  020227  176176            CMP     R2,#176176      ;IS THE NUMBER TOO HIGH?
1941  007114  101136                    BHI     REDO3           ;IF YES - GO TO RETRY SITUATION
1942  007116  020227  175616            CMP     R2,#175616      ;IS THE NUMBER TOO LOW?
1943  007122  103533                    BLO     REDO3           ;IF YES - GO TO RETRY SITUATION
1944  007124  132702  000001            BITB    #BIT0,R2        ;NUMBER IS IN RANGE BUT IS IT
1945                                                            ;ON AN EVEN BOUNDARY?
1946  007130  001130                    BNE     REDO3           ;IF NO - GO TO RETRY SITUATION
1947                                  ;CHECK TO SEE IF USER RESPONSE WAS TRULY A XMIT BUFFER REGISTER
1948  007132  010203                    MOV     R2,R3           ;GET THE USER RESPONSE
1949  007134  142703  000370            BICB    #370,R3         ;MASK OFF LOWER BYTE EXCEPT FOR
1950                                                            ;LEAST SIGNIFICANT DIGIT
1951  007140  122703  000006            CMPB    #6,R3           ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
1952                                                            ;USER RESPONSE EQUAL TO A SIX?
1953  007144  001122                    BNE     REDO3           ;BRANCH IF NOT
1954  007146  010267  172030            MOV     R2,$TMP0        ;THE TRANSMITTER ADDRESS TYPED
1955                                                            ;IS OK - STORE FOR FUTURE USE
1956                                  ;NOW CHECK TO MAKE SURE THE DEVICE IS PRESENT
1957  007152  016746  170626            MOV     ERRVEC,-(SP)    ;SAVE THE TIMEOUT VECTOR
1958  007156  012767  007170  170620    MOV     #2$,ERRVEC      ;SET UP TIMEOUT SERVICE ADDRESS
1959  007164  005712                    TST     (R2)            ;IF PRESENT WE WILL EXECUTE THE
1960                                                            ;NEXT INSTRUCTION - IF NOT WE
1961                                                            ;GO TO 2$:
1962  007166  000412                    BR      4$              ;BRANCH IF PRESENT
1963  007170  004767  004750    2$:     JSR     PC,$JERT2       ;GO SET UP FOR ERROR INFORMATION
1964  007174  012767  007204  172042    MOV     #3$,$ESCAPE     ;POINT OF RETURN AFTER ERROR REPORT
1965  007202  104006                    ERROR   +6              ;XDBR REFERENCE CAUSED TIMEOUT
1966  007204  022626            3$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
1967  007206  012667  170572            MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR
1968  007212  000477                    BR      REDO3           ;GO TO RETRY SITUATION
1969  007214  012667  170564    4$:     MOV     (SP)+,ERRVEC    ;DEVICE REGISTER IS PRESENT!
1970                                                            ;RESTORE TIMEOUT VECTOR
1971  007220  104401  020646            TYPE    ,RSTALL         ;ASK THE USER IF HE DESIRES SOME
1972                                                            ;RANDOM NO. OF MSEC. WAIT TIME
1973                                                            ;BEFORE CHECKING FOR XCSR DONE
1974                                                            ;FLAG
1975  007224  104410                    RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
1976                                                            ;AND STORE ON TOP OF STACK
1977  007226  012667  171754            MOV     (SP)+,$TMP2     ;GET THE ANSWER TYPED
1978                                  ;WE ARE NOW READY FOR THE CHARACTER TO BE TRANSMITTED
1979  007232  104401  020367    PRG4B:  TYPE    ,SELCAR         ;ASK USER FOR THE CHARACTER HE
1980                                                            ;WISHES TO TRANSFER
1981  007236  104410                    RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
1982                                                            ;AND STORE ON TOP OF STACK
1983  007240  012667  171740            MOV     (SP)+,$TMP1     ;GET THE ANSWER TYPED
1984                                  ;NOTE:  THE USER RESPONSE FOR THE CHARACTER WAS TO BE THE OCTAL
1985                                  ;       ASCII EQUIVALENT OF THE CHARACTER E.G. C=103
1986                                  ;
1987  007244  104401  017217    PRG4C:  TYPE,   LENGTH  ;ASK USER FOR THE CHARACTER LENGTH
1988                                                            ;FOR WHICH HIS DEVICE IS SET
1989  007250  104411                    RDDEC                   ;ACCEPT THE ANSWER TYPED BY USER
1990                                  ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
1991  007252  012600                    MOV     (SP)+,R0        ;GET THE ANSWER TYPED
1992  007254  020027  000010            CMP     R0,#8.          ;IS THE NUMBER TOO HIGH?
1993  007260  101060                    BHI     REDO3A          ;IF YES - GO TO RETRY SITUATION
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1994  007262  020027  000005          CMP     R0,#5.          ;IS THE NUMBER TOO LOW?
1995  007266  103455                  BLO     RED03A          ;IF YES - GO TO REITY SITUATION
1996  007270  010067  171740          MOV     R0,$TMP15       ;THE VALUE TYPED IS OK
1997                                                          ;STORE FOR FUTURE USE
1998  007274  016767  171702  171706  MOV     $TMP0,$TMP3     ;GET THE XDBR ADDRESS
1999  007302  162767  000002  171700  SUB     #2,$TMP3        ;FORM THE XCSR ADDRESS
2000  007310  005767  171672    1$:   TST     $TMP2           ;DO WE RANDOM STALL?
2001  007314  001402                  BEQ     2$              ;BRANCH IF IT WASN'T DESIRED
2002  007316  004767  004246          JSR     PC,STALL        ;GO STALL RANDOM VALUE OF MSEC.
2003  007322  004767  004352    2$:   JSR     PC,TIMETX       ;GO WAIT FOR TRANSMITTER DONE
2004                                                          ;BIT TO SET
2005  007326  104401  017104          TYPE    ,XDB            ;TYPE TRANSMITTER DONE BIT MESSAGE
2006  007332  104000                  ERROR   +0              ;XCSR DONE BIT NEVER SET
2007  007334  052777  000004  171646  BIS     #BIT2,@$TMP3    ;SET THE MAINTENANCE BIT IN THE
2008                                                          ;TRANSMITTER CONTROL STATUS REGISTER
2009  007342  016777  171636  171632  MOV     $TMP1,@$TMP0    ;LOAD TRANSMITTER DATA BUFFER
2010                                                          ;WITH SELECTED CHARACTER
2011  007350  004767  004306          JSR     PC,TIMERX       ;GO WAIT FOR RECEIVER DONE BIT
2012                                                          ;TO SET
2013  007354  104401  017153          TYPE    ,RDB            ;TYPE RECEIVER DONE BIT MESSAGE
2014  007360  104000                  ERROR   +0              ;RCSR DONE BIT NEVER SET
2015  007362  016767  171622  171622  MOV     $TMP3,$TMP4     ;GET THE TRANSMITTER CONTROL
2016                                                          ;STATUS REGISTER ADDRESS
2017  007370  162767  000002  171614  SUB     #2,$TMP4        ;FORM THE RECEIVER DATA BUFFER
2018                                                          ;ADDRESS
2019  007376  017767  171610  171610  MOV     @$TMP4,$TMP5    ;STORE THE CHARACTER FROM THE
2020                                                          ;RECEIVER BUFFER + REST OF CONTENTS
2021  007404  004767  004326          JSR     PC,DATCHK       ;GO TO COMPARE EXPECTED & RECEIVED
2022                                                          ;DATA
2023  007410  000737                  BR      1$              ;GO BACK TO ISSUE ANOTHER CHARACTER
2024  007412  104401  001252  RED03:  TYPE    ,$QUES          ;TYPE A QUESTION MARK(?)
2025  007416  000167  177456          JMP     PRG4A           ;REITERATE THE XDBR QUESTION TO USER
2026  007422  104401  001252  RED03A: TYPE,   $QUES           ;TYPE '?' INDICATING USER TYPED
2027                                                          ;SOMETHING WRONG FOR CHARACTER LENGTH
2028  007426  000167  177612          JMP     PRG4C           ;GO BACK TO REISSUE QUESTION
2029
2030                                  ;THIS IS PROGRAM #5
2031                                  ;THE FOLLOWING USER UTILITY PROGRAM WILL ALLOW USER PARAMETERS
2032                                  ;FOR RUNNING A BINARY COUNT IN MAINTENANCE MODE
2033                                  ;
2034
2035  007432  012706  001100  PRG5:   MOV     #STACK,SP       ;INITIALIZE THE STACK POINTER
2036  007436  012737  013052  000034        MOV     #$TRAP,@#TRAPVEC        ;TRAP VECTOR FOR TRAP CALLS
2037  007444  012737  000340  000036        MOV     #340,@#TRAPVEC+2        ;LEVEL 7
2038  007452  012737  010732  000030        MOV     #$ERROR,@#EMTVEC        ;EMT VECTOR FOR ERROR ROUTINE
2039  007460  012737  000340  000032        MOV     #340,@#EMTVEC+2         ;LEVEL 7
2040  007466  104401  017040          TYPE    ,PRG5M          ;INDICATE THAT USER SELECTED
2041                                                          ;PROGRAM #5
2042  007472  104401  020306  PRG5A:  TYPE    ,LINTAD         ;ASK USER FOR THE TRANSMITTER DATA
2043                                                          ;BUFFER ADDRESS OF THE DEVICE
2044                                                          ;HE WISHES TO TEST
2045  007476  104410                  RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
2046                                                          ;AND STORE ON TOP OF STACK
2047                                  ;CHECK TO SEE IF THE USER RESPONSE WAS WITHIN LIMITS
2048  007500  012602                  MOV     (SP)+,R2        ;GET THE ANSWER TYPED
2049  007502  020227  176176          CMP     R2,#176176      ;IS THE NUMBER TOO HIGH?
```

```
2050  007506  101152                        BHI     REDO4           ;IF YES - GO TO RETRY SITUATION
2051  007510  020227  175616                CMP     R2,#175616      ;IS THE NUMBER TOO LOW?
2052  007514  103547                        BLO     REDO4           ;IF YES - GO TO RETRY SITUATION
2053  007516  132702  000001                BITB    #BIT0,R2        ;NUMBER IS IN RANGE BUT IS IT
2054                                                                ;ON AN EVEN BOUNDARY?
2055  007522  001144                        BNE     REDO4           ;IF NOT - GO TO RETRY SITUATION
2056                              ;CHECK TO SEE IF USER RESPONSE WAS TRULY A XMIT BUFFER REGISTER
2057  007524  010203                        MOV     R2,R3           ;GET THE USER RESPONSE
2058  007526  142703  000370                BICB    #370,R3 ;MASK OFF LOWER BYTE EXCEPT FOR
2059                                                                ;LEAST SIGNIFICANT DIGIT
2060  007532  122703  000006                CMPB    #6,R3           ;WAS THE LEAST SIGNIFICANT DIGIT OF THE
2061                                                                ;USER RESPONSE EQUAL TO A SIX?
2062  007536  001136                        BNE     REDO4           ;BRANCH IF NOT
2063  007540  010267  171436                MOV     R2,$TMP0        ;THE TRANMITTER ADDRESS TYPED
2064                                                                ;IS OK - STORE FOR FUTURE USE
2065                              ;NOW CHECK TO MAKE SURE THE DEVICE IS PRESENT
2066  007544  016746  170234                MOV     ERRVEC,-(SP)    ;SAVE THE TIMOUT VECTOR
2067  007550  012767  007562  170226        MOV     #2$,ERRVEC      ;SET UP TIMEOUT SERVICE ADDRESS
2068  007556  005712                        TST     (R2)            ;IF PRESENT WE WILL EXECUTE THE
2069                                                                ;NEXT INSTRUCTION - IF NOT WE
2070                                                                ;GO TO 2$:
2071  007560  000412                        BR      4$              ;BRANCH IF PRESENT
2072  007562  004767  004354        2$:     JSR     PC,$JERT2       ;GO SETUP FOR ERROR INFORMATION
2073  007566  012767  007576  171450        MOV     #3$,$ESCAPE     ;POINT OF RETURN AFTER ERROR REPORT
2074  007574  104006                        ERROR   +6              ;XDBR REFERENCE CAUSED TIMEOUT
2075  007576  022626                3$:     CMP     (SP)+,(SP)+     ;CLEAN STACK FROM TIMEOUT
2076  007600  012667  170200                MOV     (SP)+,ERRVEC    ;RESTORE TIMEOUT VECTOR
2077  007604  000513                        BR      REDO4           ;GO TO RETRY SITUATION
2078  007606  012667  170172        4$:     MOV     (SP)+,ERRVEC    ;DEVICE REGISTER IS PRESENT!
2079                                                                ;ASK THE USER IF HE DESIRES SOME
2080                                                                ;RANDOM NO. OF MSEC. WAIT TIME
2081                                                                ;BEFORE CHECKING XCSR DONE FLAG
2082  007612  104401  017217        PRGSC:  TYPE,   LENGTH  ;ASK USER FOR THE CHARACTER LENGTH
2083                                                                ;FOR WHICH HIS DEVICE IS SET
2084  007616  104411                        RDDEC                   ;ACCEPT THE ANSWER TYPED BY USER
2085                              ;CHECK TO SEE IF USER RESPONSE WAS WITHIN LIMITS
2086  007620  012600                        MOV     (SP)+,R0        ;GET THE ANSWER TYPED
2087  007622  020027  000010                CMP     R0,#8.          ;IS THE NUMBER TOO HIGH?
2088  007626  101106                        BHI     REDO4A          ;IF YES - GO TO RETRY SITUATION
2089  007630  020027  000005                CMP     R0,#5.          ;IS THE NUMBER TOO LOW?
2090  007634  103503                        BLO     REDO4A          ;IF YES - GO TO RETRY SITUATION
2091  007636  010067  171372                MOV     R0,$TMP15       ;THE VALUE TYPED IS OK
2092                                                                ;STORE FOR FUTURE USE
2093  007642  104401  020646                TYPE    ,RSTALL         ;RANDOM NO. OF MSEC. WAIT TIME
2094  007646  104410                        RDOCT                   ;ACCEPT THE ANSWER TYPED BY USER
2095                                                                ;AND STORE ON TOP OF STACK
2096  007650  012667  171332                MOV     (SP)+,$TMP2     ;GET THE ANSWER TYPED
2097                              ;WE ARE NOW READY TO INITIALIZE THE BINARY COUNT AND GET
2098                              ;THE BINARY CHARACTER
2099                              ;
2100  007654  012767  177777  171342        MOV     #-1,$TMP11      ;SET LEAD IN VARIABLE TO -1
2101  007662  016767  171336  171336  PRGSB:  MOV     $TMP11,$TMP12   ;STORE PREVIOUS BINARY CHARACTER
2102  007670  005267  171332                INC     $TMP12          ;FLIP BINARY CHARACTER AGAIN
2103  007674  042767  177400  171324        BIC     #177400,$TMP12  ;MASK TO 8 BITS
2104  007702  016767  171320  171314        MOV     $TMP12,$TMP11   ;STORE BINARY CHARACTER
2105  007710  016767  171312  171266        MOV     $TMP12,$TMP1    ;STORE BINARY CHARACTER
```

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2106
2107  007716  016767  171260  171264          MOV     $TMP0,$TMP3     ;FOR FUTURE USE
2108  007724  160367  000002  171256          SUB     #2,$TMP3        ;GET THE XDBR ADDRESS
2109  007732  005767  171250          1$:     TST     $TMP2           ;FORM THE XCSR ADDRESS
2110  007736  001402                          BEQ     2$              ;DO WE RANDOM STALL?
2111  007740  004767  003624                  JSR     PC,STALL        ;BRANCH IF IT WASN'T DESIRED
2112  007744  004767  003730          2$:     JSR     PC,TIMETX       ;GO STALL RANDOM VALUE OF MSEC.
2113                                                                  ;GO WAIT FOR TRANSMITTER DONE
2114  007750  104401  017104                  TYPE    ,XDB            ;BIT TO SET
2115  007754  104000                          ERROR   +0              ;TYPE TRANSMITTER DONE BIT MESSAGE
2116  007756  052777  000004  171224          BIS     #BIT2,@$TMP3    ;XCSR DONE BIT NEVER SET
2117                                                                  ;SET THE MAINTENANCE BIT IN TH_
2118  007764  016777  171214  171210          MOV     $TMP1,@$TMP0    ;TRANSMITTER CONTROL STATUS REGISTER
2119                                                                  ;LOAD TRANSMITTER DATA BUFFER
2120  007772  004767  003664                  JSR     PC,TIMERX       ;WITH SELECTED CHARACTER
2121  007776  104401  017153                  TYPE    ,RDB            ;GO WAIT FOR RECEIVER DONE BIT TO SET
2122  010002  104000                          ERROR   +0              ;TYPE RECEIVER DONE BIT MESSAGE
2123  010004  016767  171200  171200          MOV     $TMP3,$TMP4     ;RCSR DONE BIT NEVER SET
2124                                                                  ;GET THE TRANSMITTER CONTROL
2125  010012  162767  000002  171172          SUB     #2,$TMP4        ;STATUS REGISTER ADDRESS
2126                                                                  ;FORM THE RECEIVER DATA BUFFER
2127  010020  017767  171166  171166          MOV     @$TMP4,$TMP5    ;ADDRESS
2128                                                                  ;STORE THE CHARACTER FROM THE
2129  010026  004767  003704                  JSR     PC,DATCHK       ;RECEIVER BUFFER + REST OF CONTENTS
2130                                                                  ;GO TO COMPARE EXPECTED &  RECEIVED
2131  010032  000713                          BR      PRG5B           ;DATA
2132                                                                  ;GO BACK TO ISSUE ANOTHER BINARY
2133  010034  104401  001252          RED04:  TYPE    ,$QUES          ;CHARACTER
2134  010040  000167  177426                  JMP     PRG5A           ;TYPE A QUESTION MARK(?)
2135  010044  104401  001252          RED04A: TYPE,   $QUES           ;GO BACK TO REITERATE XDBR QUESTION
2136                                                                  ;TYPE '?' INDICATING USER TYPED
2137  010050  000167  177536                  JMP     PRG5C           ;SOMETHING WRONG FOR CHARACTER LENGTH
2138                                                                  ;GO BACK TO REISSUE QUESTION
2139
2140                                  ;THIS ROUTINE WILL SET UP:
2141                                  ;       RCSR - RECEVER STATUS REGISTER
2142                                  ;       RBUF - RECEIVER BUFFER REGISTER
2143                                  ;       XCSR - TRANSMITTER STATUS REGISTER
2144                                  ;       XBUF - TRANSMITTER BUFFER REGISTER
2145                                  ;INITIALLY, IN RESPONSE TO USER REPLY TO 1ST DEVICE HE WANTS
2146                                  ;TESTED, AND THEREAFTER, AT THE END OF A PROGRAM TO CYCLE THRU
2147                                  ;ALL DEVICES FOR MULTIPLE DEVICE TESTING (IF REQUIRED)
2148  010054  016767  171200  171326  DLADDR: MOV     DLBASE,DLRCSR   ;STORE RECEIVER STATUS REGISTER
2149                                                                  ;OF CURRENT DEVICE
2150  010062  062767  000002  171170          ADD     #2,DLBASE       ;FORM RECEIVER BUFFER REGISTER
2151                                                                  ;OF CURRENT DEVICE
2152  010070  016767  171164  171314          MOV     DLBASE,DLRDBR   ;STORE RECEIVER BUFFER REGISTER
2153                                                                  ;OF CURRENT DEVICE
2154  010076  062767  000002  171154          ADD     #2,DLBASE       ;FORM TRANSMITTER STATUS REGISTER
2155                                                                  ;OF OF CURRENT DEVICE
2156  010104  016767  171150  171302          MOV     DLBASE,DLXCSR   ;STORE TRANSMITTER STATUS REGISTER
2157                                                                  ;OF CURRENT DEVICE
2158  010112  062767  000002  171140          ADD     #2,DLBASE       ;FOR TRANSMITTER BUFFER REGISTER
2159                                                                  ;OF CURRENT DEVICE
2160  010120  016767  171134  171270          MOV     DLBASE,DLXDBR   ;STORE TRANSMITTER BUFFER REGISTER
2161                                                                  ;OF CURRENT DEVICE
2162  010126  000207                          RTS     PC              ;RETURN
```

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                                .SBTTL  END OF PASS ROUTINE

                                ;;**************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO RESTRT

010130                          $EOP:
                                ;THIS NEXT SECTION UP TO THE NEXT LINE OF ASTERISKS WAS
                                ;SUPPLIED BY THE MACRO 'EOPBEG'.  THE MACRO NAME APPEARS IN
                                ;THE SOURCE PROGRAM AS ONE OF THE ARGUMENTS TO THE .$EOP
                                ;SYSMAC UTILITY ROUTINE CALL.
010130  000004                        SCOPE
010132  105767  171134                TSTB    MULTD           ;ARE WE RUNNING MULTIPLE DEVICES?
010136  001501                        BEQ     3$              ;BRANCH IF NOT FOR NORMAL
                                                                ;'END PASS # XX' TYPEOUT
010140  005767  171130                TST     ACTREG          ;ARE ANY DEVICES ACTIVE?
010144  001011                        BNE     1$              ;BRANCH IF YES
010146  104401  020074                TYPE    .FOULUP         ;INDICATE SOMETHING WRONG!
                                                                ;MULTIPLE DEVICES ARE BEING
                                                                ;RUN SUPPOSEDLY. BUT NONE ARE
                                                                ;SHOWN ACTIVE
010152  000000                        HALT                    ;WAIT FOR A USER RESPONSE
010154  005067  171112                CLR     MULTD           ;CLEAR MULTIPLE DEVICE FLAG
010160  005067  171072                CLR     TABFLG          ;CLEAR TABLE CREATION FLAG
010164  000167  171502                JMP     RESTRT          ;GET READY TO START ALL OVER
                                                                ;AGAIN - ALL DEVICES WERE
                                                                ;DESELECTED SOMEHOW!
010170  062767  000010  171066  1$:   ADD     #10,BASEADD     ;FORM A NEW BASE
                                                                ;ADDRESS FOR START OF NEXT BLOCK
                                                                ;OF REGISTERS FOR NEXT DEVICE
010176  062767  000010  171064        ADD     #10,BASEIV      ;FORM A NEW BASE ADDRESS FOR
                                                                ;START OF NEXT BLOCK OF   CTORS
                                                                ;FOR NEXT DEVICE
010204  000241                        CLC                     ;CLEAR LAST DEVICE IND! ATOR
010206  006167  171064                ROL     ROTADD          ;UPDATE NEXT POSSIBLE DEVICE ACTIVE
                                                                ;POINTER
010212  103431                        BCS     2$              ;BRANCH IF THIS WAS THE
                                                                ;LAST DEVICE TO BE TESTED ON
                                                                ;THIS PASS
010214  036767  171056  171052        BIT     ROTADD,ACTREG   ;IS THIS DEVICE TRULY ACTIVE
                                                                ;(AS PER USER)
010222  001762                        BEQ     1$              ;BRANCH IF NOT TO SEE IF NEXT
                                                                ;ONE POSSIBLE IS
010224  016767  171034  171026        MOV     BASEADD,DLBASE  ;FORM THE RECEIVER STATUS REGISTER
                                                                ;ADDRESS OF NEXT DEVICE
010232  016767  171032  171160        MOV     BASEIV,DLVECT   ;GET NEXT DEVICE RCVR VECTOR
010240  000240                        NOP
010242  004767  177606                JSR     PC,DLADDR       ;GO FORM DL ADDRESSES FOR NEXT
                                                                ;DEVICE SELECTED
010246  005067  170630                CLR     $TSTNM          ;INITIALIZE TEST NO. FOR A PROGRAM
                                                                ;PASS OVER THE NEXT DEVICE ACTIVE
010252  005077  171136                CLR     @DLXCSR         ;CLEAR OUT BOTH CSR'S
010256  005077  171126                CLR     @DLRCSR
```

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2218  010262  005777  171124          TST     @DLRDBR         ;FLUSH RCVR "DONE" BIT
2219  010266  005777  171120          TST     @DLRDBR
2220  010272  000167  172472          JMP     TST1            ;START TESTING THIS DEVICE
2221  010276                      2$:
2222                              ;IF WE TAKE THIS PATH WE HAVE MADE A CYCLE THRU THE PROGRAM ONCE
2223                              ;PER DEVICE I.E. - WE HAVE MADE A COMPLETE PASS
2224                              ;NOW WE NEED TO RESTORE EVERYTHING FOR THE NEXT COMPLETE PASS
2225  010276  012767  000001  170772          MOV     #1,ROTADD       ;SET UP ROTATING POINTER FOR NEXT
2226                                                                  ;MULTIPLE PASS
2227  010304  016767  170752  170752          MOV     KEEPADD,BASEADD ;RESTORE BASE ADDRESS
2228  010312  016767  170750  170750          MOV     KEEPIV,BASEIV   ;RESTORE BASE INTERRUPT VECTOR
2229  010320  016767  170740  170732          MOV     BASEADD,DLBASE  ;RESTORE 1ST DEVICE BASE ADDRESS
2230  010326  016767  170736  171064          MOV     BASEIV,DLVECT   ;RESTORE 1ST DEVICE VECTOR ADDRESS
2231  010334  000240                          NOP
2232  010336  004767  177512                  JSR     PC,DLADDR       ;FORM ADDRESSES FOR 1ST DEVICE
2233  010342                      3$:
2234                              ;;*****************************************************************
2235  010342  005067  170534          CLR     $TSTNM          ;;ZERO THE TEST NUMBER
2236  010346  005067  170670          CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
2237  010352  005267  170522          INC     $PASS           ;;INCREMENT THE PASS NUMBER
2238  010356  042767  100000  170514          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
2239  010364  [illegible]              DEC     (PC)+           ;;LOOP?
2240  010366  000001              $EOPCT: .WORD   1
2241  010370  003022                      BGT     $DOAGN          ;;YES
2242  010372  012737                      MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
2243  010374  000001              $ENDCT: .WORD   1
2244  010376  010366                      $EOPCT
2245  010400  104401  010445            TYPE    ,$ENDMG         ;;TYPE "END PASS #"
2246  010404  016746  170470            MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
2247  010410  104405                      TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
2248  010412  104401  010442            TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
2249  010416  013700  000042      $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
2250  010422  001405                      BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
2251  010424  000005                      RESET                   ;;CLEAR THE WORLD
2252  010426  004710              $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
2253  010430  000240                      NOP                     ;;SAVE ROOM
2254  010432  000240                      NOP                     ;;FOR
2255  010434  000240                      NOP                     ;;ACT11
2256  010436                      $DOAGN:
2257  010436  000137                      JMP     @(PC)+          ;;RETURN
2258  010440  001772              $RTNAD: .WORD   RESTRT
2259  010442     377     377     000  $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
2260  010445     015  042412  042116  $ENDMG: .ASCIZ  <15><12>/END PASS #/
2261  010452  050040  051501  020123
2262  010460  000043
2263                              .SBTTL  SCOPE HANDLER ROUTINE
2264
2265                              ;;*****************************************************************
2266                              ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
2267                              ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
2268                              ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
2269                              ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
2270                              ;*SW14=1         LOOP ON TEST
2271                              ;*SW11=1         INHIBIT ITERATIONS
2272                              ;*SW09=1         LOOP ON ERROR
2273                              ;*SW08=1         LOOP ON TEST IN SWR<7:0>
```

```
2274                                        ;*CALL
2275                                        ;*      SCOPE           ;;SCOPE=IOT
2276
2277  010462                                $SCOPE:
2278  010462  032777  040000  170450  1$:   BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
2279  010470  001111                        BNE     $OVER           ;;YES IF SW14=1
2280                                        ;*****START OF CODE FOR THE XOR TESTER*****
2281  010472  000416                $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
2282                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
2283  010474  013746  000004                MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
2284  010500  012737  010520  000004        MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
2285  010506  005737  177060                TST     @#177060        ;;TIME OUT ON XOR?
2286  010512  012637  000004                MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
2287  010516  000463                        BR      $SVLAD          ;;GO TO THE NEXT TEST
2288  010520  022626                5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
2289  010522  012637  000004                MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
2290  010526  000423                        BR      7$              ;;LOOP ON THE PRESENT TEST
2291  010530                                6$:;*****END OF CODE FOR THE XOR TESTER*****
2292  010530  032777  000400  170402        BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
2293  010536  001404                        BEQ     2$              ;;BR IF NO
2294  010540  127767  170374  170334        CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
2295  010546  001462                        BEQ     $OVER           ;;BR IF YES
2296  010550  105767  170327          2$:   TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
2297  010554  001421                        BEQ     3$              ;;BR IF NO
2298  010556  126767  170333  170317        CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
2299  010564  101015                        BHI     3$              ;;BR IF NO
2300  010566  032777  001000  170344        BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
2301  010574  001404                        BEQ     4$              ;;BR IF NO
2302  010576  016767  170306  170302  7$:   MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
2303  010604  000443                        BR      $OVER
2304  010606  105067  170271          4$:   CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
2305  010612  005067  170424                CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
2306  010616  000415                        BR      1$              ;;ESCAPE TO THE NEXT TEST
2307  010620  032777  004000  170312  3$:   BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
2308  010626  001011                        BNE     1$              ;;BR IF YES
2309  010630  005767  170244                TST     $PASS           ;;IF FIRST PASS OF PROGRAM
2310  010634  001406                        BEQ     1$              ;;      INHIBIT ITERATIONS
2311  010636  005267  170242                INC     $ICNT           ;;INCREMENT ITERATION COUNT
2312  010642  026767  170374  170234        CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
2313  010650  002021                        BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
2314  010652  012767  000001  170224  1$:   MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
2315  010660  016767  000044  170354        MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
2316  010666  105267  170210          $SVLAD: INCB  $TSTNM          ;;COUNT TEST NUMBERS
2317  010672  011667  170210                MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
2318  010676  011667  170206                MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
2319  010702  005067  170336                CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
2320  010706  112767  000001  170201        MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
2321  010714  016777  170162  170220  $OVER: MOV    $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
2322  010722  016716  170160                MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
2323  010726  000002                        RTI                     ;;FIXES PS
2324  010730  000100                $MXCNT: 100                     ;;MAX. NUMBER OF ITERATIONS
2325
2326                                        .SBTTL  ERROR HANDLER ROUTINE
2327
2328                                        ;;**************************************************************
2329                                        ;*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

        010732                                  $ERROR:
        010732  105267  170145                  7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
        010736  001775                                  BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
        010740  016777  170136  170174                  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
        010746  032777  002000  170164                  BIT     #BIT10,@SWR     ;;BELL ON ERROR?
        010754  001402                                  BEQ     1$              ;;NO - SKIP
        010756  104401  001246                          TYPE    ,$BELL          ;;RING BELL
        010762  005267  170124                  1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
        010766  011667  170124                          MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
        010772  162767  000002  170116                  SUB     #2,$ERRPC
        011000  117767  170112  170106                  MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
        011006  032777  020000  170124                  BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
        011014  001004                                  BNE     20$             ;;SKIP TYPEOUTS
        011016  004767  000044                          JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
        011022  104401  001253                          TYPE    ,$CRLF
        011026                                  20$:
        011026  005777  170106                  2$:     TST     @SWR            ;;HALT ON ERROR
        011032  100001                                  BPL     3$              ;;SKIP IF CONTINUE
        011034  000000                                  HALT                    ;;HALT ON ERROR!
        011036  032777  001000  170074          3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
        011044  001402                                  BEQ     4$              ;;BR IF NO
        011046  016716  170036                          MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
        011052  005767  170166                  4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
        011056  001402                                  BEQ     5$              ;;BR IF NONE
        011060  016716  170160                          MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
        011064                                  5$:
        011064  000002                                  RTI                     ;;RETURN

                                                .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.

        011066                                  $ERRTYP:
        011066  104401  001253                          TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
        011072  010046                                  MOV     R0,-(SP)        ;;SAVE R0
        011074  005000                                  CLR     R0              ;;PICKUP THE ITEM INDEX
        011076  153700  001114                          BISB    @#$ITEMB,R0
        011102  001004                                  BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                                                ;;TYPE THE PC OF THE ERROR
        011104  016746  170026                          MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                                ;;ERROR ADDRESS
        011110  104402                                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        011112  000426                                  BR      6$              ;;GET OUT
```

```
011114  005300          1$:   DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
011116  006300                ASL     R0              ;;      WORK FOR THE ERROR TABLE
011120  006300                ASL     R0
011122  006300                ASL     R0
011124  062700  021310        ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
011130  012067  000004        MOV     4(R0)+,2$       ;;PICKUP "ERROR MESSAGE" POINTER
011134  001404                BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
011136  104401                TYPE                    ;;TYPE THE "ERROR MESSAGE"
011140  000000          2$:   .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
011142  104401  001253        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
011146  012067  000004  3$:   MOV     4(R0)+,4$       ;;PICKUP "DATA HEADER" POINTER
011152  001404                BEQ     5$              ;;SKIP TYPEOUT IF 0
011154  104401                TYPE                    ;;TYPE THE "DATA HEADER"
011156  000000          4$:   .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
011160  104401  001253        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
011164  011000          5$:   MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
011166  001004                BNE     7$              ;;GO TYPE THE DATA
011170  012600          6$:   MOV     (SP)+,R0        ;;RESTORE R0
011172  104401  001253        TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
011176  000207                RTS     PC              ;;RETURN
011200                  7$:
011200  013046                MOV     2(R0)+,-(SP)    ;;SAVE 2(R0)+ FOR TYPEOUT
011202  104402                TYPOC                   ;;GO TYPE--OCTAL ASCII,ALL DIGITS,
011204  005710                TST     (R0)            ;;IS THERE ANOTHER NUMBER?
011206  001770                BEQ     6$              ;;BR IF NO
011210  104401  011216        TYPE    ,8$             ;;TYPE TWO(2) SPACES
011214  000771                BR      4$              ;;LOOP
011216  040040          8$:   .ASCIZ  /  /            ;;TWO(2) SPACES
011222                        .EVEN
```

.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 T PE 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
```

```
011222  017646  000000  $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
```

```
002442  011226  116667  000001  000211          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
002443  011234  112667  000207                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
002444  011240  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
002445  011244  000406                          BR      $TYPON
002446  011246  112767  000001  000171  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
002447  011254  112767  000006  000165          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
002450  011262  112767  000005  000154  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
002451  011270  010346                          MOV     R3,-(SP)        ;;SAVE R3
002452  011272  010446                          MOV     R4,-(SP)        ;;SAVE R4
002453  011274  010546                          MOV     R5,-(SP)        ;;SAVE R5
002454  011276  116704  000145                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
002455  011302  005404                          NEG     R4
002456  011304  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
002457  011310  110467  000132                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
002460  011314  116704  000125                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
002461  011320  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
002462  011324  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
002463  011326  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
002464  011330  000404                          BR      3$              ;;GO DO MSB
002465  011332  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
002466  011334  006105                          ROL     R5
002467  011336  006105                          ROL     R5
002470  011340  010503                          MOV     R5,R3
002471  011342  006103                  3$:     ROL     R3              ;;GET MSB OF THIS DIGIT
002472  011344  105367  000076                  DECB    $OMODE          ;;TYPE THIS DIGIT?
002473  011350  100016                          BPL     7$              ;;BR IF NO
002474  011352  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
002475  011356  001002                          BNE     4$              ;;TEST FOR 0
002476  011360  005704                          TST     R4              ;;SUPPRESS THIS 0?
002477  011362  001403                          BEQ     5$              ;;BR IF YES
002500  011364  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
002501  011366  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
002502  011372  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
002503  011376  110367  000040                  MOVB    R3,8$           ;;SAVE FOR TYPING
002504  011402  104401  011442                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
002505  011406  105367  000032          7$:     DECB    $OCNT           ;;COUNT BY 1
002506  011412  003347                          BGT     2$              ;;BR IF MORE TO DO
002507  011414  002402                          BLT     6$              ;;BR IF DONE
002510  011416  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
002511  011420  000744                          BR      2$              ;;GO DO THE LAST DIGIT
002512  011422  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
002513  011424  012604                          MOV     (SP)+,R4        ;;RESTORE R4
002514  011426  012603                          MOV     (SP)+,R3        ;;RESTORE R3
002515  011430  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
002516  011436  012616                          MOV     (SP)+,(SP)
002517  011440  000002                          RTI                     ;;RETURN
002520  011442  000                     8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
002521  011443  000                             .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
002522  011444  000                     $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
002523  011445  000                     $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
002524  011446  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
002525
002526                                  .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
002527
002530                                  ;;**************************************************************
002531                                  ;*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
                                        $TYPDS:
011450                                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
011450  010046                                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
011452  010146                                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
011454  010246                                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
011456  010346                                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
011460  010546                                 MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
011462  012746  020200                         MOV     20(SP),R5       ;;GET THE INPUT NUMBER
011466  016605  000020                         BPL     1$              ;;BR IF INPUT IS POS.
011472  100004                                 NEG     R5              ;;MAKE THE BINARY NUMBER POS.
011474  005405                                 MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
011476  112766  000055  000001                 CLR     R0              ;;ZERO THE CONSTANTS INDEX
011504  005000                         1$:     MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
011506  012703  011664                         MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
011512  112723  000040                         CLR     R2              ;;CLEAR THE BCD NUMBER
011516  005002                         2$:     MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
011520  016001  011654                         SUB     R1,R5           ;;FORM THIS BCD DIGIT
011524  160105                         3$:     BLT     4$              ;;BR IF DONE
011526  002402                                 INC     R2              ;;INCREASE THE BCD DIGIT BY 1
011530  005202                                 BR      3$
011532  000774                                 ADD     R1,R5           ;;ADD BACK THE CONSTANT
011534  060105                         4$:     TST     R2              ;;CHECK IF BCD DIGIT=0
011536  005702                                 BNE     5$              ;;FALL THROUGH IF 0
011540  001002                                 TSTB    (SP)            ;;STILL DOING LEADING 0'S?
011542  105716                                 BMI     7$              ;;BR IF YES
011544  100407                                 ASLB    (SP)            ;;MSD?
011546  106316                         5$:     BCC     6$              ;;BR IF NO
011550  103003                                 MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
011552  116663  000001  177777                 BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
011560  052702  000060                 6$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
011564  052702  000040                 7$:     MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
011570  110223                                 TST     (R0)+           ;;JUST INCREMENTING
011572  005720                                 CMP     R0,#10          ;;CHECK THE TABLE INDEX
011574  020027  000010                         BLT     2$              ;;GO DO THE NEXT DIGIT
011600  002746                                 BGT     8$              ;;GO TO EXIT
011602  003002                                 MOV     R5,R2           ;;GET THE LSD
011604  010502                                 BR      6$              ;;GO CHANGE TO ASCII
011606  000764                         8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
011610  105726                                 BPL     9$              ;;BR IF NO
011612  100003                                 MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
011614  116663  177777  177776                 CLRB    (R3)            ;;SET THE TERMINATOF
011622  105013                         9$:     MOV     (SP)+,R5        ;;POP STACK INTO R5
011624  012605                                 MOV     (SP)+,R3        ;;POP STACK INTO R3
011626  012603                                 MOV     (SP)+,R2        ;;POP STACK INTO R2
011630  012602                                 MOV     (SP)+,R1        ;;POP STACK INTO R1
011632  012601                                 MOV     (SP)+,R0        ;;POP STACK INTO R0
011634  012600                                 TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
011636  104401  011664                         MOV     2(SP),4(SP)     ;;ADJUST THE STACK
011642  016666  000002  000004
```

```
2554  011650  012616                          MOV     (SP)+,(SP)
2555  011652  000002                          RTI                             ;;RETURN TO USER
2556  011654  023420                $DTBL:    10000.
2557  011656  001750                          1000.
2558  011660  000144                          100.
2559  011662  000012                          10.
2560  011664  000004                $DBLK:    .BLKW   4
2561
2562                                  .SBTTL  TTY INPUT ROUTINE
2563
2564                                  ;;**********************************************************
2565                                  .ENABL  LSB
2566
2567                                  .DSABL  LSB
2568
2569
2570                                  ;;**********************************************************
2571                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
2572                                  ;*CALL:
2573                                  ;*      RDCHR                           ;;INPUT A SINGLE CHARACTER FROM THE TTY
2574                                  ;*      RETURN HERE                     ;;CHARACTER IS ON THE STACK
2575                                  ;*                                      ;;WITH PARITY BIT STRIPPED OFF
2576                                  ;
2577
2578  011674  011646                $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC
2579  011676  016666  000004  000002        MOV     4(SP),2(SP)             ;;SAVE THE PS
2580  011704  105777  167234        1$:     TSTB    @$TKS                   ;;WAIT FOR
2581  011710  100375                        BPL     1$                      ;;A CHARACTER
2582  011712  117766  167230  000004        MOVB    @$TKB,4(SP)             ;;READ THE TTY
2583  011720  042766  177600  000004        BIC     #^C<177>,4(SP)          ;;GET RID OF JUNK IF ANY
2584  011726  026627  000004  000023        CMP     4(SP),#23               ;;IS IT A CONTROL-S?
2585  011734  001013                        BNE     3$                      ;;BRANCH IF NO
2586  011736  105777  167202        2$:     TSTB    @$TKS                   ;;WAIT FOR A CHARACTER
2587  011742  100375                        BPL     2$                      ;;LOOP UNTIL ITS THERE
2588  011744  117746  167176                MOVB    @$TKB,-(SP)             ;;GET CHARACTER
2589  011750  042716  177600                BIC     #^C<177>,(SP)           ;;MAKE IT 7-BIT ASCII
2590  011754  022627  000021                CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
2591  011760  001366                        BNE     2$                      ;;IF NOT DISCARD IT
2592  011762  000750                        BR      1$                      ;;YES, RESUME
2593  011764  026627  000004  000140  3$:     CMP     4(SP),#140              ;;IS IT UPPER CASE?
2594  011772  002407                        BLT     4$                      ;;BRANCH IF YES
2595  011774  026627  000004  000175        CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
2596  012002  003003                        BGT     4$                      ;;BRANCH IF YES
2597  012004  042766  000040  000004        BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
2598  012012  000002                4$:     RTI                             ;;GO BACK TO USER
2599                                  ;;**********************************************************
2600                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
2601                                  ;*CALL:
2602                                  ;*      RDLIN                           ;;INPUT A STRING FROM THE TTY
2603                                  ;*      RETURN HERE                     ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
2604                                  ;*                                      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
2605
2606  012014  010346                $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
2607  012016  005046                        CLR     -(SP)                   ;;CLEAR THE RUBOUT KEY
2608  012020  012703  012250        1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
2609  012024  022703  012260        2$:     CMP     #$TTYIN+8.,R3           ;;BUFFER FULL?
```

```
                                        BLOS    4$              ;;BR IF YES
                                        RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
                                        MOVB    (SP)+,(R3)      ;;GET CHARACTER
                              10$:      CMPB    #177,(R3)       ;;IS IT A RUBOUT
                                        BNE     5$              ;;BR IF NO
                                        TST     (SP)            ;;IS THIS THE FIRST RUBOUT
                                        BNE     6$              ;;BR IF NO
                                        MOVB    #'\,9$          ;;TYPE A BACK SLASH
                                        TYPE    ,9$
                                        MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
                              6$:       DEC     R3              ;;BACKUP BY ONE
                                        CMP     R3,#$TTYIN      ;;STACK EMPTY?
                                        BLO     4$              ;;BR IF YES
                                        MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
                                        TYPE    ,9$             ;;GO TYPE
                                        BR      2$              ;;GO READ ANOTHER CHAR.
                              5$:       TST     (SP)            ;;RUBOUT KEY SET?
                                        BEQ     7$              ;;BR IF NO
                                        MOVB    #'\,9$          ;;TYPE A BACK SLASH
                                        TYPE    ,9$
                                        CLR     (SP)            ;;CLEAR THE RUBOUT KEY
                              7$:       CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
                                        BNE     8$              ;;BR IF NO
                                        TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
                                        BR      1$              ;;GO START OVER
                              8$:       CMPB    #22,(R3)        ;;IS CHARACTER A "^R"?
                                        BNE     3$              ;;BRANCH IF NO
                                        CLRB    (R3)            ;;CLEAR THE CHARACTER
                                        TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
                                        TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
                                        BR      2$              ;;GO PICKUP ANOTHER CHACTER
                              4$:       TYPE    ,$QUES          ;;TYPE A '?'
                                        BR      1$              ;;CLEAR THE BUFFER AND LOOP
                              3$:       MOVB    (R3),9$         ;;ECHO THE CHARACTER
                                        TYPE    ,9$
                                        CMPB    #15,(R3)+       ;;CHECK FOR RETURN
                                        BNE     2$              ;;LOOP IF NOT RETURN
                                        CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
                                        TYPE    ,$LF            ;;TYPE A LINE FEED
                                        TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
                                        MOV     (SP)+,R3        ;;RESTORE R3
                                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
                                        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
                                        MOV     #$TTYIN,4(SP)
                                        RTI                     ;;RETURN
                              9$:       .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
                                        .BYTE   0               ;;TERMINATOR
                              $TTYIN:   .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
                              $CNTLU:   .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
                              $CNTLG:   .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
                              $MSWR:    .ASCIZ  <15><12>/SWR = /
                              $MNEW:    .ASCIZ  /  NEW = /

                              .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

012314  011646          $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
012316  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
012324  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
012326  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
012330  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
012332  104407          1$:     RDLIN                   ;;READ AN ASCIZ LINE
012334  012600                  MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
012336  010067  000100          MOV     R0,5$           ;;AND SAVE IT
012342  005001                  CLR     R1              ;;CLEAR DATA WORD
012344  005002                  CLR     R2
012346  112046          2$:     MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
012350  001420                  BEQ     3$              ;;IF ZERO GET OUT
012352  122716  000060          CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
012356  003026                  BGT     4$              ;;IS AN OCTAL DIGIT
012360  122716  000067          CMPB    #'7,(SP)
012364  002423                  BLT     4$
012366  006301                  ASL     R1              ;;*2
012370  006102                  ROL     R2
012372  006301                  ASL     R1              ;;*4
012374  006102                  ROL     R2
012376  006301                  ASL     R1              ;;*8
012400  006102                  ROL     R2
012402  042716  177770          BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
012406  062601                  ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
012410  000756                  BR      2$              ;;LOOP
012412  005726          3$:     TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
012414  010166  000012          MOV     R1,12(SP)       ;;SAVE THE RESULT
012420  010267  000026          MOV     R2,$HIOCT
012424  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
012426  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
012430  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
012432  000002                  RTI                     ;;RETURN
012434  005726          4$:     TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
012436  105010                  CLRB    (R0)            ;;SET A TERMINATOR
012440  104401                  TYPE                    ;;TYPE UP THRU THE BAD CHAR.
012442  000000          5$:     .WORD   0
012444  104401  001252          TYPE    ,$QUES          ;;"?" "CR" & "LF"
012450  000730                  BR      1$              ;;TRY AGAIN
012452  000000          $HIOCT: .WORD   0               ;;HIGH ORDER BITS GO HERE

                        .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
                                        ;*

012454  105767  166477          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMIN'_?
012460  100002                          BPL     1$              ;;BR IF YES
012462  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
012464  000407                          BR      3$              ;;LEAVE
012466  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
012470  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
012474  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARAC ER TO BE TYPED ONTO STACK
012476  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
012500  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
012502  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
012504  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
012510  000002                          RTI                     ;;RETURN
012512  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
012516  001430                          BEQ     8$
012520  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
012524  001006                          BNE     5$
012526  005726                          TST     (SP)+           ;;POP  <CR><L'  EQUIV
012530  104401                          TYPE                    ;;TYPE A CR AND LF
012532  001253                          $CRLF
012534  105067  000130                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
012540  000755                          BR      2$              ;;GET NEXT CHARACTER
012542  004767  000056          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
012546  126726  166404          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
012552  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
012554  016746  166374                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
012560  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
012564  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
012566  004767  000032                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
012572  105367  000072                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
012576  000770                          BR      7$              ;;LOOP

                                        ;HORIZONTAL TAB PROCESSOR

012600  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
012604  004767  000014          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
012610  132767  000007  000052          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
012616  001372                          BNE     9$              ;;TAB STO?
012620  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
012622  000724                          BR      2$              ;;GET NEXT CHARACTER
012624  105777  166320          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
012630  100375                          BPL     $TYPEC
```

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2778  012632  116677  000002  166312          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
2779  012640  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
2780  012646  001003                          BNE     1$              ;;BRANCH IF NO
2781  012650  105067  000014                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
2782  012654  000406                          BR      $TYPEX          ;;EXIT
2783  012656  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED
2784  012664  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
2785  012666  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
2786  012670  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
2787  012672  000207                  $TYPEX: RTS     PC
2788
2789
2790                                  .SBTTL  READ A DECIMAL NUMBER FROM THE TTY
2791
2792                                  ;;*******************************   *******************************
2793                                  ;*THIS ROUTINE WILL READ A DECIMAL (ASCII) NUMBER FROM THE TTY AND
2794                                  ;*CHANGE IT TO BINARY. IF TOO MANY CHARACTERS OR ANY ILLEGAL CHARACTERS
2795                                  ;*ARE READ A "?" FOLLOWED BY A CARRIAGE RETURN-LINE FEED WILL BE TYPED.
2796                                  ;*THE COMPLETE NUMBER MUST BE RETYPED. THE INPUT IS TERMINATED BY THE
2797                                  ;*USER TYPING A CARRIAGE RETURN. THE RANGE OF THE INPUT NUMBER IS
2798                                  ;*POSITIVE 32767 TO NEGATIVE 32768.
2799                                  ;*CALL:
2800                                  ;*      RDDEC                   ;;READ A DECIMAL NUMBER
2801                                  ;*      RETURN HERE             ;;NUMBER IS ON TOP OF THE STACK
2802                                  ;
2803
2804  012674  011646                  $RDDEC: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR
2805  012676  016666  000004  000002          MOV     4(SP),2(SP)     ;;THE INPUT NUMBER
2806  012704  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
2807  012706  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
2808  012710  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
2809  012712  104407                  1$:     RDLIN                   ;;READ AN ASCIZ LINE
2810  012714  012600                          MOV     (SP)+,R0        ;;ADDRESS OF 1ST CHAR.
2811  012716  010067  000120                  MOV     R0,6$           ;;SAVE INCASE OF BAD INPUT
2812  012722  005046                          CLR     -(SP)           ;;CLEAR DATA WORD
2813  012724  005002                          CLR     R2              ;;SIGN SET POSITIVE
2814  012726  122710  000055                  CMPB    #'-,(R0)        ;;SEE IF A MINUS SIGN WAS TYPED
2815  012732  001001                          BNE     2$              ;;BR IF NO MINUS SIGN
2816  012734  112002                          MOVB    (R0)+,R2        ;;SAVE FOR LATER USE
2817  012736  112001                  2$:     MOVB    (R0)+,R1        ;;PICKUP THIS CHARACTER
2818  012740  001424                          BEQ     3$              ;;GET OUT IF ZERO
2819  012742  122701  000060                  CMPB    #'0,R1          ;;MAKE SURE THIS CHARACTER
2820  012746  003032                          BGT     5$              ;;IS A DIGIT BETWEEN 0 & 9
2821  012750  122701  000071                  CMPB    #'9,R1
2822  012754  002427                          BLT     5$
2823  012756  032716  170000                  BIT     #^C7777,(SP)    ;;DON'T LET NUMBER GET TO BIG
2824  012762  001024                          BNE     5$              ;;BR IF NUMBER WOULD OVERFLOW
2825  012764  006316                          ASL     (SP)            ;;*2
2826  012766  011646                          MOV     (SP),-(SP)      ;;SAVE FOR LATER
2827  012770  006316                          ASL     (SP)            ;;*4
2828  012772  006316                          ASL     (SP)            ;;*8.
2829  012774  062616                          ADD     (SP)+,(SP)      ;;*10.
2830  012776  102416                          BVS     5$              ;;OVERFLOW ISN'T ALLOWED
2831  013000  162701  000060                  SUB     #'0,R1          ;;STRIP AWAY THE ASCII JUNK
2832  013004  060116                          ADD     R1,(SP)         ;;ADD IN THIS DIGIT
2833  013006  102412                          BVS     5$              ;;OVERFLOW ISN'T ALLOWED
```

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2834  013010  000752                          BR      2$              ;;LOOP
2835  013012  005702                  3$:     TST     R2              ;;CHECK IF NUMBER IS NEG
2836  013014  001401                          BEQ     4$              ;;BR IF NO
2837  013016  005416                          NEG     (SP)            ;;YES--NEGATE THE NUMBER
2838  013020  012666  000012          4$:     MOV     (SP)+,12(SP)    ;;SAVE THE RESULT
2839  013024  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
2840  013026  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
2841  013030  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
2842  013032  000002                          RTI                     ;;RETURN
2843
2844  013034  005726                  5$:     TST     (SP)+           ;;CLEAN PARTIAL NUMBER FROM STACK
2845  013036  105010                          CLRB    (R0)            ;;SET A TERMINATOR
2846  013040  104401                          TYPE                    ;;TYPE THE INPUT UP TO BAD CHAR.
2847  013042  000000                  6$:     .WORD   0               ;;POINTER GOES HERE
2848  013044  104401  001252                  TYPE    ,$QUES          ;;"?" "CR" &"LF"
2849  013050  000720                          BR      1$              ;;TRY AGAIN
2850
2851                                  .SBTTL  TRAP DECODER
2852
2853                                  ;;**************************************************************
2854                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
2855                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
2856                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
2857                                  ;*GO TO THAT ROUTINE.
2858
2859  013052  010046          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
2860  013054  016600  000002          MOV     2(SP),R0        ;;GET TRAP ADDRESS
2861  013060  005740                  TST     -(R0)           ;;BACKUP BY 2
2862  013062  111000                  MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
2863  013064  006300                  ASL     R0              ;;POSITION FOR INDEXING
2864  013066  016000  013106          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
2865  013072  000200                  RTS     R0              ;;GO TO ROUTINE
2866
2867
2868                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
2869
2870  013074  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
2871  013076  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
2872  013104  000002                  .       RTI                     ;;RESTORE THE PSW
2873
2874                                  .SBTTL  TRAP TABLE
2875
2876                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
2877                                  ;*BY THE "TRAP" INSTRUCTION.
2878
2879                                  ;       ROUTINE
2880                                  ;       -------
2881  013106  013074          $TRPAD: .WORD   $TRAP2
2882  013110  012454                  $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
2883  013112  011246                  $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
2884  013114  011222                  $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
2885  013116  011262                  $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
2886  013120  011450                  $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
2887
2888
2889  013122  011674                  $RDCHR  ;;CALL=RDCHR    TRAP+6(104406)  TTY TYPEIN CHARACTER ROUTINE
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                                        $RDLIN  ;;CALL=RDLIN    TRAP+7(104407)  TTY TYPEIN STRING ROUTINE
                                        $RDOCT  ;;CALL=RDOCT    TRAP+10(104410) READ AN OCTAL NUMBER FROM TTY
                                        $RDDEC  ;;CALL=RDDEC    TRAP+11(104411) READ A DECIMAL NUMBER FROM TTY

                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;**********************************************************************
                                ;POWER DOWN ROUTINE
013132  012737  013276  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
013140  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
013146  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
013150  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
013152  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
013154  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
013156  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
013160  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
013162  017746  165752                  MOV     @$WR,-(SP)      ;;PUSH @$WR ON STACK
013166  010667  000110                  MOV     SP,$SAVR6       ;;SAVE SP
013172  012737  013204  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
013200  000000                          HALT
013202  000776                          BR      .-2             ;;HANG UP

                                ;;**********************************************************************
                                ;POWER UP ROUTINE
013204  012737  013276  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
013212  016706  000064                  MOV     $SAVR6,SP       ;;GET SP
013216  005067  000060                  CLR     $SAVR5          ;;WAIT LOOP FOR THE TTY
013222  005267  000054          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
013226  001375                          BNE     1$              ;;OF  WORD
013230  012677  165704                  MOV     (SP)+,@$WR      ;;POP STACK INTO @$WR
013234  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
013236  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
013240  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
013242  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
013244  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
013246  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
013250  012737  013132  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
013256  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
013264  104401                          TYPE                    ;REPORT THE POWER FAILURE
013266  013304          $PWRMG: .WORD   $POWER                  ;;POWER FAIL MESSAGE POINTER
013270  012716                          MOV     (PC)+,(SP)      ;;RESTART AT RESTRT
013272  001772          $PWRPC: .WORD   RESTRT                  ;;RESTART ADDRESS
013274  000002                          RTI
013276  000000          $ILLUP: HALT                            ;;THE POWER UP SEQUENCE WAS STARTED
013300  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
013302  000000          $SAVR6: 0                               ;;PUT THE SP HERE
013304  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
013312  000122
                                        .EVEN

                                ;;**********************************************************************
                                ;TRANSMIT INTERRUPT SERVICE ROUTINE FOR 256. BYTE BLOCK TRANSFERS
                                ;;**********************************************************************

013314  105777  166074          XINT:   TSTB    @DLXCSR         ;"READY" SET ??
013320  100416                          BMI     1$              ;BR IF YES
```

```
2946  013322  013767  177776  165652          MOV     @#PSW,$TMP0     ;SAVE THE ERROR PSW
2947  013330  010667  165642                  MOV     SP,$REG6        ;SAVE THE ERROR STACK POINTER
2948  013334  005167  166062                  COM     XFLG0           ;SET XMIT SOFTWARE ERROR FLAG
2949  013340  042777  000100  166042          BIC     #100,@DLRCSR    ;TURN OFF THE INTERRUPT ENABLES
2950  013346  042777  000100  166040          BIC     #100,@DLXCSR
2951  013354  000411                          BR      2$              ;GO TO EXIT
2952  013356  022767  021722  166046  1$:     CMP     #DLBUFI,OPTR    ;XMITTED 256. BYTES YET ??
2953  013364  001405                          BEQ     2$              ;BR IF YES
2954  013366  117777  166040  166022          MOVB    @OPTR,@DLXDBR   ;OUTPUT A BYTE
2955  013374  005267  166032                  INC     OPTR            ;UPDATE BUFFER POINTER
2956  013400  000002                  2$:     RTI                     ;RETURN TO MAINLINE TEST
2957
2958                                  ;;**************************************************************
2959                                  ;RECEIVER INTERRUPT SERVICE ROUTINE FOR 256. BYTE BLOCK TRANSFERS
2960                                  ;;**************************************************************
2961
2962  013402  105777  166002          RINT:   TSTB    @DLRCSR ;"DONE" SET ??
2963  013406  100410                          BMI     1$              ;BR IF YES
2964  013410  013767  177776  165564          MOV     @#PSW,$TMP0     ;SAVE THE ERROR PSW
2965  013416  010667  165554                  MOV     SP,$REG6        ;SAVR THE ERROR STACK POINTER
2966  013422  005167  165776                  COM     RFLG0           ;SET HARD RCVR ERROR FLAG
2967  013426  000415                          BR      2$              ;GO EXIT
2968  013430  005777  165756          1$:     TST     @DLRDBR         ;ANY SOFT ERRORS ??
2969  013434  100021                          BPL     3$              ;BR IF NOT
2970  013436  013767  177776  165536          MOV     @#PSW,$TMP0     ;SAVE THE ERROR PSW
2971  013444  010667  165526                  MOV     SP,$REG6        ;SAVE THE ERROR STACK POINTER
2972  013450  017767  165736  165526          MOV     @DLRDBR,$TMP1   ;SAVE THE ERROR REGISTER IN TMP1
2973  013456  005167  165744                  COM     RFLG1           ;SET THE SOFT ERROR FLAG
2974  013462  042777  000100  165724  2$:     BIC     #100,@DLXCSR    ;TURN OFF THE INTR. ENABLES
2975  013470  042777  000100  165712          BIC     #100,@DLRCSR
2976  013476  000411                          BR      4$              ;GO TO EXIT
2977  013500  022767  022322  165726  3$:     CMP     #BUFEND,IPTR    ;RECEIVED 256. BYTES YET ??
2978  013506  001405                          BEQ     4$              ;BR IF YES
2979  013510  117777  165676  165716          MOVB    @DLRDBR,@IPTR   ;INPUT A BYTE FROM THE DL11
2980  013516  005267  165712                  INC     IPTR            ;UPDATE BUFFER POINTER
2981  013522  000002                  4$:     RTI                     ;RETURN TO MAINLINE TEST
2982
2983                                  ;THE FOLLOWING ROUTINE IS USED BY THE USER UTILITY PROGRAMS TO WAIT
2984                                  ;A SPECIFIED NO. OF MILLISECONDS BETWEEN CHARACTER TRANSFERS
2985
2986  013524  017667  000000  000034  DELAY:  MOV     @(R6),DELCNT    ;GET THE NO. OF MSEC. DELAY COUNT
2987                                                                  ;TYPED IN BY USER
2988  013532  062716  000002                  ADD     #2,(R6)         ;SET UP THIS ROUTINE'S EXIT ADDRESS
2989  013536  005767  000024                  TST     DELCNT          ;IS THE DELAY COUNT ZERO?
2990  013542  001410                          BEQ     3$              ;BRANCH IF YES
2991  013544  012746  000226          1$:     MOV     #226,-(SP)      ;PUSH A 1 MSEC. COUNT TO STACK
2992  013550  005316                  2$:     DEC     (SP)            ;DECREMENT THE 1 MSEC. COUNT BY 1
2993  013552  001376                          BNE     2$              ;BRANCH IF 1 MSEC. NOT EATEN
2994                                                                  ;AWAY YET
2995  013554  005726                          TST     (SP)+           ;RESET STACK AFTER 1 MSEC. TIME UP
2996  013556  005367  000004                  DEC     DELCNT          ;DECREMENT THE TOTAL NO. OF
2997                                                                  ;MSECS. COUNT
2998  013562  001370                          BNE     1$              ;BRANCH IF WE HAVE MORE MSECS.
2999                                                                  ;TO WAIT
3000  013564  000207                  3$:     RTS     PC              ;GO BACK TO REISSUE A CHARACTER
3001  013566  000000                  DELCNT: .WORD   0               ;THE NO. OF MSECS. NEEDED TO
```

```
                                                        ;TRANSPIRE RESIDES HERE
                                ;THE FOLLOWING ROUTINE IS USED BY USER PROGRAM #4 AND WILL ALLOW
                                ;A RANDOM NUMBER OF MILLISECONDS BEFORE TRANSMISSION OF CHARACTER
                                ;
013570  016700  000062          $TALL:  MOV     NUMONE,R0       ;GET THE LOW LIMIT
013574  006100                          ROL     R0              ;MULTIPLY BY 4
013576  006100                          ROL     R0              ;
013600  066700  000054                  ADD     NUMTWO,R0       ;ADD IN THE HIGH LIMIT
013604  010067  000046                  MOV     R0,NUMONE       ;STORE THIS AS NEW LOW LIMIT
013610  006100                          ROL     R0              ;MULTIPLY NEW LOW LIMIT BY 4
013612  006100                          ROL     R0              ;
013614  066700  000040                  ADD     NUMTWO,R0       ;ADD IN THE HIGH LIMIT
013620  006100                          ROL     R0              ;MULTIPLY BY 4 AGAIN
013622  006100                          ROL     R0              ;
013624  010067  000030                  MOV     R0,NUMTWO       ;STORE THIS AS NEW HIGH LIMIT
013630  016700  000022                  MOV     NUMONE,R0       ;SAVE THE RANDOMLY GENERATED NO.
013634  046700  165446                  BIC     STLMSK,R0       ;STRIP ALL BUT 1ST 5 BITS SO AS
                                                                ;NOT TO ALLOW THE STALL TO BE TOO
                                                                ;LARGE
013640  001405                          BEQ     2$              ;BRANCH IF RESULT WAS ZERO
013642  010067  000004                  MOV     R0,1$           ;SET STALL TIME FOR DELAY ROUTINE
013646  004767  177652                  JSR     PC,DELAY        ;GO OFF TO STALL
013652  000000          1$:     .WORD   0               ;THIS IS WHERE STALL TIME RESIDES
013654  000207          2$:     RTS     PC              ;RETURN TO ISSUE CHARACTER
013656  001233          NUMONE: 1233                    ;LOW LIMIT FOR RANDOM NO.
013660  007622          NUMTWO: 7622                    ;HIGH LIMIT FOR RANDOM NO.
                                ;THE FOLLOWING ROUTINE CHECKS THE 'DONE' BIT FOR BOTH THE RECEIVER
                                ;AND TRANSMITTER.  THIS ROUTINE IS USED BY PROGRAM #4
                                ;
013662  016767  165322  000044  $TIMERX: MOV     $TMP3,@UT       ;GET THE TRANSMITTER CONTROL
                                                                ;STATUS REGISTER ADDRESS
013670  162767  000004  000036          SUB     #4,@UT          ;FORM THE RECEIVER CONTROL
                                                                ;STATUS REGISTER ADDRESS
013676  000403                          BR      $TCONT          ;GO TO TIME OUT THE RECEIVERS'
                                                                ;DONE BIT
013700  016767  165304  000026  $TIMETX: MOV     $TMP3,@UT       ;GET THE TRANSMITTER CONTROL
                                                                ;STATUS REGISTER ADDRESS
013706  005067  165304          $TCONT: CLR     $TMP6           ;INITIALIZE A TIME COUNT
013712  005267  165300          1$:     INC     $TMP6           ;INCREMENT THE TIME COUNT
013716  001405                          BEQ     2$              ;BRANCH IF TIME COUNTER OVERFLOWED
                                                                ;INDICATING DONE BIT NEVER SET
                                                                ;WITH PLENTY OF TIME ELAPSED
013720  105777  000010                  TSTB    @DUT            ;SEE IF DONE BIT IS SET YET
013724  100372                          BPL     1$              ;WAIT SOME MORE IF IT ISN'T
013726  062716  000006                  ADD     #6,@R6          ;DONE BIT IS SET - SET UP EXIT
                                                                ;RETURN TO SKIP ERROR REPORT
013732  000207          2$:     RTS     PC              ;RETURN TO PROGRAM #4
013734  000000          DUT:    .WORD   0               ;THIS IS WHERE THE RCSR OR XCSR
                                                        ;ADDRESS RESIDES
                                ;THIS ROUTINE IS USED BY PROGRAMS #4 & 5, AND WILL CHECK FOR CORRECT
                                ;EXPECTED AND RECEIVED DATA, IN ADDITION TO ANY ERROR BITS
                                ;
013736  016767  165252  165252  $DATCHK: MOV     $TMP5,$TMP6     ;GET THE CONTENTS OF THE RECEIVER
                                                                ;BUFFER
013744  016767  165242  165214          MOV     $TMP4,$REG2     ;STORE THE ADDRESS OF THE RECEIVER
                                                                ;DATA BUFFER
```

```
013752 016767 165210 165204          MOV     $REG2,$REG1         ;GET THE ADDRESS OF THE RECEIVER
                                                                 ;DATA BUFFER
013760 162767 000002 165176          SUB     #2,$REG1            ;FORM THE ADDRESS OF THE RECEIVER
                                                                 ;STATUS REGISTER FROM IT
013766 016767 165222 165174          MOV     $TMP5,$REG3         ;STORE THE CONTENTS OF THE RECEIVER
                                                                 ;DATA BUFFER
013774 032767 170000 165214          BIT     #170000,$TMP6       ;ARE ANY ERROR BITS SET?
014002 001013                        BNE     1$                  ;BRANCH IF YES
014004 004767 000720                 JSR     PC,UPMASK           ;GO TO MASK OFF BITS AS A FUNCTION OF
                                                                 ;CHARACTER LENGTH: 5, 6, 7, OR 8 BITS.
014010 026767 165200 165214          CMP     $TMP5,$TMP14        ;WAS RECEIVED CHARACTER THE
                                                                 ;SAME AS THE ONE TRANSMITTED?
014016 001406                        BEQ     2$                  ;BRANCH IF YES
014020 016767 165206 165144          MOV     $TMP14,$REG4        ;STORE WHAT THE CONTENTS OF THE
                                                                 ;RECEIVER DATA BUFFER SHOULD BE
014026 104010                        ERROR   +10                 ;DATA RECEIVED WRONG!
014030 000401                        BR      2$                  ;GET SET TO RETURN AFTER ERROR REPORT
014032 104007                1$:     ERROR   +7                  ;ERROR BIT/S SET FROM TRANSMISSION
014034 000207                2$:     RTS     PC                  ;RETURN TO PROGRAM #4

                             ;;*************************************************************
                                     ;SUBROUTINE TO SETUP ERROR INFORMATION FOR ERROR MESSAGES
                             ;;*************************************************************
```

```
                                                SUER2:  MOV     @#PSW,$TMP0     ;SAVE THE [PSW]
                                                        MOV     DLRCSR,R1       ;PUT DEVADR IN R1
                                                        MOV     (R2),R3         ;PUT WAS INFO IN R3
                                                        MOV     SP,$REG6        ;SAVE THE [SP]
                                                        ADD     #2,$REG6        ;CORRECT FOR CALLING JSR
                                                SUERR1: MOVB    $TSTNM,R0       ;PUT TEST NO. IN R0
                                                        MOV     R0,$REG0        ;SAVE [R0] THRU [R4]
                                                        MOV     R1,$REG1
                                                        MOV     R2,$REG2
                                                        MOV     R3,$REG3
                                                        MOV     R4,$REG4
                                                        RTS     PC              ;RETURN TO CALLING TEST

                                                SUERT1: MOV     @#PSW,$TMP0             ;SAVE THE [PSW]
                                                        MOVB    $TSTNM,R0               ;PUT TEST NO. IN R0
                                                        MOV     DLRCSR,R1               ;PUT DEVADR IN R1
                                                        MOV     R0,$REG0                ;SAVE [R0]
                                                        MOV     R1,$REG1                ;SAVE [R1]
                                                SUERT2: MOV     @#PSW,$TMP1             ;SAVE THE [PSW]
                                                        MOV     SP,$REG6                ;SAVE THE [SP]
                                                        ADD     #2,$REG6                ;CORRECT FOR CALLING JSR
                                                        MOV     R2,$REG2                ;SAVE [R2]
                                                        RTS     PC                      ;RETURN

                                                ;SUBROUTINE TO SETUP VECTORS FOR 256. BYTE BLOCK TRANSFER TESTS

                                                SUVEC:  MOV     DLVECT,R5       ;GET FIRST VECTOR ADDRESS
                                                        MOV     #RINT,(R5)+     ;SET UP RCVR VECTOR
                                                        MOV     DLPRI,(R5)+
                                                        MOV     #XINT,(R5)+     ;SET UP XMIT VECTOR
                                                        MOV     DLPRI,(R5)
                                                        RTS     PC              ;RETURN TO CALLER

                                                ;SUBROUTINE TO PRIME DATA BUFFERS AND DEVICE FOR 256. BYTE TRANSFER

                                                PRIME:  CLR     @DLXCSR         ;CLEAR XMIT AND RCVR CSR'S
                                                        CLR     @DLRCSR
                                                        CLR     XFLG0           ;INITIALIZE ERROR FLAGS
                                                        CLR     RFLG0
                                                        CLR     RFLG1
                                                        MOV     #DLBUF0,OPTR    ;SET UP OUTPUT POINTER
                                                        MOV     #DLBUF1,IPTR    ;SET UP INPUT POINTER
                                                        JSR     PC,CLDLBF       ;GO CLEAR THE BUFFERS
                                                        JSR     PC,@LDOUT       ;GO SET UP THE PATTERN
                                                        CLR     TIMR1           ;INIT "TIMEOUT" COUNTERS
                                                        MOV     #30.,TIMR2
                                                        TST     @DLRDBR         ;FLUSH "DONE" BIT IN RCVR CSR
                                                        TST     @DLRDBR
                                                        BIS     #100,@DLRCSR    ;ENABLE RCVR INTR.
                                                        BIS     #104,@DLXCSR    ;ENABLE XMIT INTR. AND MAINT MODE
                                                        RTS     PC



                                                ;THIS ROUTINE IS CALLED TO CLEAR THE INPUT AND OUTPUT BUFFERS
```

```
3138
3139  014330  012705  021322          CLDLBF: MOV     #DLBUF0,R5      ;R5 POINTS TO BEGINNING OF BUFFER AREA
3140  014334  105025                  1$:     CLR     (R5)+           ;CLEAR A WORD
3141  014336  022705  022322                  CMP     #BUFEND,R5      ;DONE ALL WORDS ??
3142  014342  001374                          BNE     1$              ;BR IF NOT
3143  014344  000207                          RTS     PC              ;RETURN TO CALLER
3144
3145                                  ;THIS ROUTINE IS CALLED TO SET UP THE NULL-DEL-NULL PATTERN
3146
3147  014346  012705  021322          LDOUT1: MOV     #DLBUF0,R5      ;R5 POINTS TO OUTPUT BUFFER
3148  014352  105025                  1$:     CLRB    (R5)+           ;MOVE A NULL CHAR
3149  014354  112725  000377                  MOVB    #377,(R5)+      ;MOV A DEL CHAR
3150  014360  022705  021722                  CMP     #DLBUFI,R5      ;ALL DONE ??
3151  014364  001372                          BNE     1$              ;BR IF NOT
3152  014366  000207                          RTS     PC              ;RETURN TO CALLER
3153
3154                                  ;THIS ROUTINE IS USED TO LOAD AN ASCENDING BINARY COUNT PATTERN
3155
3156  014370  005005          LDOUT2: CLR     R5              ;START WITH 000
3157  014372  110565  021322  1$:     MOVB    R5,DLBUF0(R5)   ;LOAD ONE BYTE
3158  014376  005205                  INC     R5              ;INCREMENT BYTE
3159  014400  022705  000400          CMP     #400,R5         ;DONE 000 THRU 377 ??
3160  014404  001372                  BNE     1$              ;BR IF NOT
3161  014406  000207                  RTS     PC              ;RETURN TO CALLER
3162
3163                                  ;THIS ROUTINE IS USED TO LOAD A DESCENDING BINARY COUNT PATTERN
3164
3165  014410  112767  000377  164602  LDOUT3: MOVB    #377,$TMP7      ;START WITH A 377 BYTE
3166  014416  012705  021322                  MOV     #DLBUF0,R5      ;R5 POINTS TO OUTPUT BUFFER
3167  014422  116725  164572          1$:     MOVB    $TMP7,(R5)+     ;LOAD ONE BYTE
3168  014426  022705  021722                  CMP     #DLBUFI,R5      ;ALL DONE ??
3169  014432  001403                          BEQ     2$              ;BR IF YES
3170  014434  105367  164560                  DECB    $TMP7           ;GENERATE NEXT BYTE
3171  014440  000770                          BR      1$              ;GO MOVE IT
3172  014442  000207                  2$:     RTS     PC              ;RETURN TO CALLER
3173
3174
3175                                  ;THIS ROUTINE LOADS A COMPLEMENTING WORST CASE PATTERN
3176
3177  014444  012705  021322          LDOUT4: MOV     #DLBUF0,R5      ;R5 POINTS TO OUTPUT BUFFER
3178  014450  005067  164544                  CLR     $TMP7           ;INIT. BYTE GENERATOR
3179  014454  116725  164540          1$:     MOVB    $TMP7,(R5)+     ;MOVE A BYTE
3180  014460  105167  164534                  COMB    $TMP7           ;COMPLEMENT IT
3181  014464  116725  164530                  MOVB    $TMP7,(R5)+     ;NOW LOAD THE 1'S COMPLEMENT
3182  014470  105267  164525                  INCB    $TMP7+1         ;INCREMENT THE BYTE
3183  014474  116767  164521  164516          MOVB    $TMP7+1,$TMP7   ;SET UP TO LOAD NEXT TWO
3184  014502  022705  021722                  CMP     #DLBUFI,R5      ;ALL DONE ??
3185  014506  001362                          BNE     1$              ;BR IF NOT
3186  014510  000207                          RTS     PC              ;RETURN TO CALLER
3187
3188                                  ;THIS ROUTINE CHECKS FOR DATA COMPARE ERRORS IN 256. BYTE BLOCK TRANSFERS
3189
3190  014512  042777  000104  164674  CHKDAT: BIC     #104,@DLXCSR    ;DISABLE BOTH XMIT AND RCVR INTR. ENAB.
3191  014520  042777  000100  164662          BIC     #100,@DLRCSR
3192  014526  012702  021322                  MOV     #DLBUF0,R2      ;R2 POINTS TO S/B DATA IN OUTPUT BUFFER
3193  014532  004767  000070                  JSR     PC,MASKING      ;GO TO MASK OFF BITS AS A FUNCTION OF
```

```
                                                                ;CHARACTER LENGTH 5, 6, 7, OR 8 BITS,
014536  012701  021722                MOV     #DLBUFI,R1        ;R1 POINTS TO WAS DATA IN RCVR. BUFFER
014542  122221                1$:     CMPB    (R2)+,(R1)+       ;DID S/B = WAS ??
014544  001004                        BNE     3$                ;BR IF NOT
014546  022701  022322        2$:     CMP     #BUFEND,R1        ;CHECKED ALL BYTES ??
014552  001373                        BNE     1$                ;BR IF NOT
014554  000207                        RTS     PC                ;RETURN TO CALLER
014556  013767  177776  164416  3$:   MOV     @#PSW,$TMPC       ;SAVE THE [PSW]
014564  010667  164406                MOV     SP,$REG6          ;SAVE THE [SP]
014570  114204                        MOVB    -(R2),R4          ;GET THE S/B DATA
014572  042704  177400                BIC     #177400,R4        ;CLEAR JUNK FROM HI BYTE
014576  114103                        MOVB    -(R1),R3          ;GET THE WAS DATA
014600  042703  177400                BIC     #177400,R3        ;CLEAR JUNK FROM HI BYTE
014604  004767  177254                JSR     PC,SUERR1         ;GO SET UP ERROR INFO.
014610  012767  014620  164426        MOV     #4$,$ESCAPE       ;RETURN TO 4$ AFTER ERROR PRINT
014616  104003                        ERROR+3                   ;DATA COMPARE ERROR
014620  005202                4$:     INC     R2                ;REPOSITION BUFFER POINTERS
014622  005201                        INC     R1
014624  000750                        BR      2$                ;GO CHECK NEXT BYTE

                        ;THIS ROUTINE IS USED BY THE PATTERN TESTS
                        ;IT WILL MASK OFF THE CHARACTER SENT OUT BY THE XMITTER
                        ;BEFORE THE COMPARISON OF DATA OF WHAT WAS RECEIVED AND WHAT WAS TRANSMITTED
                        ;IS DONE.  THE MASKING IS DONE AS A FUNCTION OF CHARACTER LENGTH WHICH
                        ;CAN BE EITHER 5, 6, 7, OR 8 BITS .

014626  005005                MASKING:        CLR     R5        ;INITIALIZE TABLE OFFSET
                                                                ;FOR PICKING UP MASK WORD
014630  022767  000010  164376          CMP     #8.,$TMP15        ;IS THE CHARACTER LENGTH 8 BITS?
014636  001427                          BEQ     3$                ;BRANCH IF IT IS
014640  062705  000002                  ADD     #2,R5             ;SET UP FOR NEXT MASK WORD
                                                                ;IT COULD BE THIS ONE
014644  022767  000007  164362          CMP     #7.,$TMP15        ;IS THE CHARACTER LENGTH 7 BITS?
014652  001410                          BEQ     1$                ;BRANCH IF IT IS
014654  062705  000002                  ADD     #2,R5             ;SET UP FOR NEXT MASK WORD
                                                                ;IT COULD BE THIS ONE
014660  022767  000006  164346          CMP     #6.,$TMP15        ;IS THE CHARACTER LENGTH 6 BITS?
014666  001402                          BEQ     1$                ;BRANCH IF IT IS
014670  062705  000002                  ADD     #2,R5             ;SET UP FOR NEXT MASK WORD
                                                                ;IT MUST BE THIS ONE!!!!
014674  016505  014720          1$:     MOV     CHARL(R5),R5      ;PICK UP THE MASK WORD
014700  005105                          COM     R5                ;FORM THE BITS THAT ARE TO BE MASKED
014702  140522                2$:     BICB    R5,(R2)+          ;MASK A BYTE
014704  022702  021722                  CMP     #DLBUFI,R2        ;ARE WE AT THE END OF THE XMITTER
                                                                ;OUTPUT BUFFER
014710  001374                          BNE     2$                ;BRANCH IF NO TO MASK NEXT BYTE
014712  012702  021322                  MOV     #DLBUFO,R2        ;RESTORE R2 BEFORE RETURNING
014716  000207                3$:     RTS     PC                ;RETURN TO MAINLINE CODE
                        ;TABLE OF MASK WORDS
014720  000377                CHARL:  .WORD   377               ;8. BITS IN LENGTH
014722  000177                        .WORD   177               ;7. BITS IN LENGTH
014724  000077                        .WORD   77                ;6. BITS IN LENGTH
014726  000037                        .WORD   37                ;5. BITS IN LENGTH

                        ;THIS ROUTINE IS USED BY PROGRAMS #4 & 5
                        ;IT WILL MASK OFF THE CHARACTER SENT OUT BY THE TRANSMITTER
```

```
                                        ;BEFORE THE COMPARISON OF DATA OF WHAT WAS RECEIVED AND WHAT WAS
                                        ;TRANSMITTED IS DONE.  THE MASKING IS DONE AS A FUNCTION OF CHARACTER
                                        ;LENGTH WHICH CAN BE EITHER 5, 6, 7, OR 8 BITS.

014730  016767  164250  164274  UPMASK: MOV     $TMP1,$TMP14    ;PICK UP THE CHARACTER THAT WAS
                                                                ;SENT OUT FROM THE XMITTER
014736  005005                          CLR     R5              ;INITIIALIZE TABLE OFFSET
                                                                ;FOR PICKING UP MASK WORD
014740  022767  000010  164266          CMP     #8.,$TMP15      ;IS THE CHARACTER LENGTH 8 BITS?
014746  001423                          BEQ     2$              ;BRANCH IF IT IS
014750  062705  000002                  ADD     #2,R5           ;SET UP FOR NEXT MASK WORD
                                                                ;IT COULD BE THIS ONE
014754  022767  000007  164252          CMP     #7.,$TMP15      ;IS THE CHARACTER LENGTH 7 BITS?
014762  001410                          BEQ     1$              ;BRANCH IF IT IS
014764  062705  000002                  ADD     #2,R5           ;SET UP FOR NEXT MASK WORD
                                                                ;IT COULD BE THIS ONE
014770  022767  000006  164236          CMP     #6 ,$TMP15      ;IS THE CHARACTER LENGTH 6 BITS?
014776  001402                          BEQ     1$              ;BRANCH IF IT IS
015000  062705  000002                  ADD     #2,R5           ;SET UP FOR NEXT MASK WORD
                                                                ;IT MUST BE THIS ONE!!!!
015004  016505  014720          1$:     MOV     CHARL(R5),R5    ;PICK UP THE MASK WORD
015010  005105                          COM     R5              ;FORM THE BITS THAT ARE TO BE MASKED
015012  140567  164214                  BICB    R5,$TMP14       ;MASK THE LOW BYTE
015016  000207                  2$:     RTS     PC              ;RETURN TO MAINLINE CODE

                                        ;ROUTINE TO SERVICE BUS ERROR TRAPS

015020  112767  000060  000632  BUSERR: MOVB    #60,EM4+46      ;SET UP ERROR MESSAGE
015026  112767  000060  000625          MOVB    #60,EM4+47
015034  112767  000064  000620          MOVB    #64,EM4+50
015042  000412                          BR      TRPCOM          ;GO SET UP AND REPORT BUS ERROR

                                        ;ROUTINE TO SERVICE RSVD INSTRUCTION TRAPS

015044  112767  000060  000606  RSVERR: MOVB    #60,EM4+46      .SET UP ERROR MESSAGE
015052  112767  000061  000601          MOVB    #61,EM4+47
015060  112767  000060  000574          MOVB    #60,EM4+50
015066  000400                          BR      TRPCOM          ;GO SET UP AND REPORT RSVD INSTR. ERROR

                                        ;ROUTINE TO SET UP AND REPORT BUS ERROR AND RSVD INSTR ERRORS

015070  010667  164102          TRPCOM: MOV     SP,$RE.6        ;SAVE THE TRAP SP
015074  116700  164002                  MOVB    $TSTNM,R0       ;PUT TEST NO. IN R0
015100  010067  164056                  MOV     R0,$REG0        ;SAVE TEST #
015104  016667  000002  164070          MOV     2(SP),$TMP0     ;SAVE THE ERROR PSW
015112  012767  015126  164124          MOV     #1$,$ESCAPE     ;GO TO 1$ AFTER ERROR PRINT
015120  011667  164054                  MOV     (SP),$REG7      ;SAVE THE ERROR PC
015124  104004                          ERROR+4                 ;REPORTED TRAP ERROR
015126  000137  001772          1$:     JMP     @#RESTRT        ;ATTEMPT TO RESTART THE PROGRAM
                                                                ;AND TRY AGAIN


                                        ;;******************************************************************
                                        ;ERROR MESSAGE INFORMATION
                                        ;;******************************************************************
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```
3306                                        ;INFORMATION FOR ERROR MESSAGE 1
3307
3308  015132  046104  030461  051040  EM1:    .ASCIZ  'DL11 REGISTER REFERENCE CAUSED TIMEOUT'
3309  015140  043505  051511  042524
3310  015146  020122  042522  042506
3311  015154  042522  041516  020105
3312  015162  040503  051525  042105
3313  015170  052040  046511  047505
3314  015176  052125     000
3315  015201     040  050050  024503  DH1:    .ASCIZ  '  (PC)    (PS)    (SP)    TEST   DEVADR  REGADR'
3316  015206  020040  020040  050050
3317  015214  024523  020040  020040
3318  015222  051450  024520  020040
3319  015230  020040  042524  052123
3320  015236  020040  042040  053105
3321  015244  042101  020122  051040
3322  015252  043505  042101  000122
3323                                    .EVEN
3324  015260  001116  001202  001176  DT1:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,0
3325  015266  001162  001164  001166
3326  015274  000000
3327
3328                                        ;INFORMATION FOR ERROR MESSAGE 2
3329
3330  015276  046104  030461  051040  EM2:    .ASCIZ    _11 REGISTER ERROR'
3331  015304  043505  051511  042524
3332  015312  020122  051105  047522
3333  015320  000122
3334  015322  024040  041520  020051  DH2:    .ASCIZ  '  (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   WAS     S B'
3335  015330  020040  024040  051520
3336  015336  020051  020040  024040
3337  015344  050123  020051  020040
3338  015352  052040  051505  020124
3339  015360  020040  042504  040526
3340  015366  051104  020040  042522
3341  015374  040507  051104  020040
3342  015402  053440  051501  020040
3343  015410  020040  051440  041057
3344  015416     000
3345          015420                    .EVEN
3346  015420  001116  001202  001176  DT2:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4,0
3347  015426  001162  001164  001166
3348  015434  001170  001172  000000
3349
3350                                        ;INFORMATION FOR MESSAGE 3
3351
3352  015442  046104  030461  042040  EM3:    .ASCIZ  'DL11 DATA COMPARE ERROR'
3353  015450  052101  020101  047503
3354  015456  050115  051101  020105
3355  015464  051105  047522  000122
3356  015472  024040  041520  020051  DH3:    .ASCIZ  '  (PC)    (PS)    (SP)    TEST   WASADR  SHBADR    WAS     S B'
3357  015500  020040  024040  051520
3358  015506  020051  020040  024040
3359  015514  050123  020051  020040
3360  015522  052040  051505  020124
3361  015530  020040  040527  040523
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 3362  015536  051104  020040  044123
 3363  015544  040502  051104  020040
 3364  015552  020040  040527  020123
 3365  015560  020040  020040  027523
 3366  015566  000102
 3367                                  .EVEN
 3368  015570  001116  001202  001176  DT3:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4,0
 3369  015576  001162  001164  001166
 3370  015604  001170  001172  000000
 3371
 3372                                  ;INFORMATION FOR MESSAGE 4
 3373
 3374  015612  047125  054105  042520  EM4:    .ASCIZ  'UNEXPECTED TRAP TO VECTOR AT LOCATION    '
 3375  015620  052103  042105  052040
 3376  015626  040522  020120  047524
 3377  015634  053040  041505  047524
 3378  015642  020122  052101  046040
 3379  015650  041517  052101  047511
 3380  015656  020116  020040  000040
 3381  015664  024040  041520  020051  DH4:    .ASCIZ  '  (PC)    (PS)    (SP)    TEST'
 3382  015672  020040  024040  051520
 3383  015700  020051  020040  024040
 3384  015706  050123  020051  020040
 3385  015714  052040  051505  000124
 3386                                  .EVEN
 3387  015722  001200  001202  001176  DT4:    .WORD   $REG7,$TMPO,$REG6,$REG0,0
 3388  015730  001162  000000
 3389
 3390                                  ;ERROR INFORMATION FOR ERROR MESSAGE 5
 3391
 3392  015734  046104  030461  051440  EM5:    .ASCIZ  'DL11 SOFT ERROR (PARITY,FRAMING, OR OVERRUN)'
 3393  015742  043117  020124  051105
 3394  015750  047522  020122  050050
 3395  015756  051101  052111  026131
 3396  015764  051106  046501  047111
 3397  015772  026107  047440  020122
 3398  016000  053117  051105  052522
 3399  016006  024516     000
 3400  016011     040  050050  024503  DH5:    .ASCIZ  '  (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   (REG)'
 3401  016016  020040  020040  050050
 3402  016024  024523  020040  020040
 3403  016032  051450  024520  020040
 3404  016040  020040  042524  052123
 3405  016046  020040  042040  053105
 3406  016054  042101  020122  051040
 3407  016062  043505  042101  020122
 3408  016070  020040  051050  043505
 3409  016076  000051
 3410                                  .EVEN
 3411  016100  001116  001202  001176  DT5:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,0
 3412  016106  001162  001164  001166
 3413  016114  001170  000000
 3414
 3415                                  ;INFORMATION FOR ERROR MESSAGE 6
 3416
 3417  016120  024040  041520  020051  DH6:    .ASCIZ  '  (PC)    (PS)    (SP)   REGADR'
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3418  016126  020040  024040  051520
3419  016134  020051  020040  024040
3420  016142  050123  020051  020040
3421  016150  042522  040507  051104
3422  016156     000
3423          016160                        .EVEN
3424  016160  001116  001204  001176  DT6:    .WORD   $ERRPC,$TMP1,$REG6,$REG2,0
3425  016166  001166  000000
3426
3427                                        ;INFORMATION FOR ERROR MESSAGE 7
3428
3429  016172  024040  041520  020051  DH7:    .ASCIZ  ' (PC)   DEVADR  REGADR   .REG)'
3430  016200  020040  042504  040526
3431  016206  051104  020040  042522
3432  016214  040507  051104  020040
3433  016222  024040  042522  024507
3434  016230     000
3435          016232                        .EVEN
3436  016232  001116  001164  001166  DT7:    .WORD   $ERRPC,$REG1,$REG2,$REG3,0
3437  016240  001170  000000
3438
3439                                        ;INFORMATION FOR ERROR MESSAGE 10
3440
3441  016244  024040  041520  020051  DH10:   .ASCIZ  ' (PC)   DEVADR  REGADR   (REG)    S/B'
3442  016252  020040  042504  040526
3443  016260  051104  020040  042522
3444  016266  040507  051104  020040
3445  016274  024040  042522  024507
3446  016302  020040  020040  027523
3447  016310  000102
3448                                        .EVEN
3449  016312  001116  001164  001166  DT10:   .WORD   $ERRPC,$REG1,$REG2,$REG3,$REG4,0
3450  016320  001170  001172  000000
3451                                        ;MISCELLANEOUS MESSAGES
3452
3453  016326  052516  046114  042055  XMSG1:  .ASCIZ  'NULL-DEL-NULL SEQUENCE TIMEOUT AT FOLLOWING PC'
3454  016334  046105  047055  046125
3455  016342  020114  042523  052521
3456  016350  047105  042503  052040
3457  016356  046511  047505  052125
3458  016364  040440  020124  047506
3459  016372  046114  053517  047111
3460  016400  020107  041520     000
3461  016405     102  047111  051101  XMSG2:  .ASCIZ  'BINARY UP COUNT SEQUENCE TIMEOUT AT FOLLOWING PC'
3462  016412  020131  050125  041440
3463  016420  052517  052116  051440
3464  016426  050505  042525  041516
3465  016434  020105  044524  042515
3466  016442  052517  020124  052101
3467  016450  043040  046117  047514
3468  016456  044527  043516  050040
3469  016464  000103
3470  016466  044502  040516  054522  XMSG3:  .ASCIZ  'BINARY DOWN COUNT SEQUENCE TIMEOUT AT FOLLOWING PC'
3471  016474  042040  053517  020116
3472  016502  047503  047125  020124
3473  016510  042523  052521  047105
```

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 3474  016516  042503  052040  046511
 3475  016524  047505  052125  040440
 3476  016532  020124  047506  046114
 3477  016540  053517  047111  020107
 3478  016546  041520     000
 3479  016551     127  051117  052123  XMSG4:  .ASCIZ  'WORST CASE PATTERN SEQUENCE TIMEOUT AT FOLLOWING PC'
 3480  016556  041440  051501  020105
 3481  016564  040520  052124  051105
 3482  016572  020116  042523  052521
 3483  016600  047105  042503  052040
 3484  016606  046511  047505  052125
 3485  016614  040440  020124  047506
 3486  016622  046114  053517  047111
 3487  016630  020107  041520     000
 3488
 3489  016635     015  046412  044501  STMES:  .ASCIZ  <15><12>'MAINDEC-11-DZDLC-A'<15><12>
 3490  016642  042116  041505  030455
 3491  016650  026461  055104  046104
 3492  016656  026503  006501  000012
 3493
 3494  016664  005015  047531  020125  PROG2M: .ASCIZ  <15><12>'YOU HAVE SELECTED PROGRAM NO. 2'<15><12>
 3495  016672  040510  042526  051440
 3496  016700  046105  041505  042524
 3497  016706  020104  051120  043517
 3498  016714  040522  020115  047516
 3499  016722  020056  006462  000012
 3500  016730  005015  047531  020125  PROG3M: .ASCIZ  <15><12>'YOU HAVE SELECTED PROGRAM NO. 3'<15><12>
 3501  016736  040510  042526  051440
 3502  016744  046105  041505  042524
 3503  016752  020104  051120  043517
 3504  016760  040522  020115  047516
 3505  016766  020056  006463  000012
 3506  016774  005015  047531  020125  PROG4M: .ASCIZ  <15><12>'YOU HAVE SELECTED PROGRAM NO. 4'<15><12>
 3507  017002  040510  042526  051440
 3508  017010  046105  041505  042524
 3509  017016  020104  051120  043517
 3510  017024  040522  020115  047516
 3511  017032  020056  006464  000012
 3512  017040  005015  047531  020125  PROG5M: .ASCIZ  <15><12>'YOU HAVE SELECTED PROGRAM NO. 5'<15><12>
 3513  017046  040510  042526  051440
 3514  017054  046105  041505  042524
 3515  017062  020104  051120  043517
 3516  017070  040522  020115  047516
 3517  017076  020056  006465  000012
 3518  017104  005015  051124  047101  XDB:    .ASCIZ  <15><12>'TRANSMITTER DONE BIT NEVER SET  PC= '
 3519  017112  046523  052111  042524
 3520  017120  020122  047504  042516
 3521  017126  041040  052111  047040
 3522  017134  053105  051105  051440
 3523  017142  052105  020040  041520
 3524  017150  020075     000
 3525  017153     015  051012  041505  RDB:    .ASCIZ  <15><12>'RECEIVER DONE BIT NEVER SET  PC= '
 3526  017160  044505  042526  020122
 3527  017166  047504  042516  041040
 3528  017174  052111  047040  053105
 3529  017202  051105  051440  052105
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  3530  017210  020040  041520  020075
  3531  017216     000
  3532                                  ;MESSAGES SEEKING USER RESPONSE
  3533
  3534  017217     015  053412  040510  LENGTH: .ASCIZ  <15><12>'WHAT IS THE CHARACTER LENGTH (5,6,7 OR 8 BITS)?'
  3535  017224  020124  051511  052040
  3536  017232  042510  041440  040510
  3537  017240  040522  052103  051105
  3538  017246  046040  047105  052107
  3539  017254  020110  032450  033054
  3540  017262  033454  047440  020122
  3541  017270  020070  044502  051524
  3542  017276  037451     000
  3543  017301     015  042012  020117  DEFAULT:        .ASCII  <15><12>'DO YOU WISH TO TEST OTHER THAN THE'
  3544  017306  047531  020125  044527
  3545  017314  044123  052040  020117
  3546  017322  042524  052123  047440
  3547  017330  044124  051105  052040
  3548  017336  040510  020116  044124
  3549  017344     105
  3550  017345     015  042012  043105          .ASCIZ  <15><12>'DEFAULT DEVICE (1/0 = YES/NO)?'
  3551  017352  052501  052114  042040
  3552  017360  053105  041511  020105
  3553  017366  030450  030057  036440
  3554  017374  054440  051505  047057
  3555  017402  024517  000077
  3556  017406  005015  044127  052101  MFIRSTD:.ASCIZ  <15><12>'WHAT IS THE 1ST R  EIVER STATUS REGISTER ADDRESS?  '
  3557  017414  044440  020123  044124
  3558  017422  020105  051461  020124
  3559  017430  042522  042503  053111
  3560  017436  051105  051440  040524
  3561  017444  052524  020123  042522
  3562  017452  044507  052123  051105
  3563  017460  040440  042104  042522
  3564  017466  051523  020077  000040
  3565  017474  005015  044127  052101  MVECT:  .ASCIZ  <15><12>'WHAT IS THE 1ST RECEIVER''S VECTOR ADDRESS?  '
  3566  017502  044440  020123  044124
  3567  017510  020105  051461  020124
  3568  017516  042522  042503  053111
  3569  017524  051105  020123  042526
  3570  017532  052103  051117  040440
  3571  017540  042104  042522  051523
  3572  017546  020077  000040
  3573  017552  005015  047504  054440  MULDEV: .ASCIZ  <15><12>'DO YOU WANT TO TEST MULTIPLE DEVICES 1/0=YES/NO?  '
  3574  017560  052517  053440  047101
  3575  017566  020124  047524  052040
  3576  017574  051505  020124  052515
  3577  017602  052114  050111  042514
  3578  017610  042040  053105  041511
  3579  017616  051505  030440  030057
  3580  017624  054475  051505  047057
  3581  017632  037517  020040     000
  3582  017637     015  053412  040510  MLASTD: .ASCIZ  <15><12>'WHAT IS THE STATJS REGISTER ADDRESS OF THE LAST RECEIVER?  '
  3583  017644  020124  051511  052040
  3584  017652  042510  051440  040524
  3585  017660  052524  020123  042522
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3586  017666  044507  052123  051105
3587  017674  040440  042104  042522
3588  017702  051523  047440  020106
3589  017710  044124  020105  040514
3590  017716  052123  051040  041505
3591  017724  044505  042526  037522
3592  017732  020040     000
3593  017735     015  051412  046517  MRANGE: .ASCIZ  <15><12>'SOMETHING WRONG-ANSWER THE LAST QUESTION AGAIN!  '
3594  017742  052105  044510  043516
3595  017750  053440  047522  043516
3596  017756  040455  051516  042527
3597  017764  020122  044124  020105
3598  017772  040514  052123  050440
3599  020000  042525  052123  047511
3600  020006  020116  043501  044501
3601  020014  020516  020040     000
3602  020021     015  053412  040510  PLEVEL: .ASCIZ  <15><12>'WHAT IS YOUR INTERRUPT PRIORITY LEVEL?  '
3603  020026  020124  051511  054440
3604  020034  052517  020122  047111
3605  020042  042524  051122  050125
3606  020050  020124  051120  047511
3607  020056  044522  054524  046040
3608  020064  053105  046105  020077
3609  020072  000040
3610  020074  005015  051120  043517  FOULUP: .ASCII  <15><12>'PROGRAM DEVICE ACTIVE LOCATION SHOWS NO DEVICE ACTIVE'
3611  020102  040522  020115  047504
3612  020110  044526  042503  040440
3613  020116  052103  053111  020105
3614  020124  047514  040503  044524
3615  020132  047117  051440  047510
3616  020140  051527  047040  020117
3617  020146  042504  044526  042503
3618  020154  040440  052103  053111
3619  020162     105
3620  020163     015  051412  052105          .ASCII  <15><12>'SET SWITCH 0 TO A ONE (1) AND'
3621  020170  051440  044527  041524
3622  020176  020110  020060  047524
3623  020204  040440  047440  042516
3624  020212  024040  024461  040440
3625  020220  042116
3626  020222  005015  044510  020124          .ASCIZ  <15><12>'HIT CONTINUE TO GO BACK TO DEVICE   LECTION AGAIN'
3627  020230  047503  052116  047111
3628  020236  042525  052040  020117
3629  020244  047507  041040  041501
3630  020252  020113  047524  042040
3631  020260  053105  041511  020105
3632  020266  042523  042514  052103
3633  020274  047511  020116  043501
3634  020302  044501  000116
3635  020306  005015  044127  052101  LINTAD: .ASCIZ  <15><12>'WHAT IS THE TRANSMITTER DATA BUFFER ADDRESS'  '
3636  020314  044440  020123  044124
3637  020322  020105  051124  047101
3638  020330  046523  052111  042524
3639  020336  020122  040504  040524
3640  020344  041040  043125  042506
3641  020352  020122  042101  051104
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3642  020360  051505  037523  020040
3643  020366     000
3644  020367     015  053412  040510  SELCAR: .ASCIZ  <15><12>'WHAT IS THE CHARACTER TO BE TRANSMITTED (OCTAL ASCII E.G. A=101
3645  020374  020124  051511  052040
3646  020402  042510  041440  040510
3647  020410  040522  052103  051105
3648  020416  052040  020117  042502
3649  020424  052040  040522  051516
3650  020432  044515  052124  042105
3651  020440  024040  041517  040524
3652  020446  020114  051501  044503
3653  020454  020111  027105  027107
3654  020462  040440  030475  030460
3655  020470  037451  020040     000
3656  020475     015  053412  040510  SELDLY: .ASCIZ  <15><12>'WHAT IS THE DESIRED MSEC. DELAY (OCTAL E.G. 10=8(10))?  '
3657  020502  020124  051511  052040
3658  020510  042510  042040  051505
3659  020516  051111  042105  046440
3660  020524  042523  027103  042040
3661  020532  046105  054501  024040
3662  020540  041517  040524  020114
3663  020546  027105  027107  030440
3664  020554  036460  024070  030061
3665  020562  024451  020077  000040
3666  020570  005015  044127  052101  LINRAD: .ASCIZ  <15><12>'WHAT IS THE RECEIVER DATA BUFFER ADDRESS?  '
3667  020576  044440  020123  044124
3668  020604  020105  042522  042503
3669  020612  053111  051105  042040
3670  020620  052101  020101  052502
3671  020626  043106  051105  040440
3672  020634  042104  042522  051523
3673  020642  020077  000040
3674  020650  005015  051511  040440  RSTALL: .ASCIZ  <15><12>'IS A RANDOM WAIT TIME (MSEC.) DESIRED  1/0=YES/NO?  '
3675  020654  051040  047101  047504
3676  020662  020115  040527  052111
3677  020670  052040  046511  020105
3678  020676  046450  042523  027103
3679  020704  020051  042504  044523
3680  020712  042522  020104  030440
3681  020720  030057  054475  051505
3682  020726  047057  037517  020040
3683  020734     000
3684  020735     015  054412  052517  FAILSA: .ASCII  <15><12>'YOU HAVE SWR8 SET INDICATING LOOP ON TEST'
3685  020742  044040  053101  020105
3686  020750  053523  034122  051440
3687  020756  052105  044440  042116
3688  020764  041511  052101  047111
3689  020772  020107  047514  050117
3690  021000  047440  020116  042524
3691  021006  052123
3692  021010  005015  040510  042526          .ASCII  <15><12>'HAVE YOU MODIFIED THE PROPER LOCATIONS FOR THE'
3693  021016  054440  052517  046440
3694  021024  042117  043111  042511
3695  021032  020104  044124  020105
3696  021040  051120  050117  051105
3697  021046  046040  041517  052101
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3698  021054  047511  051516  043040
3699  021062  051117  052040  042510
3700  021070  005015  042504  044526          .ASCII  <15><12>'DEVICE THAT YOU WANT TO TEST?'
3701  021076  042503  052040  040510
3702  021104  020124  047531  020125
3703  021112  040527  052116  052040
3704  021120  020117  042524  052123
3705  021126     077
3706  021127     015  044412  020106          .ASCII  <15><12>'IF SO - PRESS THE CONTINUE SWITCH'
3707  021134  047523  026440  050040
3708  021142  042522  051523  052040
3709  021150  042510  041440  047117
3710  021156  044524  052516  020105
3711  021164  053523  052111  044103
3712  021172  005015  043111  047040          .ASCII  <15><12>'IF NOT - MODIFY THE PROPER LOCATIONS, THEN'
3713  021200  052117  026440  046440
3714  021206  042117  043111  020131
3715  021214  044124  020105  051120
3716  021222  050117  051105  046040
3717  021230  041517  052101  047511
3718  021236  051516  020054  044124
3719  021244  047105
3720  021246  005015  042522  052123          .ASCIZ  <15><12>'RESTART THE PROGRAM AT ADDRESS 200'
3721  021254  051101  020124  044124
3722  021262  020105  051120  043517
3723  021270  040522  020115  052101
3724  021276  040440  042104  042522
3725  021304  051523  031040  030060
3726  021312     000
3727
3728  021313     040  020075  041520          PCMSG:  .ASCII  ' = PC'
3729  021320  000040                                  .ASCIZ  ' '
3730
3731                                  .EVEN
3732                                  ;512. WORDS RESERVED FOR TWO 256. BYTE INPUT/OUTPUT DATA BUFFERS
3733
3734  021322  000400                  DLBUFO: .BLKB   256.            ;RSVD FOR OUTPUT BUFFER
3735                                                                  ;THIS IS THE DATA BEING SENT OUT
3736                                                                  ;BY THE TRANSMITTER
3737  021722  000400                  DLBUFI: .BLKB   256.            ;RSVD FOR INPUT BUFFER
3738                                                                  ;THIS IS THE DATA THAT WAS PICKED
3739                                                                  ;UP BY THE RECEIVER (I.E. DATA
3740                                                                  ;SENT BY THE TRANSMITTER - HOPEFULLY)
3741  022322  000000                  BUFEND: 0                       ;TAG MARKS END OF BUFFERS
3742
3743          000001                  .END
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[illegible]REG	021274	677#	1032+	1064+	1065+	1075+	2180	2204						
[illegible]	[illegible]	663#	984+	1070+	1071	1078+	1096+	2192+	2208	2227+	2229			
[illegible]	[illegible]	670#	1004+	2195+	2210	2228+	2230							
[illegible]	[illegible]446	457	804#											
[illegible] =	000001	563#	971	994	1052	1497	1503	1516	1777	1859	1944	2053		
[illegible] =	[illegible]	553#	563											
[illegible] =	000002	552#	562											
[illegible] =	000004	551#	561											
[illegible] =	[illegible]	550#	560											
[illegible] =	[illegible]	549#	559											
[illegible]5 =	000040	548#	559											
[illegible] =	[illegible]	547#	557											
[illegible] =	[illegible]	546#	556											
[illegible] =	[illegible]400	545#	555	2292										
[illegible] =	[illegible]1000	544#	554	2300	2359									
[illegible] =	[illegible]	562#	1409	1422	1457									
[illegible] =	002000	543#	2344											
[illegible] =	004000	542#	2307											
[illegible]2 =	010000	541#												
[illegible]3 =	020000	540#	2351											
[illegible] =	040000	539#	2278											
[illegible]5 =	100000	538#	1342	1354	1373	1385	1387	1409	1421	1423	1481			
[illegible]2 =	000004	561#	1223	1229	1293	1300	1313	1341	1353	1905	2007	2116		
[illegible] =	[illegible]	560#	1372	1396										
[illegible] =	000020	559#												
[illegible] =	000040	558#	1442	1449	1466									
[illegible]6 =	000100	557#	1269	1275	1292	1315								
[illegible] =	000200	556#												
[illegible]8 =	000400	555#												
[illegible]9 =	001000	554#												
[illegible]TVEC=	[illegible]	570#												
[illegible]FEND	022322	1539	1595	1652	1709	2977	3141	3198	3741#					
[illegible]SERR	015020	897	3277#											
[illegible]ARL	014720	3234	3243#	3270										
[illegible]KDAT	[illegible]	1540	1597	1654	1711	3190#								
[illegible]LDLSF	[illegible]	3124	3139#											
[illegible]	022626	1037	1081	1093#	1134									
[illegible] =	[illegible]	479#	2779	2789										
[illegible]RLF =	[illegible]	479#	2750	2799										
[illegible]CHK	013736	2021	2129	3054#										
[illegible]SP =	1775[illegible]	485#	607	831										
[illegible]FAUL	[illegible]	942	3543#											
[illegible]ELAY	013524	1825	1910	2986#	3023									
[illegible]EL[illegible]NT	013566	2986+	2989	2996+	3001#									
[illegible]	[illegible]	728	3315#											
[illegible]	016244	777	3441#											
[illegible]	015322	735	3334#											
[illegible]	015472	742	3356#											
[illegible]	015654	749	3381#											
[illegible]	016011	756	3400#											
[illegible]	[illegible]	763	3417#											
[illegible]	[illegible]	770	3429#											
[illegible]	[illegible]142	607#	831+	839+	2321+	2343+								
[illegible]	[illegible]	454#	839											
[illegible]	[illegible]	991	982	2147#	2212	2232								
[illegible]	[illegible]	657#	890+	978+	991	2147	2149+	2151	2153+	2155	2157+	2159	2203+	2209+

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MAINDEC-11-DZDLC-A.      MACY11 27(732)  20-SEP-76  09:19  PAGE 81
DZDLCA.P11      CROSS REFERENCE TABLE -- USER SYMBOLS

DLBUFI  021722     2952   3123   3150   3168   3184   3195   3237   3737#
DLBUFO  021322     3122   3139   3147   3157*  3166   3177   3192   3240   3734#
DLPRI   001302     693#   951*   1107*  1113*  1114*  1115*  1116*  1117*  1118   1241   1286   1461   3110
                   3112
DLRCSR  001410     785#   919*   1125*  1143   1202   1268   1290   1339   1342   1354   1369   1373   1387
                   1405   1409   1423   1440   1465   1546*  1553   1562   1571   1603*  1610   1619   1629
                   1660*  1667   1676   1695   1717*  1723   1731   1739   2147*  2217*  2949*  2962   2975*
                   3083   3097   3119*  3130*  3191*
DLRDBR  001412     786#   920    921    1126   1127   1173   1323   1572   1629   1686   1740   2151*  2218
                   2219   2969   2972   2979   3129   3129
DLVECT  001420     789#   893*   1001*  1003   1004   1239   1284   1459   2210*  2230*  3108
DLXCSR  001414     787#   919*   1124*  1158   1212   1222   1244   1496   1515   1547*  1554   1604*  1611
                   1661*  1669   1719*  1724   2155*  2216*  2944   2950*  2974*  3117*  3131*  3190*
DLXDBR  001416     788#   1198   1324   2159*  2954*
DSWR   = 177570    484#   605    830
DT1     015260     729    3324#
DT10    016312     778    3449#
DT2     015420     736    3346#
DT3     015570     743    3368#
DT4     015722     750    3387#
DT5     016100     757    3411#
DT6     016160     764    3424#
DT7     016232     771    3436#
DUT     013734     3031*  3033*  3037*  3044   3049#
EMTVEC= 000030     573#   815*   816*   1762*  1763*  1844*  1945*  1929*  1930*  2038*  2039*
EM1     015132     727    762    3308#
EM2     015276     734    3330#
EM3     015442     741    776    3352#
EM4     015612     748    3277*  3279*  3279*  3284*  3285*  3296*  3374#
EM5     015734     755    769    3392#
ERRVEC= 000004     566#   928    929*   840*   897*   898*   1141   1142*  1153*  1156   1157*  1165*  1171
                   1172*  1180*  1186   1187*  1195*  1791   1792*  1801*  1803*  1872   1873*  1882*  1884*
                   1957   1958*  1967*  1969*  2066   2067*  2076*  2078*  2293   2294*  2256*  2239*
FAILSA  020735     874    3684#
FIRSTD  002200     960#   1012
FLUSH   002724     947    1124#
FOULUP  020074     2162   3610#
GNE    = ******    453    2882   2883   2884   2885   2886   2889   2890   2891   2892
GO      002100     917    931#   1009
HOWMAN  002376     1005   1016#
HT     = 000011    476#   2748   2789
INTFLG  001444     799#   1238*  1246   1256*  1287*  1295   1316*  1463*  1468   1479*
IOTVEC= 000020     571#   813*   814*
IPTR    001434     795#   1538   1595   1652   1709   2977   2979*  2980*  3123*
KEEPAD  001262     659#   981*   984    1078   1096   2227
KEEPIV  001266     666#   1003*  2229
LASTAD  001300     689#   1059*  1071
LASTD   002446     1031   1038#  1131
LDOUT   001436     796#   1530*  1587*  1644*  1701*  3125
LDOUT1  014346     1530   3147#
LDOUT2  014370     1587   3156#
LDOUT3  014410     1644   3165#
LDOUT4  014444     1701   3177#
LENGTH  017217     931    1397   2092   3534#
LESS1   001304     695#   1118*  1120*  1122*
LF     = 000012    477#   2783   2789
```

```
LINRAD  020570      1949    3666#
LINTAD  020306      1766    1933    2042    3635#
MASKIN  014626      3193    3220#
MFIRST  017406       960    3556#
MLASTD  017637      1041    3592#
MRANGE  017735      1098    3593#
MULDEV  017552      1016    3573#
MULTD   001272       673#    842*   1023*   1026*   1029    2177    2187*
MVEC    017474       995    3565#
NUMONE  013656      3006    3010*   3017    3026#
NUMTWO  013660      3009    3013    3016*   3027#
ONCE    002054       978     907     918#
OPTR    001432       794#   2952    2954    2955*   3122*
PC    =%000007       497#    891*    982*   1146*   1161*   1176*   1191*   1205*   1215*   1226*   1232*   1251*   1261*
                    1272*   1278*   1306*   1321*   1330*   1344*   1350*   1356*   1360*   1375*   1381*   1389*   1396*
                    1411*   1418*   1425*   1431*   1445*   1451*   1472*   1483*   1487*   1500*   1506*   1520*   1529*
                    1531*   1540*   1557*   1566*   1574*   1585*   1588*   1597*   1614*   1623*   1631*   1642*   1645*
                    1654*   1671*   1680*   1693*   1699*   1702*   1711*   1727*   1735*   1742*   1797*   1825*   1878*
                    1910*   1963*   2002*   2003*   2011*   2021*   2072*   2111*   2112*   2120*   2129*   2161*   2212*
                    2232*   2239*   2242*   2252*   2257    2353*   2405*   2757*   2764*   2771*   2795*   2797*   2930
                    3000*   3023*   3025*   3048*   3066*   3076*   3093*   3104*   3113*   3124*   3125*   3132*   3143*
                    3152*   3161*   3172*   3186*   3193*   3200*   3207*   3241*   3273*
PCMSG   021313       876    3728#
PIRQ  = 177772       483#
PIRQVE= 000240       577#
PLEVEL  020021      1099    3602#
PRG2    006330       458    1759#
PRG2A   006370      1766#   1831
PRG2B   006510      1808#
PRG3    006570       459    1841#
PRG3A   006630      1848#   1916
PRG3B   006750      1885#
PRG4    007040       460    1926#
PRG4A   007100      1933#   2025
PRG4B   007232      1979#
PRG4C   007244      1987#   2028
PRG5    007432       461    2035#
PRG5A   007472      2042#   2134
PRG5B   007662      2101#   2131
PRG5C   007612      2082#   2137
PRIME   014220      1531    1588    1645    1702    3117#
PROG2M  016664      1764    3494#
PROG3M  016730      1846    3500#
PROG4M  016774      1931    3506#
PROG5M  017040      2040    3512#
PR0   = 000000       500#
PR1   = 000040       501#
PR2   = 000100       502#
PR3   = 000140       503#
PR4   = 000200       504#
PR5   = 000240       505#
PR6   = 000300       506#
PR7   = 000340       507#
PS    = 177776       480#    481
PSW   = 177776       481#   1299    2946    2964    2970    3082    3095    3100    3201
PWRVEC= 000024       572#    819*    820*   2898*   2899*   2908*   2914*   2926*   2927*
```

```
RDB     017153          2013    2121    3525#
RDCHR = 104406          2611    2989#
RDDEC = 104411           933    1989    2094    2892#
RDLIN = 104407          2684    2809    2890#
RDOCT = 104410           944     963     986    1018    1044    1090    1100    1769    1810    1918    1951    1991    1999
                        1936    1975    1981    2045    2094    2891#
REDO1   006560          1774    1776    1779    1786    1802    1830#
REDO2   007030          1856    1858    1861    1868    1883    1915#
REDO3   007412          1941    1943    1946    1953    1968    2024#
REDO3A  007422          1993    1995    2026#
REDO4   010034          2050    2052    2035    2062    2077    2133#
REDO4A  010044          2088    2090    2135#
RESTRT  001772           896#    2189    2258    2931    3298
RESVEC= 000010           567#     899*    900*
RETRY   002346           937     939    1007#
RETRYD  002356           968     970     973     977    1010#
RETRY1  002366           991     993     996    1000    1013#
RETRY2  002750          1049    1051    1054    1058    1129#
RETRY3  002760          1104    1106    1132#
RFLG0   001424           791#    1534    1591    1648    1705    2966*   3120*
RFLG1   001426           792#    1536    1593    1650    1707    2973*   3121*
RINT    013402          2962#    3109
ROTADD  001276           684#    1035*   1063*   1065    1068*   1075    1076*   2199*   2204    2225*
RSTALL  020646          1971     2093    3674#
RSVERR  015044           899     3284#
RTRY    001430           793#    1529*   1577*   1578    1586*   1634*   1635    1643*   1691*   1692    1700*   1745*   1746
R0      =%000000         488#     935*    936     938     940     948*    951*    953*    966*    967     969     971     975
                         978     999*    990     992     994     998    1001    1020*   1021    1047*   1049    1050    1052
                        1056    1059    1102*   1103    1105    1107    1991*   1992    1994    1996    2086*   2087    2089
                        2091    2249*   2252    2377    2378*   2379*   2386*   2387*   2388*   2389*   2390*   2391    2396
                        2401*   2403*   2407    2409    2507    2517*   2521    2537    2538    2551*   2681    2695*   2565
                        2689    2709*   2712*   2740    2741*   2742    2745*   2806    2810*   2811    2814    2816    2817
                        2841*   2845*   2859    2860*   2861    2862*   2863*   2864*   2865*   2900    2925*   3006*   3007*
                        3008*   3009*   3010    3011*   3012*   3013*   3014*   3015*   3016    3017*   3018*   3022    3097*
                        3088    3096*   3098    3292*   3293
R1      =%000001         489#     949*    951     952*    954*    955    1303*   1323*   1553*   1562*   1563    1571*   1610*
                        1619*   1620    1628*   1667*   1676*   1677    1685*   1723*   1731*   1732    1739*   2508    2521*
                        2522    2526    2550*   2682    2687*   2695*   2697*   2699*   2702*   2705    2708*   2807    2917*
                        2819    2821    2831*   2832    2840*   2901    2924*   3083*   3089    3097*   3099    3195*   3196
                        3198    3205    3211*
R2      =%000002         490#     950*    953     954    1143*   1144    1158*   1159    1173*   1174    1188*   1189    1202*
                        1203    1212*   1213    1222*   1223*   1224    1229*   1230    1244*   1245*   1257*   1259    1269*
                        1269*   1270    1275*   1276    1290*   1291*   1292*   1293*   1294*   1300*   1301*   1303    1304
                        1309    1313*   1314    1315*   1319    1324*   1339*   1340*   1341*   1349    1353*   1353    1369*
                        1370*   1372*   1379    1386*   1394    1405*   1406*   1408*   1416    1422*   1429    1440*   1442*
                        1443    1448*   1449    1465*   1466*   1467*   1473*   1478*   1481    1485    1496*   1497*   1499
                        1503*   1504    1515*   1516*   1518    1554*   1555    1563*   1564    1572*   1611*   1612    1620*
                        1621    1629*   1668*   1669    1677*   1678    1686*   1724*   1725    1732*   1733    1740*   1772*
                        1773    1775    1777    1781    1787    1793    1854*   1855    1957    1959    1863    1969    1874
                        1902*   1905*   1939*   1940    1942    1944    1948    1954    1959    2048*   2049    2051    2053
                        2057    2063    2068    2509    2520*   2524*   2527    2534*   2535*   2536    2541*   2549*   2683
                        2688*   2696*   2698*   2700*   2706    2707*   2809    2813*   2816*   2935    2939*   2902    2923*
                        3084    3090    3103    3192*   3196    3203    3210*   3236*   3237    3240*
R3      =%000003         491#    1304*   1325*   1326*   1328    1555*    564*   1573*   1612*   1621*   1630*   1669*   1679*
                        1687*   1725*   1733*   1741*   1781*   1782*    .784   1863*   1864*   1866    1948*   1949*   1951
                        2057*   2058*   2060    2449    2458*   2464*   2465*   2468*   2473*   2474*   2475    2484*   2511
```

```
SW03   = 000010        522#    532
SW04   = 000020        521#    531
SW05   = 000040        520#    530
SW06   = 000100        519#    529
SW07   = 000200        518#    528
SW08   = 000400        517#    527
SW09   = 001000        516#    526
SW1    = 000002        534#
SW10   = 002000        515#
SW11   = 004000        514#
SW12   = 010000        513#    1336    1367    1403    1438    1457    1493
SW13   = 020000        512#
SW14   = 040000        511#
SW15   = 100000        510#
SW2    = 000004        533#
SW3    = 000010        532#
SW4    = 000020        531#
SW5    = 000040        530#
SW6    = 000100        529#
SW7    = 000200        528#
SW8    = 000400        527#    953
SW9    = 001000        526#
TABFLG   001256        653#    844*    894*    906     911*    2198*
TBITVE=  000014        568#
TCONT    013706        3035    3039#
TIMERX   013662        2011    2120    3031#
TIMETX   013700        2003    2112    3037#
TIMR1    001440        797#    1542*   1599*   1656*   1713*   3126*
TIMR2    001442        798#    1544*   1601*   1658*   1715*   3127*
TKVEC =  000060        575#
TPVEC =  000064        576#
TRAPVE=  000034        574#    917*    918*    1760*   1761*   1842*   1843*   1927*   1928*   2036*   2037*
TRPCOM   015070        3280    3287    3291#
TRTVEC=  000014        569#
TST1     002770        922     1128    1140#   2220
TST10    003340        1231    1237#
TST11    003464        1255    1260    1266#
TST12    003534        1277    1283#
TST13    004002        1312    1329    1335#
TST14    004132        1337    1359    1366#
TST15    004260        1368    1395    1402#
TST16    004406        1404    1430    1437#
TST17    004466        1439    1450    1456#
TST2     003036        1155#
TST20    004630        1458    1477    1486    1492#
TST21    004712        1494    1505    1513#
TST22    004744        1519    1526#
TST23    005236        1541    1552    1561    1570    1583#
TST24    005530        1598    1609    1618    1627    1640#
TST25    006022        1655    1666    1675    1684    1697#
TST3     003104        1170#
TST4     003152        1185#
TST5     003220        1200#
TST6     003242        1204    1210#
TST7     003266        1214    1220#
[illegible] = 104405   2247    2336#
```

```
TYPE   = 104401        873    874    876    903    931    942    960    985    [illegible] [illegible] [illegible] [illegible] [illegible]
                      1098   1099   1129   1132   1548   1605   1662   1719   1764   1766   [illegible] [illegible] [illegible]
                      1846   1849   1889   1896   1915   1931   1933   1971   1979   [illegible] [illegible] [illegible] [illegible]
                      2026   [illegible] 2042 [illegible] 2093 2114  2121   2133   2135   [illegible] [illegible] [illegible] [illegible]
                      2354   2376   2393   2395   2398   2400   2404   2411   2476   2552   2618   [illegible] [illegible]
                      2633   2638   2639   2641   2644   2648   2713   2715   2753   2846   2849   2882#  [illegible]
TYPOC  = 104402       2394   2408   2883#
TYPON  = 104404       2885#
TYPOS  = 104403       2884#
UPMASK   014730       3066   3254#
VECT     002264        995#  1015
VOB      017104       2005   2114   3518#
XFLAG    001422        790#  1532   1589   1646   1703   2948*  3119*
XINT     013314       2344#  3111
XMSG1    016326       1548   3453#
XMSG2    016405       1605   3461#
XMSG3    016466       1662   3470#
XMSG4    016551       1719   3479#
$AUTOB   001134        603#
$BDADR   001122        598#
$BDDAT   001126        600#
$BELL    001246        644#  2346   2367
$CHARC   012670       2755*  2765*  2772   2781*  2796#
$CKSWR=  ******       2889
$CMTAG   001100        586#   806    807   [illegible] 921    922
$CM1   = 000010        619#   619#   620#      #   622#   623#   624#   625#   626#
$CM2   = 000020        618#   619#   620#      #   622#   623#   624#   625#   626#
$CM3   = 000010        616#   619
$CM4   = 000020        626#   627#   628#   629#   630#   631#   632#   633#   634#   635#   636#   637#   638#
                       639#   640#   641#   642#
$CNTLG   012265       2659#
$CNTLU   012260       2633   2658#
$CRLF    001253        646#  2354   2367   2376   2395   2400   2404   2638   2658   2719   2754   2799   2850
$DBLK    011664       2518   2552   2560#
$DDAGN   010436       2241   2250   2256#
$DTBL    011654       2521   2556#
$ENDAD   010426       2252#
$ENDCT   010374       2243#
$ENDMG   010445       2245   2260#
$ENULL   010442       2248   2259#
$EOP     010130       1712   1722   1730   1738   1748   2171#
$EOPCT   010366       2240#  2244
$ERFLG   001103        589#  2268   2296   2298   2304*  2325   2341*  2367
$ERMAX   001115        595#   823*  2298   2320*  2325
$ERROR   010732        815   1762   1844   1929   2038   2340#
$ERRPC   001116        596#  2348*  2349*  2350   2367   2382   3324   3346   3368   3411   3424   3436   3449
$ERRTB   001310        723#  2390
$ERRTY   011066       2353   2375#
$ERTTL   001112        593#  2347*  2367
$ESCAP   001244        643#   922*  1147*  1162*  1177*  1192*  1252*  1307*  1474*  1549*  1558*  1567*  1575*
                      1606*  1615*  1624*  1632*  1663*  1672*  1681*  1689*  1720*  1729*  1736*  1743*  1799*
                      1879*  1964*  2073*  2319*  2362   2364   2367   3208*  3295*
$FILLC   001156        614#  2758   2789
$FILLS   001155        613#  2789
$GDADR   001120        597#
$GDDAT   001124        599#
```

DZDLCA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
$GET42  010416          2249#
$GTSWR= ******  U       2898
$HD     = 000001         427     429
$HIOUT  012452          2706*   2717#
$ICNT   001104           590#   2311*   2312    2314*   2324
$ILLUP  013276          2899    2914    2933#
$INTAG  001135           604#
$ITEMB  001114           594#   2350*   2367    2379
$LF     001254           647#   2367    2648    2658    2718    2789    2850
$LPADR  00110E           591#    824*   2302*   2317*   2322    2324
$LPERR  001110           592#    825*   2302    2318*   2324    2361
$MAIL = ******  U        842    2317    2356    2742
$MMEW   012303          2662#
$MSWR   012272          2660#
$MXCNT  010730          2315    2324#
$NULL   001154           612#   2760    2789
$NWTST= 000001          1137#   1152#   1167#   1182#   1197#   1207#   1217#   1234#   1263#   1280#   1332#   1353#   1399#
                        1434#   1453#   1489#   1510#   1523#   1580#   1637#   1694#
$OCNT   011444          2448*   2477*   2490#
$OMODE  011446          2443*   2447*   2452    2455*   2466*   2492#
$OVER   010714          2279    2295    2303    2313    2321#
$PASS   001100           587#   2237*   2238*   2246    2259    2309    2325
$POWER  013304          2929    2936#
$PWRAD  013272          2931#
$PWRDN  013132           819    2898#   2926
$PWRMG  013266          2929#
$PWRUP  013204          2908    2914#
$QUES   001252           645#   1007    1010    1013    1129    1132    1830    1915    2024    2026    2133    2135    2367
                        2641    2658    2715    2718    2789    2848    2853
$RDCHR  011674          2578#   2889
$RDDEC  012674          2804#   2892
$RDLIN  012014          2606#   2890
$RDOCT  012314          2679#   2891
$RDSZ = 000010          2599#
$REGAD  001160           616#
$REG0   001162           618#   3088*   3098*   3293*   3024    3346    3368    3387    3411
$REG1   001164           619#   3058*   3060*   3089*   3099*   3324    3346    3368    3411    3436    3449
$REG2   001166           620#   3056*   3058    3090*   3103*   3024    3346    3368    3411    3424    3436    3449
$REG3   001170           621#   3062*   3091*   3346    3368    3411    3436    3449
$REG4   001172           622#   3071*   3092*   3346    3368    3449
$REG5   001174           623#
$REG6   001176           624#   1302*   2947*   2965*   2971*   3085*   3086*   3101*   3102*   3202*   3291*   3324    3346
                        3368    3387    3411    3424
$REG7   001200           625#   1361*   3296*   3387
$RTNAD  010440          2258#
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                        2366    2567    2664
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                        1284    1336    1367    1403    1438    1457    1493    1514    1527    1594    1641    1699    2163
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                    2336    2344    2351    2356    2359    2367    2932
$$WRMK= 000000       442     443    2273    2274    2294
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                    2009    2105*   2118    2972*   3100*   3254    3424
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$TMP11  001224       635*   2100*   2101    2104*
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$TMP4   001212       630*   2015*   2017*   2019    2123*   2125*   2127    3056
$TMP5   001214       631*   2019*   2127*   3054    3062    3068
$TMP6   001216       632*   3039*   3040*   3054*   3064
$TMP7   001220       633*   3165*   3167    3170*   3178*   3179    3180*   3181    3182*   3193
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                    1284*   1312    1329    1332    1336*   1337    1359    1363    1367*   1368                    1399    1403*
                    1404    1430    1434    1438*   1439    1450    1453    1457*   1458    1477                    1489    1493*
                    1494    1505    1510    1514*   1519    1523    1527*   1541    1552    1561                    1580    1584*
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$TPFLG  001157       615*   2736    2789
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$TYPEC  012624      2757    2764    2771    2776*   2777
$TYPEX  012672      2782    2784    2787*
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$TYPCN  011262      2445    2448*   2885
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                    3423*   3435*   3734*   3737*
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DZDLCA.P11 CROSS REFERENCE TABLE -- MACRO NAMES

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         1452  1475  1484  1488  1501  1507  1521  1550  1559  1568  1576  1607  1616  1625  1633
         1664  1673  1682  1690  1721  1729  1737  1744  1799  1880  1965  2006  2014  2074  2115
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ESCAPE    578#
GETPRI    579#
GETSWR    578#
MORETA    429#   649
MULT      579#
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         1453  1489  1510  1523  1580  1637  1694
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PUSH      414#   578#  2506  2681  2806  2900  2906
REPORT    578#
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BCC     2532
BCS     1069 2201
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BGE     2313
BGT     2241 2478 2540 2596 2692 2820
BHI      937  968  991 1049 1072 1104 1774 1856 1941 1993 2050 2088 2299
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BICB    1782 1864 1949 2058 3236 3272
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BISB    2379
BIT      853  913  975  998 1056 1336 1342 1354 1367 1373 1387 1403 1409 1423 1438
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BITB     971  994 1052 1777 1859 1944 2053 2772
BLO      939  970  993 1051 1106 1776 1858 1943 1995 2052 2090 2622
BLOS    2610
BLT      956 2479 2523 2539 2594 2694 2763 2822
BMI     1031 2563 2945 2963
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BPL     2357 2467 2514 2544 2581 2587 2737 2777 2969 3045
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BVS     2830 2833
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CLRB    1289 2304 2546 2637 2647 2712 2755 2781 2845 3148
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CMFE    1784 1866 1951 2060 2294 2298 2613 2631 2635 2645 2691 2693 2748 2750 2759
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DECB    2466  2477  2762  2765  3170
EMT      472
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INCB    2316  2341  2785  3182
IOT      473
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	[illegible]	2991													
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D08


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DEFAULT GLOBALS GENERATED:  0

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CORE USED:  26K  (51 PAGES)
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E08

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Spooler runtime 16 Seconds, 68 KCS, 413 disk reads, 3 disk writes, 94 pages
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