.REM *

IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZDHJ-B-D
PRODUCT NAME:	DH11 ECHO/CABLE TEST
DATE CREATED:	APRIL, 1973
REVISED:	JANUARY, 1975
MAINTAINER:	DIAGNOSTIC
AUTHOR:	GEORGE BAISLEY

1. ABSTRACT

THE DH11 ECHO CABLE DIAGNOSTIC IS DIVIDED INTO TWO TESTS.
THE FIRST TEST (ECHO) IS A QUICK VERIFY TEST USING
A TTY OR VT05 ETC.

THE SECOND TEST (CABLE TEST) IS A QUICK VERIFY TEST USING THE
CABLE TERMINATOR (TEST CONNECTOR).

BOTH TESTS ASSUME 8 BITS/CHARACTER,NO PARITY GENERATION
OR CHECKING,AND A DH PRIORITY LEVEL 5 (BR:5)

1.1 THE DH11 ECHO TEST VERIFIES THAT ALL CHARACTERS (0-377)
WILL ECHO ON EACH LINE (0-17 OCTAL) WITH STANDARD DH11
TERMINAL ATTACHMENTS TTY 33,35 OR VT05 ETC. USING ASCII
ASYNCHRONOUS CODE

1.2 THE DH11 CABLE TEST VERIFIES THAT ALL CHARACTERS (0-377)
ARE TRANSMITTED AND RECEIVED ON A PER LINE BASIS.
THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR !

2. REQUIREMENTS

PDP-11 FAMILY STANDARD COMPUTER WITH MINIMUM 4K MEMORY.
DH11 ASYNCHRONOUS MULTIPLEXER.

2.1 FOR THE ECHO TEST
TWO TERMINALS; ONE FOR CONSOLE, ONE FOR DH11 ECHO TEST.

2.2 FOR THE CABLE TEST
ONE CONSOLE TERMINAL, ONE TEST CONNECTOR MINIMUM

2.3 STORAGE

THE PROGRAM LOADS INTO 4KW OF MEMORY WITH ABS LOADER

3. LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING ABSOLUTE BINARY TAPES
IS TO BE USED.

4. STARTING PROCEDURE

CONTROL SWITCH SETTINGS

AFTER PROGRAM LOAD (INITIAL PROGRAM START)

ALL CONSOLE SWITCHES DOWN.

4.1 TO MODIFY DEVICE VECTOR AND CONTROL REGISTER ADDRESSES
AFTER PROGRAM RESTART

SWDD=1

TO MODIFY DH11 LINE NUMBER AND BAUD RATE OF DH11 WHILE RUNNING)

SW03=1 MOMENTARILY- DO NOT LEAVE THIS SWITCH UP AFTER LINE # QUESTION)

4.2 STARTING ADDRESS

THE STARTING ADDRESS FOR ALL TESTS IS 000200

THE RESTART ADDRESS FOR ALL TESTS IS 000200

4.3 PROGRAM AND OR OPERATOR ACTION

4.3.1 INITIAL PROGRAM START

LOAD PROGRAM INTO MEMORY

LOAD ADDRESS 000200

CLEAR CONSOLE SWITCHES

PRESS START

4.3.2 THE PROGRAM WILL TYPE "DH11 ECHO/CABLE TEST" <CR>
<LF>DZDHJ-REVISION B (ONCE ONLY)
AND WILL TYPE "WHICH TEST ECHO OR CABLE (E OR C)" AND WILL
WAIT FOR AN INPUT FROM THE CONSOLE TELETYPE KEYBOARD

TYPE IN THE TEST YOU INTEND TO RUN (E OR C) FOLLOWED BY A <CARRIAGE RETURN>

IF AN INCORRECT CHARACTER IS TYPED, THE PROGRAM WILL TYPE "?"
AND WILL THEN REPEAT THE MESSAGE

4.3.3 THE PROGRAM WILL TYPE "VECTOR ADDRESS-" AND WAIT
FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT
VECTOR FOR THE DH11 TO BE TESTED FOLLOWED BY A
<CARRIAGE RETURN>.

4.3.3 THE PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
AND WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
OF THE DH11 TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>

IF AN INCORRECT ADDRESS IS TYPED, THE PROGRAM WILL
TYPE "?" AND WILL THEN REPEAT THE MESSAGE

4.3.4 THE PROGRAM WILL TYPE "LINE NUMBER IN OCTAL-" AND
WAIT FOR AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE DH11 LINE NUMBER (IN OCTAL, FROM 0 TO 17)
TO BE TESTED FOLLOWED BY <CARRIAGE RETURN>.

4.3.5 THE PROGRAM WILL TYPE "BAUD RATE-" AND WAIT FOR
AN INPUT FROM THE TELETYPE KEYBOARD.

TYPE IN THE APPROPRIATE DH11 TERMINAL'S LINE
SPEED FOLLOWED BY (CARRIAGE RETURN).
(ANY LEGAL BAUD RATE IS ACCEPTABE IN THE CABLE TEST) TRY 'EM ALL

IF AN INVALID BAUD RATE IS TYPED IN THE PROGRAM
WILL TYPE "INVALID BAUD RATE" AND REPEAT THE MESSAGE.

4.3.6 THE PROGRAM WILL TYPE "ECHO" OR "CABLE" RESP. TO INDICATE THAT IT IS
ABOUT TO START TESTING, AND THEN TESTING WILL BEGIN.

THE ECHO TEST WILL TYPE "TYPE A CHARACTER ON DH11 TERMINAL"
-TYPE OR TRANSMIT VIA PREPUNCHED TAPE ANY SEQUENCE OF CHARACTERS(EXCEPT ^C).
A CONTROL C (^C) WHEN TYPED ON THE DH11 TERMINAL WILL CAUSE
PROGRAM TO EXIT TO THE END OF PASS ROUTINE.

THE CABLE TEST REQUIRES NO ADDITIONAL OPERATOR INTERVENTION
UNLESS TO RESELECT LINE #,BAUD RATE, ETC.

NOTE: TO CHANGE LINE NUMBER AND/OR BAUD RATE,
SIMPLY MOMENTARILY RAISE SW02 (SW02=1).

4.4 PROGRAM RESTART WITH ALL SWITCHES DOWN

LOAD ADDRESS 000200

PRESS START

THE PROGRAM WILL TYPE "ECHO" OR "CABLE" RESPECTIVELY
AND COMMENCE TESTING AS BEFORE.

4.5 PROGRAM RESTART WITH SW00=1

LOAD ADDRESS 000200

SET SW01=1

PRESS START

THE PROGRAM WILL PERFORM AS DESCRIBED IN 4.3.2 TO 4.3.6

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SW15=1, HALT ON ERROR
SW14=1, LOOP ON CURRENT TEST (CABLE TEST ONLY)
SW13=1, SUPPRESS ERROR TYPEOUT
SW11=1, INHIBIT ITERATIONS (CABLE TEST ONLY)
SW10=1, ESCAPE ON ERROR
SW02=1, RESELECT LINE NUMBER AND BAUD RATE (MOMENTARILY)
SW00=1, CHANGE PARAMETERS AT PROGRAM RESTART

6.0 ERRORS

6.1 ERROR HALTS

THE ERROR MESSAGE FORMAT FOR ALL ERROR TYPEOUTS IS AS FOLLOWS:

PC+2
MESSAGE

WHERE
PC+2 IS THE ADDRESS OF THE CALL TO THE ERROR HANDLER +2
MESSAGE IS AN ASCII MESSAGE DESCRIBING (BRIEFLY) THE FAILURE

6.1.1 ERROR DESCRIPTIONS

SEE LISTING FOR DETAILS OF ERRORS

NOTE: FOR SERIOUS TROUBLESHOOTING....USE THE REGULAR DH11 DIAGNOSTICS

6.2 ERROR RECOVERY

6.2.1 SW15=0
IF THE PROGRAM IS RUN WITH SW15=0, NO OPERATOR ACTION IS REQUIRED TO CONTINUE TESTING.

6.2.2 SW15=1
IF THE PROGRAM IS RUN WITH SW15=1, TO CONTINUE TESTING AFTER THE PROGRAM HAS HALTED, PRESS THE PROCESSOR CONSOLE CONTINUE SWITCH.

6.2.3 ILLEGAL INTERRUPTS

IF AN INTERRUPT OCCURS TO A VECTOR ADDRESS NOT SELECTED DURING PROGRAM INITIALIZATION, THE PROGRAM WILL HALT IN THE TRAPCATCHER. THE ADDRESS AT WHICH THE PROGRAM HALTS IS 2 GREATER THAN THE ADDRESS TO WHICH THE INTERRUPT OCCURRED. THE PROGRAM MUST BE RESTARTED AT 200 TO RECOVER FROM THIS ERROR.

7. RESTRICTIONS

NONE

8. MISCELLANEOUS

- THE ECHO TEST DOES NOT ENABLE AUTO-ECHO

- BAUD RATE 134.5 HAS BEEN ROUNDED OFF TO 135

9. PROGRAM DESCRIPTION

BOTH TESTS CHECK OUT THE DH11 IN AN "ONLINE" FUNCTION; ONE LINE AT A TIME AT THE FOLLOWING ASYNCHRONOUS BAUD RATES: 50,75,110,134.5,150,200,300,600,1200,1800,2400,4800,9600.

10. LISTING

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                        ;DH11 ECHO CABLE TEST
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                                ;STARTING PROCEDURE
                                ;LOAD PROGRAM
                                ;LOAD ADDRESS 002000
                                ;PRESS START
                                ;PROGRAM WILL TYPE DH11 ECHO/CABLE TEST
                                ;PROGRAM WILL TYPE  WHICH TEST- ECHO OR CABLE
                                ;TYPE IN  E  OR  C   RESPECTIVELY
                                ;PROGRAM WILL TYPE "VECTOR ADDRESS-"
                                ;TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
                                ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                ;PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
                                ;TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
                                ;FOR THE DH11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                ;PROGRAM WILL TYPE "LINE NUMBER-"
                                ;TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)
                                ;,FOLLOWED BY <CARRIAGE RETURN>
                                ;PROGRAM WILL TYPE "BAUD RATE-"
                                ;TYPE IN THE BAUD RATE OF THE DH11 TERMINAL
                                ;,FOLLOWED BY <CARRIAGE RETURN>
                                        ;THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL
                ;                               50
                ;                               75
                ;                               110
                ;                               135     (ROUNDED OFF   134.5)
                ;                               150
                ;                               200
                ;                               300
                ;                               600
                ;                               1200
                ;                               1800
                ;                               2400
                ;                               4800
                ;                               9600
                                ;ALL OTHERS ARE REJECTED

                                ;PROGRAM WILL TYPE "ECHO"  OR  "CABLE TEST" TO INDICATE THAT TESTING HAS STARTED
                                ;AT THE END OF A PASS, PROGRAM WILL TYPE " DZDHJB "
                                ;AND THEN RESUME TESTING

                                        ;SWITCH REGISTER OPTIONS

100000                          SW15=100000             ;=1,HALT ON ERROR
040000                          SW14=40000              ;=1,LOOP ON CURRENT TEST
020000                          SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
010000                          SW12=10000
004000                          SW11=4000               ;=1,INHIBIT ITERATIONS
002000                          SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
001000                          SW09=1000               ;=1,LOOP WITH CURRENT DATA
000400                          SW08=400
000100                          SW06=100
000040                          SW05=40
000020                          SW04=20
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                    000010          SW03=10
                    000004          SW02=4          ;RESELECT DH11 LINE NUMBER AND BAUD RATE (RAISE MOMENTARILY ONLY
                    000002          SW01=2                  ;RESTART PROGRAM AT SELECTED TEST
                    000001          SW00=1                  ;RESELECT VECTOR AND CONTROL REGISTER
                                                            ;ADDRESS AFTER PROGRAM RESTART


                                    ;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          SP=%6           ;PROCESSOR STACK POINTER
                    000007          PC=%7           ;PROGRAM COUNTER

                                    ;LOCATION EQUIVALENCIES

                    177570          SWR=177570      ;CONSOLE SWITCH REGISTER
                    177570          LIGHTS=177570   ;PDP-11/45 DISPLAY REGISTER
                    177776          PS=177776       ;PROCESSOR STATUS WORD

                                    ;INSTRUCTION DEFINITIONS

                    005746          PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
                    005726          POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
                    010046          PUSHR0=10046    ;SAVE R0 ON STACK
                    012600          POPR0=12600     ;RESTORE R0 FROM STACK
                    024646          PUSH2SP=24646   ;DECREMENT STACK TWICE
                    022626          POP2SP=22626    ;INCREMENT STACK TWICE
                                    .EQUIV  EMT,HLT ;BASIC DEFINITION OF ERROR CALL


                    100000          BIT15=100000
                    040000          BIT14=40000
                    020000          BIT13=20000
                    010000          BIT12=10000
                    004000          BIT11=4000
                    002000          BIT10=2000
                    001000          BIT09=1000
                    000400          BIT08=400
                    000200          BIT07=200
                    000100          BIT06=100
                    000040          BIT05=40
                    000020          BIT04=20
                    000010          BIT03=10
                    000004          BIT02=4
                    000002          BIT01=2
                    000001          BIT00=1
                                            ;TRAPCATCHER FOR ILLEGAL INTERRUPTS
                    000000          .=0
000000  000000      000000          HALT
000002  000002      000000          HALT
                                            ;STANDARD INTERRUPT VECTORS
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          000024                    .=24
000024    004774                            PFAIL                       ;POWER FAIL HANDLER
000026    000340                            340                         ;SERVICE AT LEVEL 7
000030    002566                            ERRORS                      ;ERROR HANDLER
000032    000340                            340                         ;SERVICE AT LEVEL 7
000034    002770                            TRPSRV                      ;GENERAL HANDLER DISPATCH SERVICE
000036    000340                            340                         ;SERVICE AT LEVEL 7
          000200                    .=200
000200    000137   001100                   JMP     START               ;GO TO START OF PROGRAM



                                            ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                            ;POINTERS TO SUBROUTINES CAN BE FOUND STARTING
                                            ;AT LOCATION "TRPTAB"

          104400                            SCOPE=TRAP+0                ;SCOPE LOOP AND ITERATION HANDLER
          104401                            TYPE=TRAP+1                 ;TELETYPE OUTPUT ROUTINE
          104402                            OCTASC=TRAP+2               ;OCTAL TO ASCII CONVERSION
          104403                            INSTR=TRAP+3                ;INPUT ASCII STRING
          104404                            INSTER=TRAP+4               ;STRING INPUT ERROR
          104405                            PARAM=TRAP+5                ;CONVERT STRING TO OCTAL, CHECK LIMITS
          104406                            SAVOSP=TRAP+6               ;SAVE R0-R5, PC
          104407                            RESOS=TRAP+7                ;RESTORE R0-R5
          104410                            SCOPE1=TRAP+10              ;CHECK FOR FREEZE ON CURRENT DATA
          104411                            PARAMD=TRAP+11              ;CONVERT DECIMAL STRING TO OCTAL
          104412                            PAWCH=TRAP+12               ;SET FLAG   ECHO OR  CABLE
          104413                            SAVOS=TRAP+13               ;SAVE R0 - R5
          001100                    .=1100

                                            ;PROGRAM INITIALIZATION
                                            ;LOCK OUT INTERRUPTS
                                            ;SET UP PROCESSOR STACK
                                            ;SET UP POWER FAIL VECTOR
                                            ;CLEAR PROGRAM FLAGS AND COUNTS
                                            ;TYPE TITLE MESSAGE

001100                              STACK:
001100    012737   000340   177776  START:  MOV     #340,PS                     ;LOCK OUT INTERRUPTS
001106    012706   001100                   MOV     #STACK,SP                   ;SET UP PROCESSOR STACK
001112    012737   004774   000024          MOV     #PFAIL,@#24                 ;SET UP POWER FAIL TRAP
001120    012737   001100   004700          MOV     #START,RETURN               ;SET UP IN CASE OF POWER FAIL
001126    005037   004736                   CLR     STFLG                       ;CLEAR TEST START FLAG
001132    005037   004674                   CLR     PASCNT                      ;CLEAR PASS COUNT
001136    005037   004676                   CLR     ERRCNT                      ;CLEAR ERROR COUNT
001142    005037   004672                   CLR     ERRFLG                      ;CLEAR ERROR FLAG
001146    005037   004742                   CLR     LAST                        ;CLEAR LAST ERROR PC
001152    005237   004732                   INC     INIFLG                      ;SET UP FOR ONCE ONLY TYPE OUT
001156    001003                            BNE     VEC1                        ;DITTO
001160    104401   005136                   TYPE    ,MTITLE                     ;TYPE TITLE
001164    000404                            BR      VEC2
001166    032737   000001   177570  VEC1:   BIT     #SW00,SWR                   ;IF SW00=1, GET NEW VECTOR
001174    001471                            BEQ     BEGIN                       ;AND CSR
001176    012701   000300           VEC2:   MOV     #300,R1
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 439  001302  012702  000302                MOV     #302,R2
 440  001306  012703  000004                MOV     #4,R3
 441  001312  010211            1$:         MOV     R2,(R1)                 ;RESTORE TRAPCATCHER
 442  001314  005012                        CLR     (R2)                    ;IN FLOATING VECTOR AREA
 443  001316  060301                        ADD     R3,R1
 444  001320  060302                        ADD     R3,R2
 445  001322  020127  001000                CMP     R1,#1000
 446  001326  001371                        BNE     1$
 447  001330  104403                        INSTR           ;INPUT WHICH TEST YOU ARE RUNNING
 448  001332  005545                        MWHICH          ;ECHO OR CABLE
 449  001334  104412                        PAWCH           ;SET FLAG
 450  001336  004734                        WCHFLG          ;THIS FLAG
 451  001340  104403                        INSTR                           ;INPUT ADDRESS OF DEVICE VECTOR
 452  001342  005214                        MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
 453  001344  104405                        PARAM                           ;CONVERT STRING TO OCTAL
 454  001346  000300                        300                             ;LOW LIMIT
 455  001350  000770                        770                             ;HIGH  LIMIT
 456  001352  004660                        DHRVEC                          ;LOCATIONS TO BE FILLED
 457  001354     003                .BYTE   3                               ;LSB MASK
 458  001355     004                .BYTE   4                               ;NUMBER OF LOCATIONS
 459  001356  104403                        INSTR                           ;INPUT ADDRESS OF DEVICE CSR
 460  001360  005237                        MREGAD                          ;MESSAGE "CONTROL REGISTER ADDRESS-"
 461  001362  104405                        PARAM                           ;CONVERT STRING TO OCTAL
 462  001364  000000                        0                               ;LOW LIMIT
 463  001366  177776                        177776                          ;HIGH LIMIT
 464  001370  004636                        DHSCR                           ;LOCATIONS TO BE FILLED
 465  001372     007                .BYTE   7                               ;LSB MASK
 466  001373     010                .BYTE   10                              ;NUMBER OF LOCATIONS
 467  001374  012777  004000  003334  LINE:  MOV     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
 468  001302  005037  004736                CLR     STFLG           ;CLEAR PROGRAM START FLAG
 469  001306  104403                        INSTR                   ;INPUT LINE NUMBER
 470  001310  005433                        MLINE                   ;MESSAGE "LINE NUMBER-"
 471  001312  104405                        PARAM                   ;CONVERT  STRING TO OCTAL
 472  001314  000000                        0                       ;LOW LIMIT
 473  001316  000017                        17                      ;HIGH LIMIT
 474  001320  004756                        LINENU                  ;LOCATION TO BE FILLED
 475  001322     000                .BYTE   0                       ;LSB MASK
 476  001323     001                .BYTE   1               ;NUMBER OF LOCATIONS
 477  001324  104403                BAUD:   INSTR                   ;INPUT BAUD RATE
 478  001326  005465                        MSPEED                  ;MESSAGE "BAUD RATE-"
 479  001330  104411                        PARAMD                  ;CONVERT DECIMAL STRING TO OCTAL
 480  001332  000062                        50.                     ;LOW LIMIT
 481  001334  022600                        9600.                   ;HIGH LIMIT
 482  001336  004752                        LINESP                  ;LOCATION TO BE FILLED
 483  001340     000                .BYTE   0                       ;LSB MASK
 484  001341     001                .BYTE   1                       ;NUMBER OF LOCATIONS
 485  001342  004537  004052                JSR     R5,SET
 486  001346  013737  004654  004656        MOV     DHSSR,DHSLR             ;SET UP ADDRESS OF SILO
 487  001354  005237  004656                INC     DHSLR                   ;STATUS REGISTER HIGH BYTE
 488
 489
 490  001360  012737  000340  177776  BEGIN: MOV     #340,PS                 ;LOCK OUT INTERRUPTS
 491  001366  012706  001100                MOV     #STACK,SP               ;SET UP PROCESSOR STACK
 492  001372  005037  004740                CLR     LOCKUP                  ;CLEAR TIMEOUT
 493  001376  005737  004734                TST     WCHFLG                  ;ECHO OR CABLE TEST ?
 494  001402  001413                        BEQ     2$                      ;ECHO
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  495  001404  012737  001770  004700          MOV     #TEST2,RETURN           ;CABLE TEST
  496  001412  005737  004736                  TST     STFLG                   ;ARE YOU LOOPING ?
  497  001416  001017                          BNE     1$                      ;YES
  498  001420  005137  004736                  COM     STFLG                   ;NO
  499  001424  104401  005642                  TYPE    ,MCABLE                 ;TYPE CABLE TEST
  500  001430  000412                          BR      1$
  501  001432  012737  001462  004700  2$:     MOV     #TEST1,RETURN           ;SET UP ECHO TEST
  502  001440  005737  004736                  TST     STFLG                   ;ARE YOU LOOPING ?
  503  001444  001004                          BNE     1$                      ;YES
  504  001446  005137  004736                  COM     STFLG                   ;NO
  505  001452  104401  005614                  TYPE    ,MTERM                  ;TYPE ECHO TEST
  506  001456  000177  003216          1$:     JMP     @RETURN                 ;START TESTING
  507                                          ;THIS TEST WILL ACCEPT 1 CHARACTER AT A TIME
  508                                          ;(IN INTERRUPT MODE) AND TRANSMIT THAT SAME CHARACTER,
  509                                          ;ONE LINE AT A TIME, ANY LINE 0 THRU 17 (OCTAL)
  510
  511  001462  012737  000340  177776  TEST1:  MOV     #340,PS         ;DISABLE ALL INTERRUPTS
  512  001470  012737  001274  004702          MOV     #LINE,ESCAPE
  513  001476  012737  002374  004670          MOV     #EOP,NEXT
  514  001504  052777  004000  003124          BIS     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
  515  001512  013777  004760  003116          MOV     NUMLIN,@DHSCR   ;SELECT LINE # & SET INTERRUPT ENABLE
  516  001520  013777  004754  003114          MOV     SPEED,@DHLPR    ;SET LINE SPEED AND
  517                                                                  ;CHARACTER LENGTH (TRANS. & REC.)
  518  001526  012777  000000  003120          MOV     #0,@DHSSR       ;SET SILO ALARM LEVEL=0
  519  001534  012777  004772  003102          MOV     #TBUF,@DHBA     ;ADDRESS OF TRANSMITTER
  520                                                                  ;DATA BUFFER
  521  001542  052777  100000  003066          BIS     #100000,@DHSCR  ;SET TRANSMIT "DONE"
  522  001550  012777  001612  003102          MOV     #INTSVC,@DHRVEC ;SET UP INTERRUPT SERVICE
  523  001556  013777  004764  003076          MOV     PRIO,@DHRLVL    ;AND LEVEL
  524  001564  013737  004766  177776          MOV     LESS1,PS        ;ALLOW INTERRUPTS
  525  001572  104401  005504                  TYPE    ,MCHAR          ;TYPE "ANY CHARACTER"
  526  001576  032737  000004  177570  DELAY:  BIT     #SW02,SWR       ;IF SW02=1 GET NEW LINE NUMBER
  527  001604  001774                          BEQ     DELAY           ;RETURN HERE AFTER "INTERRUPT"
  528  001606  000137  001274                  JMP     LINE            ;
  529
  530
  531                                          ;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
  532  001612  105777  003020          INTSVC: TSTB    @DHSCR          ;TEST REC. FLAG
  533  001616  100401                          BMI     .+4
  534  001620  104000                          HLT     0               ;ERROR - INTERRUPT NOT CAUSED BY FLAG
  535  001622  005777  003012                  TST     @DHNRC          ;TEST FOR VALID CHARACTER
  536  001626  100401                          BMI     .+4
  537  001630  104001                          HLT     1               ;NON- VALID CHARACTER
  538  001632  017737  003002  004770          MOV     @DHNRC,@#RECDAT
  539  001640  113737  004770  004772          MOVB    RECDAT,TBUF     ;MOVE CHARACTER TO OUTPUT AREA
  540  001646  113737  004770  005710          MOVB    RECDAT,INBUF    ;MOVE CHARACTER TO CHECK FOR ^C
  541  001654  042737  177600  005710          BIC     #^C<177>,INBUF  ;STRIP JUNK PLUS PARITY
  542  001662  042737  170377  004770          BIC     #170377,@#RECDAT        ;SAVE ONLY LINE  NUMBER
  543  001670  000337  004770                  SWAB    RECDAT
  544  001674  023737  004756  004770          CMP     LINENU,RECDAT   ;DOES THE LINE # COMPARE?
  545  001702  001401                          BEQ     .+4
  546  001704  104002                          HLT     2               ;WRONG LINE NUMBER
  547  001706  012777  177777  002732          MOV     #-1,@DHBC       ;1 (OCTAL) BYTES WILL BE XMITTED
  548  001714  032777  100000  002714          BIT     #100000,@DHSCR  ;TEST "FLAG" FOR DONE
  549  001722  001001                          BNE     .+4
  550  001724  104003                          HLT     3               ;TRANSMITTER DONE SHOULD BE SET
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                                                CMPB    INBUF,#3                ;IS IT A 1C ?
                                                BNE     1$              ;NO
                                                BIS     #BIT11,@DHSCR   ;STOP DEVICE
                                                MOV     #EOP,(SP)       ;CRUNCH STACK
                                                RTI
                                        1$:     MOV     #TBUF,@DHBA     ;ADDRESS OF TRANSMITTER
                                                MOV     NUMBAR,@DHBAR   ;START XMITTER
                                                RTI


                                        ;THIS TEST TRANSMITS A BINARY COUNT PATTERN
                                        ;VIA INTERRUPT MODE TO THE RECEIVER
                                        ;...THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR
                                        TEST2:  MOV     #340,PS         ;DISABLE INTERRUPTS
                                                MOV     #LINE,ESCAPE
                                                MOV     #EOP,NEXT
                                                BIS     #BIT11,@DHSCR   ;MASTER CLEAR INTERFACE
                                                MOV     NUMLIN,@DHSCR   ;SELECT LINE # & REC.  INTERRUPT ENABLE
                                                BIS     #BIT13,@DHSCR   ;SET TRANSMITTER INTERRUPT ENABLE
                                                                        ;& NON EXISTANT MEMORY INTR ENABLE
                                                MOV     SPEED,@DHLPR    ;SET LINE SPEED
                                                MOV     #0,@DHSSR       ;SET SILO ALARM LEVEL =0
                                                MOV     #TABLE,@DHBA    ;ADDRESS OF TRANSMITTER DATA BUFFER
                                                MOV     #-256.,@DHBC    ;SET UP BYTE COUNT
                                                MOV     #INTREC,@DHRVEC ;SET UP INTR SERVICE
                                                MOV     PRIO,@DHRLVL    ;SET UP LEVEL
                                                MOV     #INTRAN,@DHTVEC ;SET UP INTR SERVICE
                                                MOV     PRIO,@DHTLVL    ;SET UP LEVEL
                                                MOV     #TABLE,R1       ;SET UP DATA POINTER
                                                MOV     LESS1,PS        ;ALLOW INTERRUPTS
                                                MOV     NUMBAR,@DHBAR   ;SET UP BAR BIT

                                        ;YOU RETURN HERE AFTER EVERY RECEIVER INTERRUPT
                                        SPIN:   BIT     #SW02,SWR       ;IF SW02=1  GET NEW LINE NUMBER
                                                BEQ     1$              ;SW02=0
                                                JMP     LINE            ;SW02=1
                                        1$:     INC     LOCKUP          ;INC TIMEOUT FLAG
                                                BNE     SPIN            ;IF NOT 0  RETURN SPINNING
                                                HLT     6               ;RECEIVER FAILED TO INTERRUPT  CHECK CABLE TERMINATOR
                                        QUITS:  SCOPE
                                        INTREC: CLR     LOCKUP          ;CLEAR TIMEOUT FLAG
                                                TSTB    @DHSCR          ;TEST REC DONE
                                                BMI     .+4             ;YES
                                                HLT     0               ;FALSE INTERRUPT
                                                MOV     @DHNRC,RECDAT   ;SAVE WORD
                                                TST     RECDAT          ;TEST FOR VALID CHARACTER
                                                BMI     .+4
                                                HLT     1               ;NON VALID CHARACTER
                                                BIT     #BIT14,RECDAT   ;DATA OVERRUN ?
                                                BEQ     .+4             ;NO
                                                HLT     7               ;YES
                                                BIT     #BIT13,RECDAT   ;FRAMING ERROR ?
                                                BEQ     .+4             ;NO
                                                HLT     10              ;YES .
                                                BIT     #BIT12,RECDAT   ;PARITY ERROR ?
                                                BEQ     .+4             ;NO
```

```
  607  002250  104011                          HLT     11                      ;YES
  608  002252  122137  004770                  CMPB    (R1)+,RECDAT            ;GOOD CHARACTER ?
  609  002256  001401                          BEQ     .+4                     ;YES
  610  002260  104005                          HLT     5                       ;NO
  611  002262  042737  170377  004770          BIC     #170377,RECDAT                  ;SAVE ONLY LINE NUMBER
  612  002270  000337  004770                  SWAB    RECDAT
  613  002274  023737  004756  004770          CMP     LINENU,RECDAT           ;DOES THE LINE # COMPARE ?
  614  002302  001401                          BEQ     .+4                     ;YES
  615  002304  104002                          HLT     2                       ;WRONG LINE #
  616  002306  126127  177777  000377          CMPB    -1(R1),#377             ;LAST CHARACTER ?
  617  002314  001003                          BNE     1$                      ;NO
  618  002316  012716  002160                  MOV     #QUITS,(SP)             ;CRUNCH STACK
  619  002322  000402                          BR      2$
  620  002324  012716  002134          1$:     MOV     #SPIN,(SP)              ;CRUNCH STACK
  621  002330  000002                  2$:     RTI
  622
  623  002332  032777  100000  002276  INTRAN: BIT     #BIT15,@DHSCR           ;TEST TRANSMIT FLAG
  624  002340  001001                          BNE     .+4
  625  002342  104003                          HLT     3                       ;FALSE INTERRUPT
  626  002344  032777  002000  002264          BIT     #BIT10,@DHSCR           ;NON EXISTANT MEMORY ?
  627  002352  001404                          BEQ     1$
  628  002354  104004                          HLT     4       ;NON EXISTANT MEMORY SHOULD NOT BE UP
  629  002356  042777  000400  002252          BIC     #BIT08,@DHSCR           ;CLEAR NON EXISTANT MEMORY BIT
  630  002364  042777  100000  002244  1$:     BIC     #BIT15,@DHSCR           ;CLEAR DONE BIT FOR NEXT ROUND
  631  002372  000002                          RTI     ;RETURN
```

```
                                        ;END OF PASS
                                        ;TYPE NAME OF TEST
                                        ;UPDATE PASS COUNT
                                        ;CHECK FOR EXIT TO ACT-11
                                        ;RESTART TEST

002374  104401                  EOP:  TYPE                          ;TYPE NAME OF TEST
002376  005372                        MEPASS
002400  005037  004742                CLR     LAST                  ;CLEAR LAST ERROR PC
002404  005037  004672                CLR     ERRFLG                ;CLEAR ERROR FLAG
002410  005237  004674                INC     PASCNT                ;UPDATE PASS COUNT
002414  013737  004674  177570        MOV     PASCNT,LIGHTS         ;DISPLAY PASS COUNT
002422  013701  000042                MOV     @#42,R1               ;CHECK FOR ACT-11 OR DDP
002426  001406                        BEQ     RESTRT                ;IF NOT, CONTINUE TESTING
002430  000005                        RESET
002432  004711                LOGICAL:        JSR     PC,(R1)
002434  000240                        NOP
002436  000240                        NOP
002440  000240                        NOP
002442  000240                        NOP
002444  000137  001360          RESTRT: JMP     BEGIN

                                        ;CHECK FOR LOOP ON CURRENT TEST
                                        ;CHECK FOR ITERATION SUPPRESSION

002450  032737  002000  177570  SCOPER: BIT     #SW10,SWR
002456  001030                        BNE     4$
002460  032737  040000  177570  1$:     BIT     #SW14,SWR
002466  001021                        BNE     3$
002470  032737  004000  177570        BIT     #SW11,SWR
002476  001006                        BNE     2$
002500  005237  004710                INC     LPCNT
002504  023737  004710  004706        CMP     LPCNT,ICOUNT
002512  001007                        BNE     3$
002514  005037  004710          2$:     CLR     LPCNT
002520  005037  004672                CLR     ERRFLG
002524  013737  004670  004700        MOV     NEXT,RETURN
002532  013716  004700          3$:     MOV     RETURN,(SP)     ;LOOPING
002536  000002                        RTI
002540  005737  004672          4$:     TST     ERRFLG
002544  001745                        BEQ     1$
002546  000762                        BR      2$

                                        ;CHECK FOR FREEZE ON CURRENT DATA

002550  032737  001000  177570  SCOPIF: BIT     #SW09,SWR
002556  001402                        BEQ     1$
002560  013716  004704                MOV     FREEZ1,(SP)
002564  000002                  1$:     RTI

                                        ;ERROR HANDLER

002566  032737  020000  177570  ERRORS: BIT     #SW13,SWR
002574  001051                        BNE     HALTS
002576  021637  004742                CMP     (SP),LAST
```

```
                        BEQ     1$
                        MOV     (SP),LAST
                        CLR     ERRFLG
                1$:     SAVOSP
                        MOV     (SP),R5
                        SUB     #2,R5
                        MOV     (R5),R4
                        ASL     R4
                        ASL     R4
                        BIC     #177001,R4
                        ADD     #ERRTAB,R4
                        MOV     (R4)+,ERRMSG
                        MOV     (R4),DATABP
                        TST     ERRFLG
                        BEQ     TYPMSG
                        TST     @#TABSP
                        BNE     TYPDAT
                TYPMSG: OCTASC
                        ERTABC
                        MOV     #1,ERRFLG
                        TYPE
                ERRMSG: 0
                TYPDAT: TST     DATABP
                        BEQ     RESREG
                        OCTASC
                DATABP: 0
                RESREG: RESOS
                HALTS:  TST     SWR
                        BPL     EXITER
                        PUSHRO
                        MOV     2(SP),RO
                        HALT
                        POPRO
                EXITER: INC     ERRCNT
                        BIT     #SW10,SWR
                        BEQ     1$
                        MOV     ESCAPE,(SP)
                1$:     RTI
                ERTABC: 1
                        .BYTE   6,2
                        SAVPC
                        ;TRAP DISPATCH SERVICE
                        ;ARGUMENT OF TRAP IS EXTRACTED
                        ;AND USED AS OFFSET TO OBTAIN POINTER
                        ;TO SELECTED SUBROUTINE

                TRPSRV: MOV     (SP),-(SP)              ;GET PC OF RETURN
                        SUB     #2,(SP)                 ;=PC OF TRAP
                        MOV     @(SP),(SP)              ;GET TRP
                TRPOK:  ASL     (SP)                    ;MULTIPLY TRAP ARG BY 2
                        BIC     #177001,(SP)            ;CLEAR UNWANTED BITS
                        ADD     #TRPTAB,(SP)            ;POINTER TO SUBROUTINE ADDRESS
                        MOV     @(SP),(SP)              ;SUBROUTINE ADDRESS
                        JMP     @(SP)+                  ;GO TO SUBROUTINE

                        ;SAVE PC OF TEST THAT FAILED AND PC-R5
```

```
003022  016637  000004  004730  SVOSP:  MOV     4(SP),SAVPC
                                        ;SAVE R0-R5
003030  010537  004724          SVOS:   MOV     R5,SAVR5
003034  010437  004722                  MOV     R4,SAVR4
003040  010337  004720                  MOV     R3,SAVR3
003044  010237  004716                  MOV     R2,SAVR2
003050  010137  004714                  MOV     R1,SAVR1
003054  010037  004712                  MOV     R0,SAVR0
003060  000002                          RTI
                                        ;RESTORE R0-R5
003062  013700  004712          RSOS:   MOV     SAVR0,R0
003066  013701  004714                  MOV     SAVR1,R1
003072  013702  004716                  MOV     SAVR2,R2
003076  013703  004720                  MOV     SAVR3,R3
003102  013704  004722                  MOV     SAVR4,R4
003106  013705  004724                  MOV     SAVR5,R5
003112  000002                          RTI
                                        ;TELETYPE OUTPUT ROUTINE
003114  017605  000000          TYPER:  MOV     @(SP),R5
003120  062716  000002                  ADD     #2,(SP)
003124  105777  001502          1$:     TSTB    @TPCSR
003130  100375                          BPL     1$
003132  105715                          TSTB    (R5)
003134  001001                          BNE     2$
003136  000002                          RTI
003140  112577  001470          2$:     MOVB    (R5)+,@TPDBR
003144  000767                          BR      1$
                                        ;ASCII STRING INPUT ROUTINE
003146  017637  000000  003162  INSTRG: MOV     @(SP),MSG
003154  062716  000002                  ADD     #2,(SP)
003160  104401                  INSTR1: TYPE
003162  000000                  MSG:    0
003164  012704  005710                  MOV     #INBUF,R4
003170  012703  000037                  MOV     #7,R3
003174  105777  001426          1$:     TSTB    @TKCSR
003200  100375                          BPL     1$
003202  117714  001422                  MOVB    @TKDBR,(R4)
003206  142714  000200                  BICB    #200,(R4)
003212  122427  000015                  CMPB    (R4)+,#15
003216  001413                          BEQ     INSTR2
003220  117777  001404  001406          MOVB    @TKDBR,@TPDBR
003226  105777  001400          2$:     TSTB    @TPCSR
003232  100375                          BPL     2$
003234  005303                          DEC     R3
003236  001356                          BNE     1$
003240  104401                  INSTRE: TYPE
003242  005274                          MOM
003244  000745                          BR      INSTR1
```

```
                                ;CONVERT ASCII STRING TO OCTAL
003246  000003        INSTR2: RTI
003250  011605        PARAMS: MOV     (SP),R5
003252  012537 003424          MOV     (R5)+,LOLIM
003256  012537 003426          MOV     (R5)+,HILIM
003262  012537 003430          MOV     (R5)+,DEVADR
003266  112537 003432          MOVB    (R5)+,LOBITS
003272  112537 003433          MOVB    (R5)+,ADRCNT
003276  010516                 MOV     R5,(SP)
003300  005005        PARAM1: CLR     R5
003302  012704 005710          MOV     #INBUF,R4
003306  122714 000015          CMPB    #15,(R4)
003312  001420                 BEQ     PARERR
003314  121427 000060  1$:     CMPB    (R4),#60
003320  002415                 BLT     PARERR
003322  121427 000067          CMPB    (R4),#67
003326  003012                 BGT     PARERR
003330  142714 000060          BICB    #60,(R4)
003334  152405                 BISB    (R4)+,R5
003336  122714 000015          CMPB    #15,(R4)
003342  001406                 BEQ     LIMITS
003344  006305                 ASL     R5
003346  006305                 ASL     R5
003350  006305                 ASL     R5
003352  000760                 BR      1$
003354  104404        PARERR: INSTER
003356  000750                 BR      PARAM1

                                ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
003360  020537 003426  LIMITS: CMP     R5,HILIM
003364  101373                 BHI     PARERR
003366  020537 003424          CMP     R5,LOLIM
003372  103770                 BLO     PARERR
003374  133705 003432          BITB    LOBITS,R5
003400  001365                 BNE     PARERR

                                ;STORE NUMBER AT SPECIFIED ADDRESS
003402  013704 003430          MOV     DEVADR,R4
003406  010524          1$:    MOV     R5,(R4)+
003410  062705 000002          ADD     #2,R5
003414  105337 003433          DECB    ADRCNT
003420  001372                 BNE     1$
003422  000002                 RTI
003424  000000         LOLIM:  0
003426  000000         HILIM:  0
003430  000000         DEVADR: 0
003432     000         LOBITS: .BYTE 0
003433     000         ADRCNT: .BYTE 0

                                ;CONVERT DECIMAL ASCII STRING TO OCTAL
003434  011605         .PARAMD:        MOV     (SP),R5
003436  012537 003620                 MOV     (R5)+,6$
```

```
003442  012537  003622          MOV     (R5)+,7$
003446  012537  003624          MOV     (R5)+,8$
003452  112537  003626          MOVB    (R5)+,9$
003456  112537  003627          MOVB    (R5)+,10$
003462  010516                  MOV     R5,(SP)
003464  005005          2$:     CLR     R5
003466  012704  005710          MOV     #INBUF,R4
003472  122714  000015          CMPB    #15,(R4)
003476  001424                  BEQ     3$
003500  121427  000060      1$: CMPB    (R4),#'0
003504  002421                  BLT     3$
003506  121427  000071          CMPB    (R4),#'9
003512  003016                  BGT     3$
003514  142714  000060          BICB    #'0,(R4)
003520  005002                  CLR     R2
003522  152402                  BISB    (R4)+,R2
003524  060205                  ADD     R2,R5
003526  122714  000015          CMPB    #15,(R4)
003532  001410                  BEQ     4$
003534  006305                  ASL     R5          ;X2
003536  010502                  MOV     R5,R2       ;SAVE X2
003540  006305                  ASL     R5          ;X4
003542  006305                  ASL     R5          ;X8
003544  060205                  ADD     R2,R5       ;TIMES 10
003546  000754                  BR      1$
003550  104404          3$:     INSTER
003552  000744                  BR      2$

                                ;TEST TO SEE IF NUMBER IS WITHIN LIMITS

003554  020537  003622      4$: CMP     R5,7$
003560  101373                  BHI     3$
003562  020537  003620          CMP     R5,6$
003566  103770                  BLO     3$
003570  133705  003626          BITB    9$,R5
003574  001365                  BNE     3$

                                ;STORE NUMBER AT SPECIFIED ADDRESS

003576  013704  003624          MOV     8$,R4
003602  010524          5$:     MOV     R5,(R4)+
003604  062705  000002          ADD     #2,R5
003610  105337  003627          DECB    10$
003614  001372                  BNE     5$
003616  000002                  RTI
003620  000000          6$:     0
003622  000000          7$:     0
003624  000000          8$:     0
003626      000         9$:     .BYTE 0
003627      000         10$:    .BYTE 0


                                ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
                                ;BUFFER TO THE CHARACTERS "E" AND "C"
                                ;IF THE CHARACTER IS "E" CLEAR THE FLAG
                                ;IF THE CHARACTER IS "C" SET THE FLAG
```

```
                                .PAWCH:MOV      @(SP),R5
003630  017605  000000  005710          CMPB    #'E,INBUF       ;IS IT "E" ?
003634  122737  000105  005710          BNE     1$
003642  001002                          CLRB    (R5)            ;000
003644  105015                          BR      2$
003646  000406                  1$:     CMPB    #'C,INBUF       ;IS IT "C" ?
003650  122737  000103  005710          BNE     3$
003656  001005                          MOVB    #-1,(R5)        ;377
003660  112715  177777          2$:     ADD     #2,(SP)
003664  062716  000002                  RTI
003670  000002                  3$:     INSTER                  ;RETRY
003672  104404                  .PAWCH  SR
003674  000755

                                ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER

003676  104401                  OCTASN: TYPE
003700  005301                          MCRLF
003702  104413                          SAV05
003704  017601  000000                  MOV     @(SP),R1
003710  062716  000002                  ADD     #2,(SP)
003714  012137  004530                  MOV     (R1)+,WRDCNT
003720  112137  004532          1$:     MOVB    (R1)+,CHRCNT
003724  112137  004533                  MOVB    (R1)+,SPACNT
003730  013137  004534                  MOV     @(R1)+,BINWRD
003734  013704  004534          2$:     MOV     BINWRD,R4
003740  113705  004532                  MOVB    CHRCNT,R5
003744  012700  005722                  MOV     #TEMP,R0
003750  010403                  3$:     MOV     R4,R3
003752  042703  177770                  BIC     #177770,R3
003756  062703  000260                  ADD     #260,R3
003762  110320                          MOVB    R3,(R0)+
003764  006204                          ASR     R4
003766  006204                          ASR     R4
003770  006204                          ASR     R4
003772  005305                          DEC     R5
003774  001365                          BNE     3$
003776  012703  005734                  MOV     #MDATA,R3
004002  114023                  4$:     MOVB    -(R0),(R3)+
004004  105337  004532                  DECB    CHRCNT
004010  001374                          BNE     4$
004012  105737  004533                  TSTB    SPACNT
004016  001405                          BEQ     6$
004020  112723  000240          5$:     MOVB    #240,(R3)+
004024  105337  004533                  DECB    SPACNT
004030  001 373                         BNE     5$
004032  105(13                  6$:     CLRB    (R3)
004034  104401                          TYPE
004036  005724                          MDATA
004040  005337  004530                  DEC     WRDCNT
004044  001325                          BNE     1$
004046  104407                          RES05
004050  000002                          RTI

                                ;THIS ROUTINE CONVERTS LINE SPEED (LINESP) AND
                                ;LINE NUMBER (LINENO) FOR DHLPR, DHBAR AND DHSCR
```

```
                                        ;REGISTER USAGE.
                                        
004052  013737  004756  004760  SET:    MOV     LINENU,@#NUMLIN ;SAVE LINENU
004060  052737  000100  004760          BIS     #BIT06,@#NUMLIN ;SET REC INTERRUPT ENABLE
004066  023727  004756  000000  BAR0:   CMP     LINENU,#0       ;IS IT LINE 0?
004074  001004                          BNE     BAR1            ;NO
004076  012737  000001  004762          MOV     #1,@#NUMBAR     ;STORE BAR BIT 0
004104  000572                          BR      SET1
004106  023727  004756  000001  BAR1:   CMP     LINENU,#1       ;IS IT LINE 1?
004114  001004                          BNE     BAR2            ;NO
004116  012737  000002  004762          MOV     #2,@#NUMBAR     ;STORE BAR BIT 1
004124  000562                          BR      SET1
004126  023727  004756  000002  BAR2:   CMP     LINENU,#2       ;IS IT LINE 2?
004134  001004                          BNE     BAR3            ;NO
004136  012737  000004  004762          MOV     #4,@#NUMBAR     ;STORE BAR BIT 2
004144  000552                          BR      SET1
004146  023727  004756  000003  BAR3:   CMP     LINENU,#3       ;IS IT LINE 3?
004154  001004                          BNE     BAR4            ;NO
004156  012737  000010  004762          MOV     #10,@#NUMBAR    ;STORE BAR BIT 3
004164  000542                          BR      SET1
004166  023727  004756  000004  BAR4:   CMP     LINENU,#4       ;IS IT LINE 4?
004174  001004                          BNE     BAR5            ;NO
004176  012737  000020  004762          MOV     #20,@#NUMBAR    ;STORE BAR BIT 4
004204  000532                          BR      SET1
004206  023727  004756  000005  BAR5:   CMP     LINENU,#5       ;IS IT LINE 5?
004214  001004                          BNE     BAR6            ;NO
004216  012737  000040  004762          MOV     #40,@#NUMBAR    ;STORE BAR BIT 5
004224  000522                          BR      SET1
004226  023727  004756  000006  BAR6:   CMP     LINENU,#6       ;IS IT LINE 6?
004234  001004                          BNE     BAR7            ;NO
004236  012737  000100  004762          MOV     #100,@#NUMBAR   ;STORE BAR BIT 6
004244  000512                          BR      SET1
004246  023727  004756  000007  BAR7:   CMP     LINENU,#7       ;IS IT LINE 7 ?
004254  001004                          BNE     BAR8            ;NO
004256  012737  000200  004762          MOV     #200,@#NUMBAR   ;STORE BAR BIT 7
004264  000502                          BR      SET1
004266  023727  004756  000010  BAR8:   CMP     LINENU,#10      ;IS IT LINE 10?
004274  001004                          BNE     BAR9            ;NO
004276  012737  000400  004762          MOV     #400,@#NUMBAR   ;STORE BAR BIT 8
004304  000472                          BR      SET1
004306  023727  004756  000011  BAR9:   CMP     LINENU,#11      ;IS IT LINE 11?
004314  001004                          BNE     BAR10           ;NO
004316  012737  001000  004762          MOV     #1000,@#NUMBAR  ;STORE BAR BIT 9
004324  000462                          BR      SET1
004326  023727  004756  000012  BAR10:  CMP     LINENU,#12      ;IS IT LINE 12?
004334  001004                          BNE     BAR11           ;NO
004336  012737  002000  004762          MOV     #2000,@#NUMBAR  ;STORE BAR BIT 10
004344  000452                          BR      SET1
004346  023727  004756  000013  BAR11:  CMP     LINENU,#13      ;IS IT LINE 13?
004354  001004                          BNE     BAR12           ;NO
004356  012737  004000  004762          MOV     #4000,@#NUMBAR  ;STORE BAR BIT 11
004364  000442                          BR      SET1
004366  023727  004756  000014  BAR12:  CMP     LINENU,#14      ;IS IT LINE 14?
004374  001004                          BNE     BAR13           ;NO
004376  012737  010000  004762          MOV     #10000,@#NUMBAR ;STORE BAR BIT 12
004404  000432                          BR      SET1
```

```
 1034  004406  023727  004756  000015  BAR13:  CMP     LINENU,#15      ;IS IT LINE 15?
 1035  004414  001004                  BNE     BAR14           ;NO
 1036  004416  012737  020000  004762          MOV     #20000,@#NUMBAR ;STORE BAR BIT 13
 1037  004424  000422                  BR      SET1
 1038  004426  023727  004756  000016  BAR14:  CMP     LINENU,#16      ;IS IT LINE 16?
 1039  004434  001004                  BNE     BAR15           ;NO
 1040  004436  012737  040000  004762          MOV     #40000,@#NUMBAR ;STORE BAR BIT 14
 1041  004444  000412                  BR      SET1
 1042  004446  023727  004756  000017  BAR15:  CMP     LINENU,#17      ;IS IT LINE 17?
 1043  004454  001004                  BNE     BARNUN          ;NO
 1044  004456  012737  100000  004762          MOV     #100000,@#NUMBAR        ;STORE BAR BIT 15
 1045  004464  000402                  BR      SET1
 1046  004466  005037  004762  BARNUN: CLR     @#NUMBAR        ;CLEAR BAR BITS
 1047  004472  012701  004536  SET1:   MOV     #TABLE2,R1
 1048  004476  022137  004752  1$:     CMP     (R1)+,LINESP
 1049  004502  001407                  BEQ     2$
 1050  004504  005721                  TST     (R1)+           ;IS IT THE END OF TABLE?
 1051  004506  001373                  BNE     1$              ;NO
 1052  004510  104401  005404          TYPE    ,MINVAL         ;INVALID BAUD RATE,BEGIN AGAIN.
 1053  004514  012705  001324          MOV     #BAUD,R5        ;JUMP TO BAUD THRU R5
 1054  004520  000402                  BR      3$
 1055  004522  011137  004754  2$:     MOV     (R1),SPEED      ;SET UP BAUD RATE
 1056  004526  000205  3$:     RTS     R5
 1057
 1058
 1059  004530  000000          WRDCNT: 0
 1060  004532  000000          CHRCNT: 0
 1061          004533          SPACNT=CHRCNT+1
 1062  004534  000000          BINWRD: 0
 1063
 1064                                  ;THE FOLLOWING IS A TABLE OF LEGAL BAUD RATES (8 BITS CHAR
 1065  004536  000062          TABLE2: .WORD   50.     ;50 BAUD
 1066  004540  002107                  .WORD   2107    ;TWO STOP BITS
 1067  004542  000113                  .WORD   75.     ;75 BAUD
 1068  004544  004207                  .WORD   4207    ;TWO STOP BITS
 1069  004546  000156                  .WORD   110.    ;110 BAUD
 1070  004550  006307                  .WORD   6307    ;TWO STOP BITS
 1071  004552  000207                  .WORD   135.    ;134.5 BAUD
 1072  004554  010407                  .WORD   10407   ;TWO STOP BITS
 1073  004556  000226                  .WORD   150.    ;150 BAUD
 1074  004560  012503                  .WORD   12503   ;ONE STOP BIT
 1075  004562  000310                  .WORD   200.    ;200 BAUD
 1076  004564  014603                  .WORD   14603   ;ONE STOP BIT
 1077  004566  000454                  .WORD   300.    ;300 BAUD
 1078  004570  016703                  .WORD   16703   ;ONE STOP BIT
 1079  004572  001130                  .WORD   600.    ;600 BAUD
 1080  004574  021003                  .WORD   21003   ;ONE STOP BIT
 1081  004576  002260                  .WORD   1200.   ;1200 BAUD
 1082  004600  023103                  .WORD   23103   ;ONE STOP BIT
 1083  004602  003410                  .WORD   1800.   ;1800 BAUD
 1084  004604  025203                  .WORD   25203   ;ONE STOP BIT
 1085  004606  004540                  .WORD   2400.   ;2400 BAUD
 1086  004610  027303                  .WORD   27303   ;ONE STOP BIT
 1087  004612  011300                  .WORD   4800.   ;4800 BAUD
 1088  004614  031403                  .WORD   31403   ;ONE STOP BIT
 1089  004616  022600                  .WORD   9600.   ;9600 BAUD
```

```
1080  004620  033503                        .WORD   33503   ;ONE STOP BIT
1081  004622  177777  000000                .WORD   -1.0    ;TABLE TERMINATOR
1082
1083
1084                                        ;INDIRECT POINTERS
1085
1086  004626  177560                TKCSR:  177560
1087  004630  177562                TKDBR:  177562
1088  004632  177564                TPCSR:  177564
1089  004634  177566                TPDBR:  177566
1090  004636  000000                DHSCR:  0
1091  004640  000000                DHNRC:  0
1092  004642  000000                DHLPR:  0
1093  004644  000000                DHBA:   0
1094  004646  000000                DHBC:   0
1095  004650  000000                DHBAR:  0
1096  004652  000000                DHBCR:  0
1097  004654  000000                DHSSR:  0
1098  004656  000003                DHSLR:  0
1099  004660  000000                DHRVEC: 0
1100  004662  000000                DHRLVL: 0
1101  004664  000000                DHTVEC: 0
1102  004666  000000                DHTLVL: 0
1103                                        ;PROGRAM VARIABLES
1104
1105  004670  000000                NEXT:   0               ;NEXT TEST #
1106  004672  000000                ERRFLG: 0               ;ERROR FLAG
1107  004674  000000                PASCNT: 0               ;PASS COUNT
1108  004676  000000                ERRCNT: 0               ;ERROR COUNT
1109  004700  001100                RETURN: START           ;RETURN ADDRESS
1110  004702  000000                ESCAPE: 0               ;ADDRESS FOR ERROR ESCAPE
1111  004704  000000                FREEZI: 0               ;DATA LOOPING RETURN ADDRESS
1112  004706  000012                ICOUNT: 10.             ;ITERATION COUNT FOR TEST IN PROGRESS
1113  004710  000000                LPCNT:  0               ;NUMBER OF ITERATIONS THIS TEST
1114  004712  000000                SAVR0:  0               ;R0 SAVE AREA
1115  004714  000000                SAVR1:  0               ;R1 SAVE AREA
1116  004716  000000                SAVR2:  0               ;R2 SAVE AREA
1117  004720  000000                SAVR3:  0               ;R3 SAVE ARE
1118  004722  000000                SAVR4:  0               ;R4 SAVE AREA
1119  004724  000000                SAVR5:  0               ;R5 SAVE AREA
1120  004726  000000                SAVSP:  0               ;STACK POINTER SAVE AREA
1121  004730  000000                SAVPC:  0               ;CALLING ROUTINE SAVE AREA
1122  004732  177777                INIFLG: .WORD   -1              ;PROGRAM INITIALIZATION FLAG
1123  004734  000000                WCHFLG:0                ;ECHO OR CABLE FLAG
1124  004736  000000                STFLG:  0               ;PROGRAM START FLAG
1125  004740  000000                LOCKUP: 0               ;TIMEOUT FLAG
1126  004742  000000                LAST:   0               ;LAST ERROR PC
1127  004744  000000                TDATA:  0
1128  004746  000000                RDATA:  0
1129  004750  000000                BYTCNT: 0
1130  004752  000156                LINESP: 110.                            ;DEFAULT BAUD RATE
1131  004754  006307                SPEED:  6307                            ;DEFAULT 110 BAUD, 8 BITS CHAR,
1132                                                                        ;FOX, 2 STOP BITS
1133  004756  000000                LINENU: 0                               ;DEFAULT VALUE, LINE 0
1134  004760  000100                NUMLIN: 100                             ;DEFAULT VALUE, REC. INTERRUPT ENABLED
1135
```

```
 1136  004762  000001                    NUMBAR: 1               ;DEFAULT VALUE,BAR BIT 0
 1137  004764  000240                    PRIO:   240                             ;DEFAULT DEVICE PRIORITY 5
 1138  004766  000200                    LESSI:  200                             ;DEFAULT PRIORITY4, TO ALLOW INTERRUPTS
 1139  004770  000000                    RECDAT: 0
 1140  004772  000000                    TBUF:   0
 1141                                            ;ENTER HERE ON POWER FAILURE
 1142
 1143
 1144  004774  010046                    PFAIL:  MOV     R0,-(SP)                ;SAVE R0-R5 ON PROCESSOR STACK
 1145  004776  010146                            MOV     R1,-(SP)
 1146  005000  010246                            MOV     R2,-(SP)
 1147  005002  010346                            MOV     R3,-(SP)
 1148  005004  010446                            MOV     R4,-(SP)
 1149  005006  010546                            MOV     R5,-(SP)
 1150  005010  013746  000024                    MOV     24,-(SP)
 1151  005014  010637  004726                    MOV     SP,SAVSP                ;SAVE STACK POINTER
 1152  005020  012737  005032  000024            MOV     #RESTART,24             ;SET UP FOR POWER UP TRAP
 1153  005026  000000                            HALT                            ;HALT ON POWER DOWN NORMAL
 1154  005030  000777                            BR      .
 1155
 1156                                            ;PROCESSOR WILL TRAP HERE WHEN POWER IS RESTORED
 1157
 1158  005032  013706  004726            RESTAR: MOV     SAVSP,SP                ;RESTORE STACK POINTER
 1159  005036  012605                            MOV     (SP)+,R5                ;RESTORE R0-R5
 1160  005040  012604                            MOV     (SP)+,R4
 1161  005042  012603                            MOV     (SP)+,R3
 1162  005044  012602                            MOV     (SP)+,R2
 1163  005046  012601                            MOV     (SP)+,R1
 1164  005050  012600                            MOV     (SP)+,R0
 1165  005052  012737  004774  000024            MOV     #PFAIL,24               ;SET UP FOR POWER FAILURE
 1166  005060  012737  000340  177776            MOV     #340,PS
 1167  005066  012706  001100                    MOV     #STACK,SP
 1168  005072  005037  005722                    CLR     TEMP
 1169  005076  005237  005722                    INC     TEMP
 1170  005102  001375                            BNE     .-4
 1171  005104  104402                            OCTASC
 1172  005106  005130                            PFTAB
 1173  005110  104401                            TYPE
 1174  005112  005304                            MPFAIL
 1175  005114  005037  004672                    CLR     ERRFLG
 1176  005120  005037  004742                    CLR     LAST
 1177  005124  000177  177550                    JMP     @RETURN
 1178  005130  000001                    PFTAB:  1
 1179  005132     006     002             .BYTE   6,2
 1180  005134  000207                            RETURN
 1181  005136  005015  042012  030510    MTITLE: .ASCII  <15><12><12>?DH11 ECHO CABLE TEST \:E  :E>
       005170  055104  044104  020112            .ASCIZ  /DZDHJ REVISION B   /
       005214  005015  042526  052103    MVECTO: .ASCIZ  <15><12>/VECTOR ADDRESS- '
       005237     015  041412  047117    MREGAD: .ASCIZ  <15><12>/CONTROL REGISTER ADDRESS-
       005274  020040  020077     000    MQM:    .ASCIZ  /  ? /
       005301     015  000012            MCRLF:  .ASCIZ   <15><12>
       005304  020040  047520  042527    MPFAIL: .ASCIZ  /  POWER FAILURE, PROGRAM RESTART AT TEST IN PROGRESS
       005372  005015  055104  044104    MEPASS: .ASCIZ  <15>\12>/DZDHJB '
       005404  005015  047111  040526    MINVAL: .ASCIZ  <15><12>/INVALID BAUD RATE - '
       005433     015  046012  047111    MLINE:  .ASCIZ  <15><12>'LINE NUMBER IN OCTAL -
       005465     015  041012  052501    MSPEED: .ASCIZ  <15>.12>/BAUD RATE -
```

```
                005504  005015  054524  042520  MCHAR:  .ASCIZ  <15><12>/TYPE A CHAR. ON DH11 TERMINAL /
                005545     015  053412  044510  MWHICH: .ASCIZ  <15><12>/WHICH TEST ? ECHO OR CABLE (E OR C) /
                005614  005015  042524  046522  MTERM:  .ASCIZ  <15><12>/TERMINAL ECHO TEST /
                005642  005015  040503  046103  MCABLE: .ASCIZ  <15><12>/CABLE TEST /
                                                .EVEN

                                                ;TABLE OF POINTERS FOR TRAP DECODING

                005660  002450                  TRPTAB: SCOPER
                005662  003114                          TYPER
                005664  003676                          OCTASN
                005666  003146                          INSTRG
                005670  003240                          INSTRE
                005672  003250                          PARAMS
                005674  003022                          SVOSP
                005676  003062                          RSOS
                005700  002550                          SCOFIR
                005702  003434                          .PARAMD
                005704  003630                          .PAWCH
                005706  003030                          SVOS

                                                ;BUFFERS FOR INPUT-OUTPUT

                005710  000000                  INBUF:  0
                        005722                  .=.+10
                005722  000000                  TEMP:   0
                        005734                  .=.+10
                005734  000000                  MDATA:  0
                        005746                  .=.+10

                                                ;TABLE OF POINTERS TO ERROR MESSAGES AND DATA

                005746                          ERRTAB:
                005746  006016                          EM1
                005750  000000                          0
                005752  006065                          EM2
                005754  000000                          0
                005756  006122                          EM3
                005760  000000                          0
                005762  006155                          EM4
                005764  000000                          0
                005766  006225                          EM5
                005770  000000                          0
                005772  006262                          EM6
                005774  000000                          0
                005776  006313                          EM7
                006000  000000                          0
                006002  006411                          EM8
                006004  000000                          0
                006006  006437                          EM9
                006010  000000                          0
                006012  006466                          EM10
                006014  000000                          0
                006016  005015  051105  047522  EM1:    .ASCIZ  <15><12>/ERROR- INTERRUPT NOT CAUSED BY FLAG /
                006065     015  042412  051122  EM2:    .ASCIZ  <15><12>/ERROR-NON VALID CHARACTER /
                006122  005015  051105  047522  EM3:    .ASCIZ  <15><12>/ERROR-WRONG LINE NUMBER
```

```
                006155     015  042412  051122  EM4:    .ASCIZ  <15><12>/ERROR-TRANSMITTER DONE SHOULD BE SET /
                006225     015  042412  051122  EM5:    .ASCIZ  <15><12>/ERROR-NON-EXISTANT MEMORY /
                006262  005015  051105  047522  EM6:    .ASCIZ  /<15><12>/ERROR-WRONG CHARACTER /
                006313     015  042412  051122  EM7:    .ASCIZ  <15><12>/ERROR- NOT RECEIVING CHARACTERS -CHECK CABLE OR TERMINATOR /
                006411     015  042412  051122  EM8:    .ASCIZ  /<15><12>/ERROR-DATA OVERRUN /
                006437     015  042412  051122  EM9:    .ASCIZ  /<15><12>/ERROR-FRAMING ERROR /
                006466  005015  040520  044522  EM10:   .ASCIZ  <15><12>/PARITY ERROR /
                                                        .EVEN
                006506                          TABLE:
  1230          006506     000                          .BYTE   0
  1231          006507     001                          .BYTE   1
  1232          006510     002                          .BYTE   2
  1233          006511     003                          .BYTE   3
  1234          006512     004                          .BYTE   4
  1235          006513     005                          .BYTE   5
  1236          006514     006                          .BYTE   6
  1237          006515     007                          .BYTE   7
  1238          006516     010                          .BYTE   10
  1239          006517     011                          .BYTE   11
  1240          006520     012                          .BYTE   12
  1241          006521     013                          .BYTE   13
  1242          006522     014                          .BYTE   14
  1243          006523     015                          .BYTE   15
  1244          006524     016                          .BYTE   16
  1245          006525     017                          .BYTE   17
  1246          006526     020                          .BYTE   20
  1247          006527     021                          .BYTE   21
  1248          006530     022                          .BYTE   22
  1249          006531     023                          .BYTE   23
  1250          006532     024                          .BYTE   24
  1251          006533     025                          .BYTE   25
  1252          006534     026                          .BYTE   26
  1253          006535     027                          .BYTE   27
  1254          006536     030                          .BYTE   30
  1255          006537     031                          .BYTE   31
  1256          006540     032                          .BYTE   32
  1257          006541     033                          .BYTE   33
  1258          006542     034                          .BYTE   34
  1259          006543     035                          .BYTE   35
  1260          006544     036                          .BYTE   36
  1261          006545     037                          .BYTE   37
  1262          006546     040                          .BYTE   40
  1263          006547     041                          .BYTE   41
  1264          006550     042                          .BYTE   42
  1265          006551     043                          .BYTE   43
  1266          006552     044                          .BYTE   44
  1267          006553     045                          .BYTE   45
  1268          006554     046                          .BYTE   46
  1269          006555     047                          .BYTE   47
  1270          006556     050                          .BYTE   50
  1271          006557     051                          .BYTE   51
  1272          006560     052                          .BYTE   52
  1273          006561     053                          .BYTE   53
  1274          006562     054                          .BYTE   54
  1275          006563     055                          .BYTE   55
  1276          006564     056                          .BYTE   56
```

```
 1277  006565  057                    .BYTE   57
 1278  006566  060                    .BYTE   60
 1279  006567  061                    .BYTE   61
 1280  006570  062                    .BYTE   62
 1281  006571  063                    .BYTE   63
 1282  006572  064                    .BYTE   64
 1283  006573  065                    .BYTE   65
 1284  006574  066                    .BYTE   66
 1285  006575  067                    .BYTE   67
 1286  006576  070                    .BYTE   70
 1287  006577  071                    .BYTE   71
 1288  006600  072                    .BYTE   72
 1289  006601  073                    .BYTE   73
 1290  006602  074                    .BYTE   74
 1291  006603  075                    .BYTE   75
 1292  006604  076                    .BYTE   76
 1293  006605  077                    .BYTE   77
 1294  006606  100                    .BYTE   100
 1295  006607  101                    .BYTE   101
 1296  006610  102                    .BYTE   102
 1297  006611  103                    .BYTE   103
 1298  006612  104                    .BYTE   104
 1299  006613  105                    .BYTE   105
 1300  006614  106                    .BYTE   106
 1301  006615  107                    .BYTE   107
 1302  006616  110                    .BYTE   110
 1303  006617  111                    .BYTE   111
 1304  006620  112                    .BYTE   112
 1305  006621  113                    .BYTE   113
 1306  006622  114                    .BYTE   114
 1307  006623  115                    .BYTE   115
 1308  006624  116                    .BYTE   116
 1309  006625  117                    .BYTE   117
 1310  006626  120                    .BYTE   120
 1311  006627  121                    .BYTE   121
 1312  006630  122                    .BYTE   122
 1313  006631  123                    .BYTE   123
 1314  006632  124                    .BYTE   124
 1315  006633  125                    .BYTE   125
 1316  006634  126                    .BYTE   126
 1317  006635  127                    .BYTE   127
 1318  006636  130                    .BYTE   130
 1319  006637  131                    .BYTE   131
 1320  006640  132                    .BYTE   132
 1321  006641  133                    .BYTE   133
 1322  006642  134                    .BYTE   134
 1323  006643  135                    .BYTE   135
 1324  006644  136                    .BYTE   136
 1325  006645  137                    .BYTE   137
 1326  006646  140                    .BYTE   140
 1327  006647  141                    .BYTE   141
 1328  006650  142                    .BYTE   142
 1329  006651  143                    .BYTE   143
 1330  006652  144                    .BYTE   144
 1331  006653  145                    .BYTE   145
 1332  006654  146                    .BYTE   146
```

```
 1333  006655  147                    .BYTE   147
 1334  006656  150                    .BYTE   150
 1335  006657  151                    .BYTE   151
 1336  006660  152                    .BYTE   152
 1337  006661  153                    .BYTE   153
 1338  006662  154                    .BYTE   154
 1339  006663  155                    .BYTE   155
 1340  006664  156                    .BYTE   156
 1341  006665  157                    .BYTE   157
 1342  006666  160                    .BYTE   160
 1343  006667  161                    .BYTE   161
 1344  006670  162                    .BYTE   162
 1345  006671  163                    .BYTE   163
 1346  006672  164                    .BYTE   164
 1347  006673  165                    .BYTE   165
 1348  006674  166                    .BYTE   166
 1349  006675  167                    .BYTE   167
 1350  006676  170                    .BYTE   170
 1351  006677  171                    .BYTE   171
 1352  006700  172                    .BYTE   172
 1353  006701  173                    .BYTE   173
 1354  006702  174                    .BYTE   174
 1355  006703  175                    .BYTE   175
 1356  006704  176                    .BYTE   176
 1357  006705  177                    .BYTE   177
 1358  006706  200                    .BYTE   200
 1359  006707  201                    .BYTE   201
 1360  006710  202                    .BYTE   202
 1361  006711  203                    .BYTE   203
 1362  006712  204                    .BYTE   204
 1363  006713  205                    .BYTE   205
 1364  006714  206                    .BYTE   206
 1365  006715  207                    .BYTE   207
 1366  006716  210                    .BYTE   210
 1367  006717  211                    .BYTE   211
 1368  006720  212                    .BYTE   212
 1369  006721  213                    .BYTE   213
 1370  006722  214                    .BYTE   214
 1371  006723  215                    .BYTE   215
 1372  006724  216                    .BYTE   216
 1373  006725  217                    .BYTE   217
 1374  006726  220                    .BYTE   220
 1375  006727  221                    .BYTE   221
 1376  006730  222                    .BYTE   222
 1377  006731  223                    .BYTE   223
 1378  006732  224                    .BYTE   224
 1379  006733  225                    .BYTE   225
 1380  006734  226                    .BYTE   226
 1381  006735  227                    .BYTE   227
 1382  006736  230                    .BYTE   230
 1383  006737  231                    .BYTE   231
 1384  006740  232                    .BYTE   232
 1385  006741  233                    .BYTE   233
 1386  006742  234                    .BYTE   234
 1387  006743  235                    .BYTE   235
 1388  006744  236                    .BYTE   236
```

```
4389 006745     237     .BYTE   237
4390 006746     240     .BYTE   240
4391 006747     241     .BYTE   241
4392 006750     242     .BYTE   242
4393 006751     243     .BYTE   243
4394 006752     244     .BYTE   244
4395 006753     245     .BYTE   245
4396 006754     246     .BYTE   246
4397 006755     247     .BYTE   247
4398 006756     250     .BYTE   250
4399 006757     251     .BYTE   251
4400 006760     252     .BYTE   252
4401 006761     253     .BYTE   253
4402 006762     254     .BYTE   254
4403 006763     255     .BYTE   255
4404 006764     256     .BYTE   256
4405 006765     257     .BYTE   257
4406 006766     260     .BYTE   260
4407 006767     261     .BYTE   261
4408 006770     262     .BYTE   262
4409 006771     263     .BYTE   263
4410 006772     264     .BYTE   264
4411 006773     265     .BYTE   265
4412 006774     266     .BYTE   266
4413 006775     267     .BYTE   267
4414 006776     270     .BYTE   270
4415 006777     271     .BYTE   271
4416 007000     272     .BYTE   272
4417 007001     273     .BYTE   273
4418 007002     274     .BYTE   274
4419 007003     275     .BYTE   275
4420 007004     276     .BYTE   276
4421 007005     277     .BYTE   277
4422 007006     300     .BYTE   300
4423 007007     301     .BYTE   301
4424 007010     302     .BYTE   302
4425 007011     303     .BYTE   303
4426 007012     304     .BYTE   304
4427 007013     305     .BYTE   305
4428 007014     306     .BYTE   306
4429 007015     307     .BYTE   307
4430 007016     310     .BYTE   310
4431 007017     311     .BYTE   311
4432 007020     312     .BYTE   312
4433 007021     313     .BYTE   313
4434 007022     314     .BYTE   314
4435 007023     315     .BYTE   315
4436 007024     316     .BYTE   316
4437 007025     317     .BYTE   317
4438 007026     320     .BYTE   320
4439 007027     321     .BYTE   321
4440 007030     322     .BYTE   322
4441 007031     323     .BYTE   323
4442 007032     324     .BYTE   324
4443 007033     325     .BYTE   325
4444 007034     326     .BYTE   326
```

```
                                                .BYTE   327
                                                .BYTE   330
                                                .BYTE   331
                                                .BYTE   332
                                                .BYTE   333
                                                .BYTE   334
                                                .BYTE   335
                                                .BYTE   336
                                                .BYTE   337
                                                .BYTE   340
                                                .BYTE   341
                                                .BYTE   342
                                                .BYTE   343
                                                .BYTE   344
                                                .BYTE   345
                                                .BYTE   346
                                                .BYTE   347
                                                .BYTE   350
                                                .BYTE   351
                                                .BYTE   352
                                                .BYTE   353
                                                .BYTE   354
                                                .BYTE   355
                                                .BYTE   356
                                                .BYTE   357
                                                .BYTE   360
                                                .BYTE   361
                                                .BYTE   362
                                                .BYTE   363
                                                .BYTE   364
                                                .BYTE   365
                                                .BYTE   366
                                                .BYTE   367
                                                .BYTE   370
                                                .BYTE   371
                                                .BYTE   372
                                                .BYTE   373
                                                .BYTE   374
                                                .BYTE   375
                                                .BYTE   376
                                                .BYTE   377
                                        .END
```

DU3


```
ADRCNT    003433              909*    844*    851#
BARNUM    004466             1033    1036#
BAR0      004066              972#
BAR1      004106              973     976#
BAR10     004326             1009    1012#
BAR11     004346             1013    1016#
BAR12     004366             1017    1020#
BAR13     004406             1021    1024#
BAR14     004426             1025    1028#
BAR15     004446             1029    1032#
BAR2      004126              977     980#
BAR3      004146              981     984#
BAR4      004166              985     988#
BAR5      004206              989     992#
BAR6      004226              993     996#
BAR7      004246              997    1000#
BAR8      004266             1001    1004#
BAR9      004306             1005    1008#
BALD      001324              477#   1043
BEGIN     001360              437     490#    653
BINWRD    004534              937*    938    1052#
BIT00 =   000001              377#
BIT01 =   000002              376#
BIT02 =   000004              375#
BIT03 =   000010              374#
BIT04 =   000020              373#
BIT05 =   000040              372#
BIT06 =   000100              371#    971
BIT07 =   000200              370#
BIT08 =   000400              369#    629
BIT09 =   001000              368#
BIT10 =   002000              367#    626
BIT11 =   004000              366#    467     514     553     567
BIT12 =   010000              365#    605
BIT13 =   020000              364#    569     602
BIT14 =   040000              363#    599
BIT15 =   100000              362#    623     630
BYTCNT    004750             1129#
CHRCNT    004532              935*    939     952*   1050#   1051
CPTABP    002714              700*    703     710     713#
DELAY     001576              526#    527
DEVADR    003430              807*    841     849#
CHBP      004644              519*    556*    573*   1093#
CHBAR     004650              557*    581*   1095#
CHBC      004646              547*    574*   1094#
CHBCR     004652             1096#
CHLPR     004642              516*    571*   1092#
CHBRC     004640              535     538     595    1091#
CHRLV     004662              523*    576*   1100#
CHRVEC    004660              456     522*    575*   1099#
CHBCR     004636              464     467*    514*    515*    521*    532     548     553*    567*    568*    569*    592     623
                              626     629*    630*   1090#
CHBLP     004656              486*    487*   1098#
CHBBP     004654              486     519*    572*   1097#
[illegible]   004666          578*   1102#
[illegible]   004664          577*   [illegible]
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E03

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EM10	006466	1227	1229#											
EM2	006065	1211	1229#											
EM3	006122	1213	1229#											
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ERRFLG	004672	430*	642*	668*	672	690*	701	707*	1106#	1175*				
ERRMSG	002702	699*	709#											
ERRORS	002565	388	685#											
ERRTAB	005746	698	1208#											
ERTABO	002762	706	726#											
ESCAPE	004702	512*	565*	724	1110#									
EXITER	002740	716	721#											
FREEZ!	004704	680	1111#											
HALTS	002720	686	715#											
HILIM	003426	806*	832	948#										
ICOUNT	004706	665	1112#											
INBUF	005710	540*	541*	551	764	812	862	914	918	1199#				
INIFLG	004732	432*	1122#											
INSTER=	104404	405#	827	881	923									
INSTR =	104403	404#	447	451	459	469	477							
INSTRE	003240	797#	1188											
INSTRG	003146	780#	1187											
INSTR1	003160	782#	799											
INSTR2	003246	791	800#											
INTRAN	002332	577	623#											
INTREC	002162	575	591#											
INTSVC	001612	522	532#											
LAST	004742	431*	641*	687	699*	1126#	1176*							
LESS1	004766	524	580	1138#										
LIMITS=	177570	348#	644*											
LIMITS	003360	822	832#											
LINE	001274	457#	512	529	565	596								
LINENU	004755	474	544	613	970	972	976	980	984	988	992	996	1000	1004
		1008	1012	1016	1020	1024	1028	1032	1133#					
LINESP	004752	492	1038	1130#										
LOBITS	003432	808*	836	850#										
LOOKUP	004740	492*	587*	591*	1125#									
LOGICA	002432	548#												
LOLIM	003424	805*	834	847#										
LPOINT	004710	664*	665	667*	1113#									
MCABLE	005642	499	1181#											
MCHAR	005504	525	1181#											
MCRLF	005301	930	1181#											
MDATA	005734	950	961	1203#										
MEPASS	005372	540	1181#											
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MLINE	005433	470	1181#											
MEFAIL	005304	1174	1181#											
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MSG     003162   1180*  1183#
MSPEED  005465    478  1181#
MTERM   005614    505  1181#
MTITLE  005136    434  1181#
MVECTO  005214    452  1181#
MWHICH  005545    448  1181#
NEXT    004670    513*   566*   669  1105#
NUMBAR  004762    557    581   974*  978*  982*  986*  990*  994*  998*  1002*  1006*  1010*  101-*
                 1018*  1022*  1026*  1030*  1034*  1036*  1139#
NUMLIN  004750    515    568   970*  971*  1134#
OCTASC= 104402    403#   705   712  1171
OCTASN  003676    929#  1186
PARAM = 104405    406#   453   461   471
PARAMD= 104411    410#   479
PARAMS  003250    804#  1189
PARAM1  003300    811#   828
PARERR  003354    814    816   818   827#  833   835   837
PASCNT  004674    428*   643*  644  1107#
PBWCH = 104412    411#   449
PC    =%000007    343#   548*
PFAIL   004774    386    425  1144#  1165
PFTAB   005130   1172   1178#
POPRC = 012600    356#   720
POP1SP= 005726    354#
POP2SP= 322626    358#
PRIO    004764    523    576   578  1137#
PS    = 177776    349#   423*  490*  511*  524*  564*  580*  1166*
PUSHRO= 010046    355#   717
PUSH1S= 005746    353#
PUSH2S= 024646    357#
QUITS   002160    590#   618
RDATA   004746   1128#
RECDAT  004770    538*   539   540   542*  543*  544   595*  596   599   602   605   609   611*
                  612*   613  1139#
RESREG  002716    711    714#
RESTAR  005032   1152   1158#
RESTRT  002444    646    653#
RESUME = 104407    408#   714   964
RETURN  004700    426*   495*  501*  506   669*  670  1139#  1177
RSCS    003062    758#  1191
R0    =%000000    336#   718*  754   758*  940*  944*  951  1144  1164*
R1    =%000001    337#   438*  441*  443*  445   579*  609   616   645*  648   753   759*  933*
                  934    935   936   937  1037*  1038  1040  1045  1145  1163*
R2    =%000002    338#   439*  441   442*  444*  752   760*  970*  971*  973   976*  979   1146
                 1162*
R3    =%000003    339#   440*  443   444   751   761*  785*  795*  941*  943*  943*  944   950*
                  951*   956*  959*  1147  1161*
R4    =%000004    340#   694*  695*  696*  697*  698*  699   700   750   760*  761*  762*  763*
                  790    812*  813   815   817   819*  820   931   941*  942*  943*  944*  945*
                  867    869*  871   873   895*  896*  938*  941   945*  946*  947*  948*  949*
R5    =%000005    341#   485*  692*  693*  694   749   763*  763*  1122  1123  1124  1125  1126
                  807    808   809   810   811*  820*  823*  924*  925*  926*  927*  928*  929*
                  843*   854*  855   856   857   958   959   960   961*  962*  963*  964*  965*
                  878*   879*  886   888   890   996   997*  913*  915*  916*  917*  918*  919*
                 1046*  1149  1159*
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SAVR0     004712      754*   758    1114#
SAVR1     004714      753*   759    1115#
SAVR2     004716      752*   760    1116#
SAVR3     004720      751*   761    1117#
SAVR4     004722      750*   762    1118#
SAVR5     004724      749*   763    1119#
SAVSP     004726     1120#  1151*   1159
SAVDS  =  104413      412#   931
SAVDSP=   104406      407#   691
SCOPE  =  104400      401#   590
SCOPER    002450      658#  1194
SCOPE1=   104410      409#
SCOPIR    002550      678#  1192
SET       004052      455    970#
SET1      004472      975    979    983    987    991    995    999   1003   1007   1011   1015   1019   1023
                     1027   1031   1035   1037#
SP     =%000006       342#   424*   491*   554*   618*   620*   670*   680*   687    689    692    718    724*
                      734*   735*   736*   737*   738*   739*   740*   741    745    758    759*   780    781*
                      804    810*   854    860*   913    921*   932    933*  1144*  1145*  1146*  1147*  1148*
                     1149*  1150*  1151   1159*  1159   1160   1161   1162   1163   1164   1167*
SPACNT=   004533      936*   954    957*  1051#
SPEED     004754      516    571   1045*  1131#
SPIN      002134      584#   599    620
STACK     001100      422#   424    491   1167
START     001100      393    423#   426   1109
STFLG     004736      427*   468*   496    498*   502    504*  1124#
SVCS      003030      749#  1195
SVCSP     003022      745#  1190
SWR    =  177570      347#   436    526    584    658    660    662    678    685    715    722
SW00   =  000001      330#   436
SW01   =  000002      329#
SW02   =  000004      328#   526    584
SW03   =  000010      327#
SW04   =  000020      326#
SW05   =  000040      325#
SW06   =  000100      324#
SW08   =  000400      323#
SW09   =  001000      322#   678
SW10   =  002000      321#   658    722
SW11   =  004000      320#   662
SW12   =  010000      319#
SW13   =  020000      318#   685
SW14   =  040000      317#   660
SW15   =  100000      316#
TABLE     006505      573    579   1229#
TABLE2    004536     1037   1055#
TBUF      004772      519    539*   556   1140#
TDATA     004744     1127#
TEMP      005722      940   1168*  1169*  1201#
TEST1     001462      501    511#
TEST2     001770      495    564#
TKCSR     004626      786   1086#
TKDBR     004630      788    792   1087#
TPCSR     004632      770    793   1088#
TPDBR     004634      775*   792*  1089#
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H03


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TRPSRV   002770       390     734*
TRPTAB   005660       739    1184*
TYPDAT   002704       704     710*
TYPE   = 104401       402*    434     493     505     525     639     708     782     797     929     960    1042    1173
TYPER    003114       768*   1185
TYPMSG   002666       702     705*
VEC1     001166       433     436*
VEC2     001176       435     438*
WCHFLG   004734       450     493    1123*
WRDCNT   004530       934*    962*   1049*
$Q     = 000400      1229*   1230    1231*   1232*   1233*   1234*   1235*   1236*   1237*   1238*   1239*   1240*   1241*
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.      = 007106       379*    382     385*    392*    413*    533     536     545     549     593     597     603     603
                      606     609     614     624    1154    1170    1200*   1202*   1204*
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ASL      695   696   737   923   924   925   975   877   878
BR       945   946   947
BEQ      493   494   527   545   585   600   603   606   609   614   627   646   673   679   688
         702   711   723   791   814   822   864   874   955  1039
         910   968
         883   887
         541   542   611   629   630   697   738   942
         789   819   969
         514   521   553   567   569   971
         820   971
         535   536   548   584   599   602   605   623   626   658   660   662   678   685   722
         930   990
         835   889
         916   966
         533   536   593   597
BNE      433   446   497   503   549   552   588   617   624   659   661   663   666   686   704
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BPL      716   771   787   794
BR       435   500   619   674   776   799   826   828   880   882   917   924   975   979   983
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CLR      427   428   429   430   431   442   468   492   591   641   642   567   568   690   911
         861   972  1036  1168  1175  1176
CLRB     916   959
CMP      445   544   613   665   687   932   934   886   888   972   976   980   984   958   962
         996  1000  1004  1008  1012  1016  1020  1024  1028  1032  1038
CMPB     551   608   616   790   813   815   917   821   863   965   967   973   914   918
COM      498   504
DEC      795   948   962
DECB     844   898   952   957
EMT      359
HALT     380   381   382   719  1153
INC      432   487   587   643   664   721  1169
JMP      393   506   528   586   653   741  1177
JSR      485   548
MOV      423   424   425   426   438   439   440   441   467   486   490   491   495   501   511
         512   513   515   516   518   519   522   523   524   538   547   554   560   557   564
         565   566   568   571   572   573   574   575   576   577   578   579   580   581   584
         618   620   644   645   669   670   680   689   692   694   699   700   715   718   724
         734   736   740   745   749   750   751   752   753   754   758   759   761   764   771
         763   768   781   784   785   804   805   806   807   810   812   841   854   857   864
         856   867   860   862   876   895   896   913   932   934   937   938   947   952   961
         970   974   978   982   986   990   994   998  1002  1006  1010  1014  1022  1026  1030
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        1155  1160  1161  1162  1163  1164  1165  1166  1167
MOVB     539   540   775   788   792   808   809   959   859   920   935   936   939   944   951
         956
NOP      649   650   651   652
RESET    647
RETURN  1180
RTI      555   558   621   631   671   681   725   755   764   774   900   946   903   922   965
RTS     1046
SBCB     693   735
SUBB     543   612
TRAP     401   402   403   404   405   406   407   408   409   410   411   412
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	1485														
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DZDHJB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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                1070    1071    1072    1073    1074    1075    1076    1077    1078    1079    1080    1081    1122
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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RUN-TIME RATIO: 67/22=2.9
CORE USED: 9K (15 PAGES)