VT61

EXERCISER

MD-11-DZVTH-A

EP-DZVTH-A-DL-A

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IDENTIFICATION

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Author:	Paul Nelson

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1. ABSTRACT

This program is an acceptance test for the entire VT61 family of terminals. The functional testing is based upon a set of terminal functions which are common throughout the entire family of vt61 type terminals. The functions and their derived testing is designed to completely check(at the functional level) the terminal micro-processor and associated rams.

There are two distinct modes in which the program can be operated. In "auto" mode all DL11's with operational VT61's will be mapped and all will be tested sequentially. All tests which do not require manual intervention or visual screen observation (Tests 1 thru 20) will be executed for each VT61 repetitively. All errors will be reported on the system console (which is not tested even if it is a VT61).

In Manual mode console entry of the addresses and tests is required. The addresses and tests can be entered in a non-sequential manner and the subsequent execution will follow the entry sequence. This mode must be utilized to enter the keyboard tests, data loop test, and printer controller test. Sequence completion will exit to the re-start point for the manual test.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP 11 family computer with 8K words of memory, a console, and up to 16 VT61's connected to the host computer via DL11-A,B,C or D. VT61 must be in remote; full duplex and at least 300 baud.

3. LOADING PROCEDURE

Procedure for normal binary papertapes should be followed.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

Standard PDP 11 format

SW15 = 1	Halt on error.
SW14 = 1	Loop on test
SW13 = 1	Inhibit error typeouts
SW11 = 1	Inhibit iterations
SW10 = 1	Bell on error
SW9 = 1	Loop on error
SW8 = 1	Loop on test in SWR<7:0>

SPECIAL NOTE

If the computer utilized is a LSI 11 or a computer without a switch register. The program will utilize locations 174 and 176 as a "display" register and a "switch" register respectively. The operator will be responsible for the loading of the "switch" register location prior to starting or restarting the program.

4.2 STARTING ADDRESSES

200 is the starting address of the "Auto" acceptance test
204 is the starting address on the "Manual" select test.

5. OPERATING PROCEDURE

Following is the operating procedure for the "auto" and "manual" modes of testing.

5.1 AUTO ACCEPTANCE MODE (SA = 200).

In this mode the only operator intervention required is SWR option selections such as loop on test (SWR 11), bell on error (SWR C), ect.. The program will, without any external intervention, locate the DL11's with VT61 type units attached and sequentially test all units repetitively with tests 1 thru 20.

5.2 MANUAL UNIT/TEST SELECTION MODE (SA = 204)

This mode requires the operator to enter the addresses of the DL11's to be tested (format is 17XXXX, ect, -up to 16 entries). The entries must be separated by commas and terminated with a carriage return. The operator must then, upon program request, enter a list of tests to be executed in the same format as the address entry (i.e.yy,zz,c/r). Preceeding the terminating carriage return with a 377 octal will result in the tests being repetitively executed for all addresses entered.

Simply depressing a carriage return when unit addresses are requested will result in the mapping and testing of all good DL11's with operational VT61's attached. However, the test list must still be entered via the console!! When running the exercisor in manual mode a control C (03 octal) will result in the termination of testing at the end of the current subtest.

6. ERRORS-GENERAL

6.1 NO OPERATIONAL VT61 ATTACHED

If the unit selected (in "manual" mode) or in the mapping operation ("auto" mode) does not result in a unit which is capable of responding to the test the message "NO VT61 RESPONDED TO ESCZ SEQ. AUTO RETRY IN 30 SEC". will be displayed on the console every 30 seconds until the test is stopped or a unit responds.

6.2 EXCESSIVE "FATAL" ERRORS FROM UNIT UNDER TEST

If ten fatal errors (incomplete transmit/recieve cycles) occurs the message "TESTING ABORTED-TOO MANY FATAL XMITS" will be displayed and the test will exit to the initial setup sequence of the requested mode. If the test then locates an operational unit, it will begin testing it.

6.3 COMMON ERROR MESSAGES

a. ESCAPE SEQUENCE ERROR (ERROR 1)

This error message is returned when a specific escape sequence did not elicit the expected response from the unit under test. Message returns test #, error program count and two words which contain up to 4 bytes of the failing escape sequence (i.e. if "TRANSMIT ALL" failed;the ESC,O, V would be displayed in the format BYTE 1+2=015517,BYTE 3+4= 000126).

b. RECEIVE STATUS ERROR (ERROR 2)

This error message is returned if any of bits 12, 13, or 14 are set in the interface receive buffer register. Data displayed is the address of the CSR (Control and Status Register) of the failing unit. The contents of the forementioned CSR , the error bits from the receive buffer register, and the character which was stored when the errors were detected.

c. SOFTWARE STATUS (VSTAT) ERROR (ERROR 3)

The location tagged "VSTAT" is used by the program to store dynamic conditions relating to the unit under test. The bits which may cause a software status error are:

BIT 15	SET FOR XOFF, CLEARED FOR XON
BIT 14	SET WHEN START OF MESSAGE RECEIVED
BIT 13	SET WHEN END OF MESSAGE RECEIVED
BIT 12	SET FOR A PERIPHERAL ABORT MESSAGE
BIT 10	SET WHEN AN INTERFACE ERROR DETECTED
BIT 7	SET WHEN AN XOFF WAS DETECTED AND THE TRANSMITTER WAS SHUT DOWN BY THE SOFTWARE.
BIT 1	SET WHEN TRANSMIT COMPLETE

The only bit which will unconditionally cause this error is BIT 12 (Peripheral Abort) all other bits will be set and reset and an error is dependent upon expected conditions (i.e. after a complete transmission bits 1, 13 and 14 must be set and others mentioned reset or an error will be reported). Data displayed is the pass #, the test #, expected status and actual status.

D. VT61 HUNG ERROR (ERROR 11)

This error message is displayed if a complete transmission(s) does not result in a SOM(s), an EOM(s) and transmit done. This error is a fatal error and ten of these errors will result in the test aborting.

7. RESTRICTIONS

A. It is imperative that bcth the interface and the VT61 should be placed in full duplex and remote (not local) mode.

B. Unit to be tested cannot be the console device.

C. For the automatic test mapping of the D111's, all addresses for the units to be tested must be within the standard DEC addresses and vectors. if this is not the case, the procedure outlined in Section 8-B must be followed before testing is begun.

8. MISCELLANEOUS

A. Execution time for the auto selection tests (test 1-20) with units set to a baud rate of 9600 baud is approximately 90 seconds.

B. To test a device (D111 with vt61 attached) at non-standard addresses the location "STRTAB" can be modified to contain the lowest of the non-standard addresses and locaton "ENDTAB" modified to contain the highest non-standard address. All interfaces within the new addresses will be mapped and tested if the proper responses are obtained.

C. To change the number of fatal errors allowed before testing is aborted, location "ALWCNT" (loaded with 10) can be modified to the desired count.

D. All tests except Test 1 and Test 23 are run in MAINTENANCE mode, therefore all transmissions from the vt61 are expected to be preceeded by a SOM and terminated with a EOM.

9. PROGRAM DESCRIPTION

9.0 INITIALIZATION

In "Auto" sequence mode this section of the test maps all devices in the pre-determined areas. Devices are then tested for interrupt capability via the "MAINTENANCE" bit and all units which do not or cannot respond are purged from the table. All units are then issued the "ESCAPE Z" sequence and those which do not respond, or do not respond with the proper "IDENT" are purged. All operational units are stored in a table(DLTBL) and tested sequentially.

9.1 TEST 1 CHECK ALL COMMON ESCAPE SEQUENCES.

This test issues all escape sequences and insures the VT61 has not failed during an ESC sequence by issuing a ESC Z to force a VT61 response. The purpose of the test is to attempt to insure that subsequent tests will not result in a "hung" unit. Data is not evaluated.

All errors are reporteded as Escape Sequence failures(Error 1).

9.2 TEST 2 CHECK MAINTENANCE MODE.

Routine to insure entering maintenance mode causes SOM and EOM to be appended to all transmits from VT61 under test. Maintenance mode is entered, then an escape Z sequence is issued to the unit and the resulting response from the vt61 is checked for SOM/EOM.

Error 22 will be issued if either component(SOM/EOM) is missing.

9.3 TEST 3 CHECK DIRECT CURSOR ADDRESSING

This test insures that the cursor will respond to direct cursor addressing. The unit is reset and the cursor position is verified to be home. The cursor is then moved to row 23 column 80 and the position is again verified.

Cursor positioning errors(ERROR 7) are reported if the positions are incorrect.

9.4 TEST 4 CHECK LINEAR ADDRESSING MODE.

Routine to insure the unit can enter linear addressing mode. 81 characters are issued to the unit under test then the cursor position is read and must be rowl, col.0.

An Escape Sequence error (ERROR 1)is issued if the cursor is not at rowl,col.0

9.5 TEST 5 CHECK XON/XOFF FROM VT61

Test to insure operation of XON/XOFF commands from VT61. XOFF is forced by transmitting the data on line 23 while simultaneously filling the silo with new data. After sensing the XOFF, the test waits for the transmit to finish and insures XON occurs before the maximum transfer time has elapsed. (30 seconds)

Errors are reported if the format of ERROR 3(VSTAT errors) and will reflect either lack or excess of Bit 15.

9.6 TEST 6 CHECK XON/XOFF TO VT61

Routine to verify operation of XOFF and XON to the VT61. A full screen transmit is initiated and a series of XOFFs and XONs are issued to the terminal sequentially. Errors are reported if a XOFF does not stop, or a XON restart the transmission. Test is ended when EOM is sensed.

Errors are reported(Error 15 for XOFF failure and Error 16 for a XON failure)as specific error messages.

9.7 TEST 7 CHECK RAM AND COMMUNICATIONS PATHS

Routine to test VT61 RAM and the communication paths. This routine issues a series of full screen patterns (77/100, 100/77, 52/125, incrementing, and rev. video incrementing) to the VT61. The full screen is then transmitted to the host and after each iteration received data is checked and all errors (including transmission) are reported.

Errors reported could be ERROR 2 for a Receive Status error,ERROR 4 for data errors and ERROR 5 for a Receive Byte Count error.

9.10 TEST 10 CHECK TRANSMIT AND RECEIVE CHECKSUMS.

Routine to test the ability of the VT61 to calculate and transmit checksums of both transmitted and received data. Subtest "A" transmits a full buffer updating a calculated checksum on each character transmitted. An escape sequence requesting the receiver checksum is embedded at the end of xmit buffer and the received checksum is compared to the calculated. Subtest "B" performs the same type of check on the VT61 transmit checksum, utilizing the data sent to the VT61 in subtest "A", during a full screen transmit.

Error 13 is issued(with calculated and received checksum) if a Receive Checksum error is detected. Error 14 is issued (with same data as ERROR 13) if a VT61 Transmit Checksum error is detected.

9.11 TEST 11 CHECK BASIC CURSOR COMMANDS

Routine to insure basic cursor commands result in correct cursor movement. Commands are issued in the sequence: reset, cursor right, cursor down, cursor left, and cursor up. The read cursor position command is issued after every move cursor command and received position is compared to the expected position and any errors reported.

An Escape Sequence error(Error 1) and a Cursor Positioning error(Error 6) are issued if any functions are detected to fail.

9.12 TEST 12 CHECK READ CHARACTER AT CURSOR

Routine to insure that read character at cursor functions correctly. Command sequence is: reset, A, cursor left, read character at cursor. An error is reported if the character received is not an "A".

An Escape Sequence error(Error 1) and a Data Compare error(Error 4) are issued if a failure is detected.

9.13 TEST 13 CHECK REPLACE AND INSERT CHARACTER MODES

Routine to verify operation of replace and insert mode. Initially row 0 is written to 80 incrementing characters; on the first pass (replace mode) a character(172) is replaced at the home position and the characters at row0, col.0 and row1, col.0 are read and verified to be a "172" and a "Null" respectively. On the second pass, insert mode is entered and the resulting insertion (at the home position) is verified. Row0, col.0 should be "172" and row1, col.0 should be "161".

If an error is detected in either mode,the appropriate Escape Sequence error(Error 1) is issued.

9.14 TEST 14 CHECK VT61 SCROLL CAPABILITIES.

Routine to insure VT61 will scroll if a line feed is issued from row 23 or a data insert from row 23 col. 79. In subtest "A", row 0 is initially written to a 0 and row 1 A 1. After completion of a line feed (and resulting scroll) row 00, col.00 is expected to contain A 1. In subtest "B", the cursor is placed at row23, col.79 and a data character "A" is entered. The cursor position is then read and should be row23, col.00. The char. at home is verified to be a null.

A Scroll error(Error 23) is issued if either functions fail to elicit the proper response from the unit under test. the ERROR PC will distinguish between the failing functions.

9.15 TEST 15 CHECK ALL SCREEN ADDRESSES.

This test insures that the VT61 cursor can be positioned to every possible row/column position on the screen. This is tested by filling the complete screen (except Row 23,Col.79 which will contain a "Null") with the character "A" and then positioning the cursor (via DCA) to every position and the "A" at that position is replaced with a space(octal 40). The screen is then read to verify that only spaces exist on the screen. All positions containing non-spaces are reported.

All errors detected will be reported as Direct Cursor Address erros(Error 7),and will contain the position the bad data(non-space) was detected at.

9.16 TEST 16 CHECK LINE FEED AND CARRIAGE RETURN

Routine to insure proper operation of carriage return and line feed during normal mode. Initially the cursor is set (via D.C.A.) to row0, col 20 and a line feed is issued, the cursor position is then read and must be row1, col.20. A carriage return is then issued and cursor position verified to be row1, col0.

An Escape Sequence error(Error 1) and a Cursor positioning error(Error 6) will be issued if an error is detected.

9.17 TEST 17 CHECK ERASE TO END OF SCREEN

Routine to verify proper operation of erase to end-of-screen. Screen is written to 1920 incrementing char. Erase to end of screen is then issued and the entire screen is read verifying that it is all nulls.

If any non-null positions are detected, and Escape Sequence error (Error 1) and a Data error(Error 4) will be issued.

9.20 TEST 20 CHECK SELF TEST, COPIER, AND ISSUE END OF PASS.

SELF TEST (ESC T) is issued to the unit under test and an Self Test error(Error 10) is issued if the unit cannot respond to an "Escape Z" sequence after self test is complete. If self test is successful the screen is written to 23 lines of incrementing characters and 23 lines of incrementing char. in reverse video. The "Ident" is then checked and if a copier is present a copy screen command is issued (NOTE: This command will cause the unit to be "busy" and not respond to any further commands until the screen has been completely copied.)

If the Ident indicates a copier is present and the COPY SCREEN is initiated,but not completed, a "PERIPHERAL ABORT" (Error 20) Error is issued.

END OF AUTO-ACCEPTANCE TESTS

9.21 TEST 21 KEYBOARD ECHO TEST

Routine to echo the keyboard. Keys for tab, bell, carriage and line feed echo a mnemonic, non-display char. echo octal equivalents and display char. echo themselves. (examples- char., space, ESC, space or 037, space.) A Control C (003) will cause a test exit.

9.22 TEST 22 TEST A LINE PRINTER(PRINTER CONTROLLER MODE)

Routine to utilize the VT61 as a printer controller. After test message is displayed, the test waits for a C/R before actually entering test. A pattern of incrementing, rolling char. will be outputted until a Control C (003) is received.

If the Line Printer is disabled after the initialization of the test, a "PERIPHERAL ABORT" (Error 20) is issued.

9.23 TEST 23 UNIT SIMULATOR TEST

Routine to loop data/commands from the VT61 back to the VT61. Data transmissions resulting from a ESC sequence will also be looped and will enter the screen at the cursor position. This test can be used to simulate, or create, specific screen patterns and operations. A control C (003) exits test.

9.24 TEST 24 PRODUCTION KEYBOARD TEST

Production keyboard test. All keys must be depressed in the sequence indicated on the screen. All errors or mistakes are displayed in octal positional format and the correct key position in the row is displayed in decimal. This test is run in maintenance mode, therefore the keys will echo their position, not their indicated mnemonic. The exceptions are the individual tests for the shift and control functions.These tests are explicitely defined by messages to the operator. 10 errors will cause an automatic exit from test.

```
     1                                  .NLIST  MD,MC,CND
     2                                  .LIST   ME
     3                          .TITLE  MAINDEC-11-DZVTH-A
```

B02

```
                                  ;*COPYRIGHT (C) 1976
                                  ;*DIGITAL EQUIPMENT CORP.
                                  ;*MAYNARD, MASS. 01754
                                  ;*
                                  ;*PROGRAM BY P. NELSON
                                  ;*
                                  ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                  ;*PACKAGE (MAINDEC-11-DZQAC-B1),AUG 19,1975.
                                  ;*

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

                                  .SBTTL  BASIC DEFINITIONS

                                  ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
             001100               STACK=  1100
                                  .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                                  .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
             177776               PS=     177776          ;;PROCESSOR STATUS WORD
                                  .EQUIV  PS,PSW
             177774               STKLMT= 177774          ;;STACK LIMIT REGISTER
             177772               PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
             177570               DSWR=   177570          ;;HARDWARE SWITCH REGISTER
             177570               DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                                  ;*GENERAL PURPOSE REGISTER DEFINITIONS
             000000               R0=     %0              ;;GENERAL REGISTER
             000001               R1=     %1              ;;GENERAL REGISTER
             000002               R2=     %2              ;;GENERAL REGISTER
             000003               R3=     %3              ;;GENERAL REGISTER
             000004               R4=     %4              ;;GENERAL REGISTER
             000005               R5=     %5              ;;GENERAL REGISTER
             000006               R6=     %6              ;;GENERAL REGISTER
             000007               R7=     %7              ;;GENERAL REGISTER
                                  .EQUIV  R6,SP           ;;STACK POINTER
                                  .EQUIV  R7,PC           ;;PROGRAM COUNTER

                                  ;*PRIORITY LEVEL DEFINITIONS
             000000               PR0=    0               ;;PRIORITY LEVEL 0
             000040               PR1=    40              ;;PRIORITY LEVEL 1
             000100               PR2=    100             ;;PRIORITY LEVEL 2
             000140               PR3=    140             ;;PRIORITY LEVEL 3
             000200               PR4=    200             ;;PRIORITY LEVEL 4
```

```
             000240               PR5=    240             ;;PRIORITY LEVEL 5
             000300               PR6=    300             ;;PRIORITY LEVEL 6
             000340               PR7=    340             ;;PRIORITY LEVEL 7

                                  ;*"SWITCH REGISTER" SWITCH DEFINITIONS
             100000               SW15=   100000
             040000               SW14=   40000
             020000               SW13=   20000
```

```
        010000                  SW12=   10000
        004000                  SW11=   4000
        002000                  SW10=   2000
        001000                  SW09=   1000
        000400                  SW08=   400
        000200                  SW07=   200
        000100                  SW06=   100
        000040                  SW05=   40
        000020                  SW04=   20
        000010                  SW03=   10
        000004                  SW02=   4
        000002                  SW01=   2
        000001                  SW00=   1
                                .EQUIV  SW09,SW9
                                .EQUIV  SW08,SW8
                                .EQUIV  SW07,SW7
                                .EQUIV  SW06,SW6
                                .EQUIV  SW05,SW5
                                .EQUIV  SW04,SW4
                                .EQUIV  SW03,SW3
                                .EQUIV  SW02,SW2
                                .EQUIV  SW01,SW1
                                .EQUIV  SW00,SW0

                                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
        100000                  BIT15=  100000
        040000                  BIT14=  40000
        020000                  BIT13=  20000
        010000                  BIT12=  10000
        004000                  BIT11=  4000
        002000                  BIT10=  2000
        001000                  BIT09=  1000
        000400                  BIT08=  400
        000200                  BIT07=  200
        000100                  BIT06=  100
        000040                  BIT05=  40
        000020                  BIT04=  20
        000010                  BIT03=  10
        000004                  BIT02=  4
        000002                  BIT01=  2
        000001                  BIT00=  1
                                .EQUIV  BIT09,BIT9
                                .EQUIV  BIT08,BIT8
                                .EQUIV  BIT07,BIT7
                                .EQUIV  BIT06,BIT6
                                .EQUIV  BIT05,BIT5
                                .EQUIV  BIT04,BIT4
                                .EQUIV  BIT03,BIT3
```

```
                                .EQUIV  BIT02,BIT2
                                .EQUIV  BIT01,BIT1
                                .EQUIV  BIT00,BIT0

                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
        000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
        000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
        000014                  TBITVEC=14              ;;"T" BIT
        000014                  TRTVEC= 14              ;;TRACE TRAP
        000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
        000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
        000024                  PWRVEC= 24              ;;POWER FAIL
        000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
```

D02

```
        000034                  TRAPVEC=34                  ;;"TRAP" TRAP
        000060                  TKVEC=  60                  ;;TTY KEYBOARD VECTOR
        000064                  TPVEC=  64                  ;;TTY PRINTER VECTOR
        000240                  PIRQVEC=240                 ;;PROGRAM INTERRUPT REQUEST VECTOR

                                .SBTTL  TRAP CATCHER

        000000                          .=0
                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
        000174                          .=174
000174  000000                          DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
000176  000000                          SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
        000200                          .=200
000200  000137  002230          START:  JMP     AUTO            ;USE AUTO SELECTION OF UNITS
000204  000137  002262          MSTRT:  JMP     MANS            ;ALLOW OPERATOR SELECTIONOF UNITS/TESTS
```

```
                                ;*****************************************************************

                                .SBTTL  COMMON TAGS

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

        001100                          .=1100
001100                          $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  $PASS:  .WORD   0               ;;CONTAINS PASS COUNT
001102     000                  $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001103     000                  $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001114     000                  $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001115     001                  $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0               ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000000                          .WORD   0
001136  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001140  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001142  177560                  $TKS:   177560                  ;;TTY KBD STATUS
001144  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
001146  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001150  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001152     000                  $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001153     002                  $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001154     012                  $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001155     000                  $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001156  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
001160  000000                  $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
001162  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001166     077                  $QUES:  .ASCII  /?/             ;;QUESTION MARK
001167     015                  $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001170  000012                  $LF:    .ASCIZ  <12>            ;;LINE FEED
```

```
                                        ;*****************************************************************

                                        .SBTTL  ERROR POINTER TABLE

                                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:         IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:         EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                        ;*      EM                      ;;POINTS TO THE ERROR MESSAGE
                                        ;*      DH                      ;;POINTS TO THE DATA HEADER
                                        ;*      DT                      ;;POINTS TO THE DATA
                                        ;*      DF                      ;;POINTS TO THE DATA FORMAT

        001172                          $ERRTB:
                                                ;GENERAL ESCAPE SEQUENCE ERROR MESSAGE

        001172  023201                          EM1                             ;AN ESCAPE SEQUENCE TO VT61   FAILED.
        001174  023266                          DH1                             ;TEST#,ERROR PC,2 SEQUENCE BYTES,2 SEQUENCE BYTES.
        001176  001422                          DT0
        001200  001442                          DF0

                                                ;RECEIVE STATUS ERROR MESSAGE

        001202  023331                          EM2                             ;RECEIVE STATUS ERROR
        001204  023361                          DH2                             ;ADDRESS,STATUS ,ERR. BITS,CHAR.
        001206  001452                          DT2
        001210  001442                          DF0


                                                ;RECIEVE SOFTWARE STATUS ERROR MESSAGE.

        001212  023420                          EM3                             ;SFTWARE (SIAT) STATUS ERROR
        001214  023461                          DH3                             ;PASS#,TEST#,GOOD STATUS,RECEIVED STATUS
        001216  001500                          DT4
        001220  001543                          DF6

                                                ;DATA ERROR

        001222  023530                          EM4                             ;DATA EXPECTED DOES NOT MATCH RECEIVE DATA.
        001224  023574                          DH4                             ;TEST#,REC.CNT.,EXPECTED DATA, RECEIVE DATA
        001226  001512                          DT5
        001230  001442                          DF0

                                                ;RECEIVE BYTE COUNT ERROR

        001232  023642                          EM5                             ;BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED.
        001234  023721                          DH5                             ;BYTES EXPECTED, BYTES RECEIVED
        001236  001434                          DT1
        001240  001450                          DF2

                                                ;GENERAL DIRECT CURSOR ADDRESS FAILURE

        001242  023752                          EM6                             ;CURSOR POSITION ERROR
```

```
        001244  024005                          DH6                             ;GD LINE, GD COL., BD LINE, BAD COL.
        001246  001452                          DT2
        001250  001474                          DF3
```

```
                                        ;DIRECT CURSOR ADDRESS ERROR

001252  024052                          EM7                     ;DIRECT CURSOR ADDRESS ERROR
001254  024152                          DH10                    ;PASS#,TEST#,BD. ROW,BD. COL.
001256  001500                          DT4
001260  001543                          DF6


                                        ;LAST TEST-SELF TEST FAILED

001262  024354                          EM10                    ;VT61 FAILED SELF-TEST FUNCTION
001264  024723                          DH11                    ;CSR, VECTOR
001266  001434                          DT1
001270  001446                          DF1

                                        ;VT61 FAIL/HUNG ERROR MESSAGE
001272  024211                          EM11                    ;LAST TRANSMISSION TO VT61 CAUSED VT61 TO FAIL/HANG
001274  024115                          DH7                     ;PASS#,TEST#,ERROR PC
001276  001464                          DT3
001300  001534                          DF4

                                        ;GENERAL TEST FAILURE-PRECEEDS DATA/POSITION ERROR

001302  024277                          EM12                    ;VT61 UNDERR TEST FAILED-ERROR DATA FOLLOWS
001304  024115                          DH7                     ;PASS#,TEST#,ERROR PC.
001306  001464                          DT3
001310  001534                          DF4

                                        ;RECEIVE CHECKSUM ERROR

001312  024530                          EM13                    ;VT61 RECEIVER CHECKSUM ERROR
001314  024415                          DH12                    ;PASS#,TEST#,GD.CKSUM,BD CKSUM
001316  001500                          DT4
001320  001543                          DF6

                                        ;TRANSMITTER CHECKSUM ERRROR

001322  024577                          EM14                    ;VT61 TRANSMITTER CHECKSUM ERROR
001324  024415                          DH12
001326  001500                          DT4
001330  001543                          DF6



                                        ;XOFF FAILED TO HALT BLOCK XMIT

001332  025016                          EM15                    ;XOFF TO VT61 FAILED TO HALT BLOCK XMIT
001334  025533                          DH13                    ;PASS,TEST,VSTAT
001336  001524                          DT6
001340  001534                          DF4

                                        ;XON FAILED TO RESTART BLOCK XMIT
```

```

001342  025067                          EM16                    ;XON TO VT61 FAILED TO RESTART BLOCK XMIT
001344  025533                          DH13
001346  001524                          DT6
001350  001534                          DF4

                                        ;NO XON AFTER UNIT WAS RESET

001352  025142                          EM17                    ;NO XON AFTER UNIT WAS RESET.
```

```
001354  024115                          DH7                     ;PASS#,TEST#,ERROR PC
001356  001524                          DT6
001360  001534                          DF4

                                        ;PERIPHERAL ABORT ERROR

001362  025220                          EM20                    ;LAST PERIPHERAL OPERATION ABORTED.
001364  025565                          DH14                    ;PASS,TEST,ERROR PC, VSTAT
001366  001500                          DT4
001370  001543                          DF6

                                        ;CANT CLEAR PERIPHERAL ABORT FLAG.

001372  025264                          EM21                    ;COULD NOT CLEAR LAST ABORT FLAG.
001374  025565                          DH14
001376  001500                          DT4
001400  001543                          DF6

                                        ;MAINTENANCE MODE DID NOT FORCE A SOM/EOM.

001402  025327                          EM22                    ;SOM OR EOM NOT REC. IN MAINT. MODE.
001404  023461                          DH3                     ;PASS#,TEST#,EXP.STAT, ACT.STAT
001406  001500                          DT4
001410  001543                          DF6

                                        ;LINE FEED OR CURSOR RIGHT AT ROW 23 DID NOT CAUSE A SCROLL.

001412  025415                          EM23                    ;NO SCROLL FROM LINE FEED OR CURSOR RIGHT.
001414  024115                          DH7
001416  001524                          DT6
001420  001534                          DF4

001422  002226  001116  001124  DT0:    .WORD   TSTNM,$ERRPC,$GDDAT,$BDDAT,0
001430  001126  000000
001434  001124  001126  000000  DT1:    .WORD   $GDDAT,$BDDAT,0
001442     000     000     000  DF0:    .BYTE   0,0,0,0
001445     000
001446     000     000          DF1:    .BYTE   0,0

001450     001     001          DF2:    .BYTE   1,1             ;DECIMAL TYPE

001452  001120  001124  001122  DT2:    .WORD   $GDADR,$GDDAT,$BDADR,$BDDAT,0
001460  001126  000000
001464  001100  002226  001116  DT3:    .WORD   $PASS,TSTNM,$ERRPC,0
001472  000000
001474     001     001     001  DF3:    .BYTE   1,1,1,1
001477     001
```

```
001500  001100  002226  001124  DT4:    .WORD   $PASS,TSTNM,$GDDAT,$BDDAT,0
001506  001126  000000
001512  002226  001120  001124  DT5:    .WORD   TSTNM,$GDADR,$GDDAT,$BDDAT,0
001520  001126  000000
001524  001100  002226  001120  DT6:    .WORD   $PASS,TSTNM,$GDADR,0
001532  000000
001534     001     000     000  DF4:    .BYTE   1,0,0
001537     000     000     001  DF5:    .BYTE   0,0,1,1
001542     001
001543     001     000     000  DF6:    .BYTE   1,0,0,0
001546     000
        001550                          .EVEN
                                                ;INSTRUCTION DEFINITIONS
        022626                  POP2SP  =22626
```

```
024646         PUSH2SP =24646

               ;************************************************************
                       ;DEFINITION SOFTWARE STATUS(VSTAT) REGISTER BITS
               ;************************************************************

100000         RXOFF   =100000                 ;SET FOR XOFF, CLEARED FOR XON
040000         RSOM    =040000                 ;SET FOR SOM (START OF MESSAGE).
020000         REOM    =020000                 ;SET FOR EOM (END OF MESSAGE).
010000         PABRT   =010000                 ;SET FOR A PERIPHERAL ABORT.
004000         RSTT    =004000                 ;SET FOR RECEIVE STATUS ERROR.
002000         CKSUM   =002000                 ;SET TO CALCULATE 61 REC.  CHECKSUM
001000         EPL     =001000                 ;SET WHEN END OF LINE DETECTED
000400         ESC     =000400                 ;SET WHEN OCTAL 33 RECEIVED.
000200         XMKIL   =000200                 ;SET WHEN TRANSMIT KILLLED.
000100         TXSUM   =000100                 ;SET TO CALCULATE 61 XMIT CHECKSUM
000040         REVID   =000040                 ;SET WHEN REVERSE VIDEO MODE RECEIVED.
000020         COMGP   =000020                 ;SET TO CONVERT REC. CHAR. BY -137.
000004         CURPOS  =000004                 ;SET WHEN CURSOR POS. RECEIVED
000002         TRMID   =000002                 ;SET WHEN TERMINAL I.D. RECEVED.
000001         XMDNE   =000001                 ;SET UPON TRANSMIT COMPLETE

               ;************************************************************
                                ;DEFINITION OF DL11 CONTROL BITS
               ;************************************************************

000200         RECDN   =200
100000         DSCHNG  =100000
000100         RDENA   =000100
100000         RERR    =100000
040000         RORUN   =40000
020000         RFMER   =20000
010000         RPAR    =10000
000200         TRDY    =00200
000100         TENA    =00100
000004         MAINT   =00004
000104         TCOMB   =00104                  ;COMBINATION INTERRUPT ENABLE AND MAINT.
```

```

        003600                TOTCH   =1920.                ;TOTAL CHARACTERS ON SCREEN
        003601                TOTC1   =1921.                ;TOTAL SCREEN +1
                              ;************************************************************
                                      ;FOLLOW ARE DL11 ADDRESS AND VECTOR STORAGE TABLES
```

```
                              ;************************************************************
001550  000020                VVECT:  .BLKW  20             ;GOOD DL11 VECTOR TABLE
001610  000020                DLTBL:  .BLKW  20             ;GOOD DL11 ADDRESS TABLE
001650  000020                INTAB:  .BLKW  20             ;TABLE OF POSSIBLE DL11 ADDRESSES


                                      ;CURRENT POINTERS FOR ADDRESSES AND VECTORS
001710  000000                VECPT:  .WORD                 ;VECTOR INDEX
001712  000000                DLTPT:  .WORD                 ;ADDRESS INDEX
                                             ;ADDRESS TABLES FOR DL11 INTERFACES
001714  176500                STRTAB: .WORD  176500         ;DL11A/B
001716  175610                        .WORD  175610         ;DL11 C/D/E
001720  000000                        .WORD  0
001722  176676                ENDTAB: .WORD  176676         ;DL11 A/B
001724  176170                        .WORD  176170         ;DL11 C/D/E
001726  000000                        .WORD  0              ;END OF LIST MARKER
                              ;************************************************************
                                             ;VT61 ADDRESSES IN TABLE REFLECT UNIT UNDER TEST
                              ;************************************************************
001730  000000                VRCSR:  .WORD  0
001732  000000                VRBUF:  .WORD  0              ;RECEIVE DATA BUFFER
001734  000000                VXCSR:  .WORD  0              ;XMITTER CSR
001736  000000                VXBUF:  .WORD  0              ;XMITTER DATA BUFFER
001740  000000                VECT:   .WORD  0              ;VECTOR FOR UNIT UNDER TEST
001742  000000                CRCSR:  .WORD  0              ;CONSOLE RECEIVE CSR
001744  000000                CRBUF:  .WORD  0              ;CONSOLE DATA BUFFER


                              ;************************************************************
                                      ;TABLE OF VT61 COMMAND AND SEQUENCES
                              ;************************************************************

        000007                .BEL    =007
001746  000007                BEL:    .WORD  007            ;BELL
        000015                .CARRT  =015
001750  000015                CARRT:  .WORD  015            ;CARRIAGE RETURN
        000012                .LNFED  =012
001752  000012                LNFED:  .WORD  012            ;LINE FEED
        000011                .TAB    =011
001754  000011                TAB:    .WORD  011            ;TAB
                              ;************************************************************
001756  000001                        .WORD  01             ;TABLE DELIMITER (ESCN)
                              ;************************************************************

        000110                .CHOM   =110
001760  000110                CHOM:   .WORD  110            ;HOME CURSOR  H

        000103                .CRT    =103
001762  000103                CRT:    .WORD  103            ;CURSOR RIGHT  C

        000102                .CDWN   =102
001764  000102                CDWN:   .WORD  102            ;CURSOR DOWN  B

        000104                .CLFT   =104
001766  000104                CLFT:   .WORD  104            ;CURSOR LEFT  D
```

```
                000101                  .CUP    =101
        001770  000101                  CUP:    .WORD   101             ;CURSOR UP  A

                000112                  .EOS    =112
        001772  000112                  EOS:    .WORD   112             ;ERASE TO END OF SCREEN  J


                000127                  .EPNT   =127
        001774  000127                  EPNT:   .WORD   127             ;ENABLE PRINT MODE.  W
                000130                  .DPNT   =130
        001776  000130                  DPNT:   .WORD   130             ;DISABLE PRINT MODE  X

                                        ;************************************************************
        002000  000002                          .WORD   2               ;TABLE DELIMITER (ESCO)
                                        ;************************************************************


                000101                  .EMAIN  =101
        002002  000101                  EMAIN:  .WORD   101             ;ENTER MAINTENANCE MODE  A
                000141                  .DMAIN  =141
        002004  000141                  DMAIN:  .WORD   141             ;EXIT MAINTENANCE MODE  SA

                000105                  .LKKB   =105
        002006  000105                  LKKB:   .WORD   105             ;LOCK KEYBOARD  E
                000145                  .UNLKKB =145
        002010  000145                  UNLKKB: .WORD   145             ;UNLOCK KEYBOARD  SE

                000103                  .DRECT  =103
        002012  000103                  DRECT:  .WORD   103             ;ENABLE LINEAR MODE  C

                000133                  .CLRCK  =133
        002014  000133                  CLRCK:  .WORD   133             ;CLEAR RECEIVER CHECKSUM I

                000134                  .CLTCK  =134
        002016  000134                  CLTCK:  .WORD   134             ;CLEAR TRANSMITTER CHECKSUM


                000112                  .EEMP   =112
        002020  000112                  EEMP:   .WORD   112             ;ENABLE REVERSE  VIDEO  J
                000152                  .DEMP   =152
        002022  000152                  DEMP:   .WORD   152             ;DISABLE REVERSE VIDEO  SJ

                000137                  .IABT   =137
        002024  000137                  IABT:   .WORD   137             ;INITIALIZE ABORT FLAG  -

                                        ;************************************************************
        002026  000003                          .WORD   3               ;TABLE DELIMITER (ESCAPE P)
                                        ;************************************************************

                000131                  .EAPNT  =131
        002030  000131                  EAPNT:  .WORD   131             ;ENABLE AUTO PRINT MODE  Y
                000171                  .DAPNT  =171
        002032  000171                  DAPNT:  .WORD   171             ;DISABLE AUTO PRINT MODE  SY

                000111                  .EINST  =111
        002034  000111                  EINST:  .WORD   111             ;ENABLE INSERT  I
```

```
                000151                  .ERPL   =151
```

```
002036  000151                  ERPL:   .WORD   151             ;ENABLE REPLACE  SI



                                ;**************************************************************
002040  000004                          .WORD   4               ;TABLE DELIMITER (I/O)
                                ;**************************************************************

        054433                  .DCRAD  =054433
002042  054433                  DCRAD:  .WORD   054433          ;DIRECT CURSOR ADDRESSING
        067467                  .R23C79 =067467
002044  067467                  R23C79: .WORD   067467          ;CURSOR TO LOWER RIGHT
002046  000000                          .WORD   0

002050  047433                  RCUR:   .WORD   047433          ;DIRECT CURSOR ADDRESSING
        000131                  .Y      =131
        000131                  .RDCUR  =00131
002052  000131                  RDCUR:  .WORD   00131           ;READ CURSOR POSITION  Y
002054  000000                          .WORD   0

        000117                  .O      =117
002056  047433                  ESCO:   .WORD   047433          ;ESCAPE O
        000126                  .XMTAL  =000126
002060  000126                  XMTAL:  .WORD   000126          ;TRANSMIT ALL  V
002062  000000                          .WORD   0

002064  047433                          .WORD   047433          ;ESCAPE O
        000127                  .TCUCH  =127
002066  000127                  TCUCH:  .WORD   127             ;XMIT CHARACTER AT CURSOR.  W
002070  000000                          .WORD   0

002072  047433                          .WORD   047433          ;ESCAPE O
        000135                  .TXRCK  =135
002074  000135                  TXRCK:  .WORD   135             ;XMIT RECIEVER CHECKSUM ]
002076  000000                          .WORD   0

002100  047433                          .WORD   047433          ;ESCAPE O
        000136                  .TXTCK  =136
002102  000136                  TXTCK:  .WORD   136             ;XMIT TRANSMITTER CHECKSUM
002104  000000                          .WORD   0

002106  147433                          .WORD   147433          ;ESCAPE O
        000140                  .RABT   =140
002110  000140                  RABT:   .WORD   140             ;READ THE ABORT FLAG.  \
002112  000000                          .WORD   0


                                ;**************************************************************
002114  177777                          .WORD   -1              ;END OF TABLE TERMINATOR
                                ;**************************************************************

                                ;**************************************************************
                                        ;PERIPHERAL COMMANDS
                                ;**************************************************************

        000135                  .CPYSC  =135            ;COPY SCREEN  ]
        000136                  .ENAC   =136            ;ENABLE AUTO COPY MODE  ESC ↑
```

```
        000137                  .DISAC  =137            ;DISABLE AUTO COPY MODE  ESC -
        000150                  .PSCRN  =000150         ;PRINT THE SCREEN  H/SH



                                ;**************************************************************
                                        ;ESCAPE CODE EQUIVALENCES AND IDENTIFIERS
```

```
                                                L02
                        ;*************************************************************
        000033          .ESC    =033                    ;PRIMARY ESCAPE CODE.
        000120          .P      =120
002116  050033          ESCP:   .WORD   050033          ;ESCAPE P
        000124          .TSTER  =124
002120  000124          TSTER:  .WORD   124             ;TEST TERMINAL(ESC O T)
        002042          ESCYI   =DCRAD                  ;ESCYI EQUALS DCRAD/DCRADI
        000057          SLSH    =000057                 ;SLASH CODE FOR TERMINAL  IDENT ESC.
        000106          CKGP    =106                    ;ENABLE REC.TO SUB 137 FROM ALL REC DATA
        000107          NCKGP   =107                    ;ENABLE NORMAL RECEIVED DATA.
        000171          CPABRT  =171                    ;COPIER ABORT
        000172          PRABRT  =172                    ;PRINTER ABORT
        000170          NABRT   =170                    ;NO ABORT  SX
002122  000000          IDENT:  .WORD   0               ;VT61 IDENT CODE
        002056          ESCOI   =ESCO
        002116          ESCPI   =ESCP
        002124          ESCZI   =ESCZ
        055033          .ESCZ   =055033
002124  055033          ESCZ:   .WORD   055033          ;OCTAL EQUIV. OF ESZ SEQUENCE
        000122          .RESET  =122
002126  000122          RESET:  .WORD   122             ;VT61 INITIALIZE R

002130  000033          ESCN:   .WORD   000033          ;ESCAPE N-FLAG
002132  020041          R01C00: .WORD   020041          ;ROW1,COL. 0
002134  032041          R01C20: .WORD   032041          ;ROW01,COLUMN 20
002136  020066          R22C00: .WORD   020066          ;ROW22,COL.00
002140  020054          R12C00: .WORD   020054          ;ROW 12,COLUMN 00
        020067          .R23C00 =020067
002142  020067          R23C00: .WORD   020067          ;ROW23,COL.00
        025440          .R00C11 =025440
002144  025440          R00C11: .WORD   025440          ;ROW,COL.11
        032040          .R00C20 =032040
002146  032040          R00C20: .WORD   032040          ;ROW 0,COLUMN 20
002150  024040          R00C08: .WORD   024040          ;ROW 00,COLUMN 8
002152  020040          CUHME:  .WORD   020040          ;OCTAL EQUIV. OF CURSOR HOME.
002154  067440          R00C80: .WORD   067440          ;ROW 0, COLUMN 80.
002156  067067          R23C78: .WORD   067067          ;ROW 23,COL. 78.
        000040          .R00    =40                     ;ROW 0
        000041          .R01    =41                     ;ROW 1
        000054          .R12    =54                     ;ROW 12
        000066          .R22    =66                     ;ROW 22
        000067          .R23    =67                     ;ROW 23
        000040          .C00    =40                     ;COLUMN 0
        000043          .C03    =43                     ;COL. 3
        000050          .C08    =50                     ;COL. 8
        000053          .C11    =53                     ;COL. 11
        000064          .C20    =64                     ;COL. 20
        000065          .C21    =65                     ;COL. 21
        000110          .C40    =110                    ;COL. 40
```

```
        000157          .C79    =157                    ;COL. 79

                        ;*************************************************************
                                ;TEMPORARY STORAGE LOCATIONS AND
                                ;SPECIAL RECEIVE CODE EQUIVALENCES.
                        ;*************************************************************
        000002          SOM     =02                     ;START OF MESSAGE
        000004          EOM     =04                     ;END OF MESSAGE
        000023          XOFF    =23                     ;TURN OFF TRANSMISSION
        000021          XON     =21                     ;TURN ON TRANSMISSION
002160  000000          CHRD:   .WORD   0               ;STORAGE FOR SINGLE CH. READ
```

```
002162  000000                  SVER1:  .WORD                   ;TEMP. STORAGE R1.
002164  000000                  SVER2:  .WORD                   ;TEMP. STORAGE R2.
002166  000000                  ZERO:   .WORD   0               ;MUST BE LEFT AS ZERO.
002170  003000                  TYP6:   .WORD   3000            ;TYPE 6 OCTAL CHAR-NO ZEROS
002172  000000                  TSTPTR: .WORD   0               ;TEST POINTER IN MANUAL SELECT MODE
002174  000000                  MODE:   .WORD   0               ;BYTE0=TESTING MODE,BYTE1=INTERFACE TYPE
002176  000000                  FTLCNT: .WORD   0               ;COUNT OF INCOMPLETE XMITS.
002200  000012                  ALWCNT: .WORD   10.             ;# OF ALLOWABLE INCOMPLETE XMITS.
002202  000001                  ONE:    .WORD   1
002204  000000                  TOADD:  .WORD
002206  000000                  BUBCT:  .WORD
002210  000000                  TPREG:  0
002212  000000                  PRESC:  .WORD                   ;PRIMARY ESC COMMAND
002214  000000                  ESSEQ:  .WORD                   ;SEQUENCE ASSEMBLY AREA
002216  000000                  DLAY:   .WORD
002220  000000                  ROSVE:  .WORD                   ;TEMP STORAGE FOR RO ONLY.
002222  000000                  VSTAT:  .WORD   0
002224  000000                  BLKM:   .WORD   0               ;FLAG LOCATION FOR BLOCK MODE XMITS.
002226  000000                  TSTNM:  .WORD   0               ;DISPLAY STORAGE FOR TEST NUMBER.


                                ;*********************************************************
                                        ;AUTOMATIC SELECTION OF UNITS. TESTS 1 THROUGH 33 WILL BE
                                        ;REPITIVELY EXECUTED FOR ALL UNITS.
                                ;*********************************************************

002230  005037  002174          AUTO:   CLR     MODE            ;ZERO THE MODE SWITCH
002234  000137  011604                  JMP     SETA            ;;DO VECTOR SETUP
002240  004037  012122          AUTOA:  JSR     RO,TRPVEC       ;GO FIND GOOD DL11S
002244  004037  012242                  JSR     RO,CDEV         ;CHECK DL11S FOUND
002250  004037  012620                  JSR     RO,INITA        ;INSURE VT61S ON DL11
002254  000137  002502                  JMP     MODCK           ;VT61 PRESENT -BEGIN TESTING
002260  000767                          BR      AUTOA           ;NO VT61 FOUND LOOP IN CHECKING

                                ;*********************************************************

                                        ;MANUAL UNIT AND TEST SELECTION.  UNITS CAN BE
                                        ;SELECTED VIA CONSOLE OR AUTO SELECTION CAN
                                        ;BE UTILIZED.  TESTS ENTERED VIA CONSOLE WILL
                                        ;BE EXECUTED IN THE ORDER ENTERED.

                                ;*********************************************************

002262  012737  000001  002174  MANS:   MOV     #1,MODE         ;SET MODE TO MANUAL SELECT.
002270  000137  011604                  JMP     SETA            ;GO SET UP CONSTANTS
```

```
002274  104400  023051          MANSA:  TYPE    ,DMANA
002300  004037  012122                  JSR     RO,TRPVEC       ;FIND GOOD DL11'S
002304  012703  001650                  MOV     #INTAB,R3
002310  005002                  BLDADD: CLR     R2

002312  004037  017406          BLDADA: JSR     RO,GTNUM        ;GET A KEYBOARD INPUT
002316  120127  000054                  CMPB    R1,#54          ;CHAR. = COMMA?
002322  001002                          BNE     1$              ;NO
002324  010223                          MOV     R2,(R3)+        ;YES - STORE THIS ADDRESS
002326  000770                          BR      BLDADD          ;AND LOOK FOR ANOTHER ADDRESS
002330  120137  001752          1$:     CMPB    R1,LNFED        ;CHAR. = LINE FEED?
002334  001022                          BNE     3$              ;NO
002336  005702                          TST     R2              ;ANY ENTRIES CREATED?
002340  001411                          BEQ     2$              ;NO USE AUTO SELECTION OF UNITS
002342  010223                          MOV     R2,(R3)+        ;YES STORE LAST ADDRESS,
002344  013723  002166                  MOV     ZERO,(R3)+      ;SET ATERMINATOR IN TABLE
```

N02

```
002350  004037  012242                    JSR     R0,CDEV           ;CHECK DL11 ON VT 61 SELECTED
002354  005737  001610                    TST     DLTBL             ;ANY DL11S GOOD?
002360  001745                            BEQ     MANSA             ;NO-BACK TO SQUARE ONE
002362  000412                            BR      BLDTST            ;YES- GO GET TESTS
002364  004037  012242            2$:     JSR     R0,CDEV           ;CHECK DL11'S
002370  004037  012620                    JSR     R0,INITA          ;VERIFY DL11 HAVE VT61 ATTACHED
002374  000137  002410                    JMP     BLDTST            ;BEGIN TEST SELECTION
002400  000735                            BR      MANSA             ;NO UNIT FOUND-LOOP
002402  004037  017342            3$:     JSR     R0,OCTBIN         ;KEEP BUILDING ADDRESS
002406  000741                            BR      BLDADA

002410  104400  023151            BLDTST: TYPE    ,DMANB            ;TYPE 2ND PART OF MANUAL MESSAGE
002414  012703  001650                    MOV     #INTAB,R3         ;USE INTAB AS TEST # STORAGE.
002420  005004                            CLR     R4                ;CLEAR TEST COUNTER
002422  005002                    11$:    CLR     R2                ;CLEAR ASSEMBL WORD
002424  004037  017406            10$:    JSR     R0,GTNUM          ;GET A NUMERIC CHAR.
002430  120127  000054                    CMPB    R1,#54            ;CHAR.=COMMA?
002434  001006                            BNE     1$                ;NO
002436  110223                            MOVB    R2,(R3)+          ;YES STORE A TEST #
002440  005204                            INC     R4                ;AND INCREMENT TEST COUNT.
002442  020437  000040                    CMP     R4,32.            ;COUNT =32?
002446  001415                            BEQ     MODCK             ;YES ACCEPT NO MORE ENTRIES.
002450  000764                            BR      11$               ;NO KEEP LOOKING
002452  120137  001752            1$:     CMPB    R1,LNFED          ;CHAR. = LINE FEED?
002456  001006                            BNE     2$                ;NO
002460  110223                            MOVB    R2,(R3)+          ;LOAD THE LAST TEST
002462  105013                            CLRB    (R3)              ;AND INSERT TEST TABLE TERMINATOR
002464  112737  000001  002174            MOVB    #1,MODE           ;SET MODE SWITCH TO MANUAL
002472  000403                            BR      MODCK             ;AND BEGIN TESTING.

002474  004037  017342            2$:     JSR     R0,OCTBIN         ;CONVERT CHAR.
002500  000751                            BR      10$


                                  ;*************************************************************
                                          ;THIS ROUTINE LOOKS FOR THE OPERATIONAL MODE REQUESTED AND
                                          ;SELECTS THE NEXT UNIT TO BE TESTED.

                                          ;MODE 0 = ACCEPTANCE TYPE TEST
                                          ;MODE 1 = OPERATOR SELECTION OF UNITS AND SEQUENCE OF TESTS.
                                  ;*************************************************************
```

```

002502  012737  001610  001712    MODCK:  MOV     #DLTBL,DLTPT      ;INITIAL SETUP OF ADDRESS
002510  012737  001550  001710            MOV     #VVECT,VECPT      ;AND VECTOR POINTERS.
002516  012701  001730            MODCA:  MOV     #VRCSR,R1         ;LOAD ADDRESS DESTINATION
002522  013702  001712                    MOV     DLTPT,R2          ;LOAD CURRENT ADDRESS POINTER
002526  017703  177156                    MOV     @VECPT,R3         ;LOAD CURRENT VECTOR POINTER
002532  005712                            TST     (R2)              ;ALL UNITS CHECKED?
002534  001013                            BNE     1$                ;NO - CONTINUE
002536  005737  002174                    TST     MODE              ;CHECK MODE
002542  001002                            BNE     10$
002544  000137  002240                    JMP     AUTOA             ;GO RESTART AUTO MODE
002550  105777  177416            10$:    TSTB    @TSTPTR           ;MANUAL LOOP REQUESTED?
002554  100001                            BPL     2$                ;NO
002556  000751                            BR      MODCK             ;YES-RESTART COMPLETE TEST.
002560  000137  002274            2$:     JMP     MANSA             ;GO RESTART MANUAL MODE
002564  004037  013040            1$:     JSR     R0,LDADD          ;NO-LOAD NEXT ADDRESSES
002570  010337  001740                    MOV     R3,VECT           ;STORE VECT. OF UNIT UNDER TEST
002574  012723  013746                    MOV     #INTRC,(R3)+      ;YES - NOW SET UP RECEIVE VECTOR
002600  012723  000340                    MOV     #340,(R3)+        ;AND SET RECEIVER PSW TO 7
002604  012723  014670                    MOV     #INTXM,(R3)+      ;SET UP TRANSMIT VECTOR
002610  012723  000340                    MOV     #340,(R3)+        ;AND SET PSW TO 7.
```

```
002614  005046                          CLR     -(SP)     B03  ;CLEAR THE PSW,LSI11 STYLE.
002616  012746  002624                  MOV     #100$,-(SP)
002622  000002                          RTI
002624  010237  001712          100$:   MOV     R2,DLTPT        ;SAVE ADDRESS POINTER.
002630  012737  030327  014632          MOV     #RCRLB+477,REBUF        ;SET UP END OF BUFFER
002636  012737  031027  015140          MOV     #TCRLB+477,TEBUF
002644  012737  027630  014630          MOV     #RCRLB,RBBUF    ;INITIIALIZE REC.BUFFER.
002652  012737  030330  015136          MOV     #TCRLB,TBBUF    ;INITIALIZE TRANSMIT BUFFER.
002660  004037  016136                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
002664  005037  002224                  CLR     BLKM            ;CLEAR BLOCK MODE FLAG.
002670  005037  020466                  CLR     XMZER           ;CLEAR ZERO TRANSMIT FLAG
002674  005037  002222                  CLR     VSTAT           ;CLEAR ALL INTERRUPT FLAGS
002700  004037  015326                  JSR     R0,ZFLAG        ;ISSUE ESC Z TO VT61
002704  012637  002122                  MOV     (SP)+,IDENT     ;;POP STACK INTO IDENT
002710  100002                          BPL     11$             ;IF IDENT IS -1,CLEAR IT.
002712  005037  002122                  CLR     IDENT
002716                          11$:
002716  012637  002160                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
002722  001375                          BNE     11$
002724  104400  001167                  TYPE    ,$CRLF
002730  104400  024652                  TYPE    ,DVUNIT         ;ISSUE UNIT UNDER TEST MESSAGE
002734  013746  001730                  MOV     VRCSR,-(SP)     ;;SAVE VRCSR FOR TYPEOUT
                                                                ;;TYFE THE ADDRESS
002740  104402                          TYPOS                   ;;GO TYPE--OCTAL ASCII
002742     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
002743     001                          .BYTE   1               ;;TYPE LEADING ZEROS
002744  017746  176740                  MOV     @VECPT,-(SP)    ;;SAVE @VECPT FOR TYPEOUT
                                                                ;;TYPE THE VECTOR
002750  104402                          TYPOS                   ;;GO TYPE--OCTAL ASCII
002752     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
002753     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
002754  013746  002122                  MOV     IDENT,-(SP)     ;;SAVE IDENT FOR TYPEOUT
                                                                ;;TYPE THE IDENT
002760  104402                          TYPOS                   ;;GO TYPE--OCTAL ASCII
002762     006                          .BYTE   6               ;;TYPE 6 DIGITS
```

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002763     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
002764  104400  001167                  TYPE    ,$CRLF          ;CARRIAGE RETURN AND LINE FEED
002770  032737  000001  002122          BIT     #BIT00,IDENT    ;UNIT HAVE A COPIER?
002776  001402                          BEQ     20$             ;NO
003000  104400  024771                  TYPE    ,DCOPYR         ;YES-ISSUE COPIER MESSAGE
003004  032737  000002  002122  20$:    BIT     #BIT01,IDENT    ;UNIT HAVE A PRINTER?
003012  001402                          BEQ     21$             ;NO
003014  104400  024743                  TYPE    ,DPRTR          ;YES-ISSUE PRINTER MESSAGE.
003020  062737  000002  001710  21$:    ADD     #2,VECPT        ;LEAVE WITH VECPOINT AT NEXT VECTOR.
003026  005037  002176                  CLR     FTLCNT          ;CLEAR COUNT OF FATAL XMITS.
003032  012737  031032  031030          MOV     #ABBUF,ABUFP    ;RESET THE REC. DATA POINTER
003040  052777  000100  176662          BIS     #RDENA,@VRCSR   ;SET THE REC. INT. ENABLE  FOR TESTS
003046  105737  002174                  TSTB    MODE            ;CHECK TESTING MODE
003052  001403                          BEQ     ASTRT           ;AUTO MODE
003054  012737  001650  002172          MOV     #INTAB,TSTPTR   ;LOAD THE INITIAL TEST NUMBER

                                ;*************************************************************
                                ;*************************************************************
                                        ;THIS TEST ISSUES ALL ESCAPE SEQUENCES AND
                                        ;INSURES THE VT61 HAS NOT FAILED DURING AN
                                        ;ESC SEQUENCE BY ISSUING A ESC Z TO FORCE A
                                        ;VT61 RESPONSE.  THE PURPOSE OF THE TEST IS TO ATTEMPT TO
                                        ;INSURE THAT SUBSEQUENT TESTS WILL NOT RESULT IN
                                        ;A "HUNG" UNIT.  DATA IS NOT EVALUATED.
                                ;*************************************************************

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```
003062                                  ASTRT:
                                        ;***************************************************************
003062  000004                          TST1:   SCOPE
003064  012737  000001  001156                  MOV     #1,$TIMES       ;;DO 1 ITERATION
003072  012737  003100  001106                  MOV     #ESTST,$LPADR   ;;SET SCOPE LOOP ADDRESS

003100  012701  001746                  ESTST:  MOV     #BEL,R1         ;POINT TO FIRST COMMAND
003104  042777  000100  176616                  BIC     #RDENA,@VRCSR   ;CLEAR REC. INT. ENABLE
003112  113737  001102  002226                  MOVB    $TSTNM,TSTNM    ;LOAD THE TEST NUMBER.
003120  005037  002212                          CLR     PRESC
003124  005004                                  CLR     R4
003126                                  ZERST:
003126  013746  002166                          MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
003132  012702  002212                          MOV     #PRESC,R2       ;SET UP SEQNENCE ADDRESS
003136  012103                          GCMD:   MOV     (R1)+,R3        ;LOAD THE COMMAND
003140  001405                                  BEQ     1$              ;IF CHAR. ZERO,MUST BE XMIT TERMINATOR
003142  100535                                  BMI     ESTEX           ;TABLE EXPENDED - EXIT TEST.
003144  120327  000004                          CMPB    R3,#4           ;IS COMMAND ACTUALLY A DELIMITER?
003150  103442                                  BLO     DELIM           ;YES, GO UPDATE FUNCTIONS
003152  001471                                  BEQ     SPTN            ;NO, ITS A "10" - SPECIAL CASE.
003154  005704                          1$:     TST     R4              ;SEE IF FLAG INDICATING SEQ.
003156  100472                                  BMI     SEQ4            ;4 IS SET. - YES EXIT
003160  010337  002214                  2$:     MOV     R3,ESSEQ        ;PUSH THE SEQUENCE TO BE TESTED
003164                                  INXMT:
003164  013746  002214                          MOV     ESSEQ,-(SP)     ;;PUSH ESSEQ ON STACK
003170  005704                                  TST     R4              ;DOES THIS SEQUENCE REQUIRE
003172  001402                                  BEQ     3$              ;ADDITIONAL ESC?
003174  013746  002212                          MOV     PRESC,-(SP)     ;;PUSH PRESC ON STACK

003200  004037  013322                  3$:     JSR     R0,TESC         ;GO TRANSMIT THIS SEQUENCE.
```

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003204  005704                          4$:     TST     R4              ;IN I/O SEQUENCES?
003206  100007                                  BPL     40$             ;NO
003210  012737  000054  017074                  MOV     #44.,DCOUNT     ;YES,SET UP TO DELAY 1+ SEC.
003216  004037  017032                          JSR     R0,DELAY
003222  005777  176504                          TST     @VRBUF          ;CLEAR ANY RECEIVE FLAGS

003226  004037  015326                  40$:    JSR     R0,ZFLAG        ;ISSUE ESC Z SEQUENCE-GET IDENT
003232                                  5$:
003232  012637  002160                          MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
003236  123737  002160  002122                  CMPB    CHRD,IDENT      ;HAVE WE POPPED THE IDENT?
003244  001045                                  BNE     T!ERR           ;NO-ERROR CONDITION
003246                                  POPIT:
003246  012637  002160                          MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
003252  001375                                  BNE     .-4
003254  000724                                  BR      ZERST           ;GET NEXT COMMAND

003256  120327  000001                  DELIM:  CMPB    R3,#1
003262  001407                                  BEQ     1$              ;FIRST DELIMITER - SET ESCN

003264  120327  000002                          CMPB    R3,#BIT01       ;SECOND DELIMITER - SET ESCO
003270  001412                                  BEQ     2$

003272  120327  000003                          CMPB    R3,#3           ;THIRD DELIMITER - SET ESCP
003276  001413                                  BEQ     3$
003300  000716                                  BR      GCMD            ;INVALID CHARACTER - GET ANOTHER

003302  012704  000001                  1$:     MOV     #1,R4           ;SET FIRST DELIMITER FLAG.
003306  013737  002130  002212                  MOV     ESCN,PRESC      ;INSERT ESCN.
003314  000710                                  BR      GCMD

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003316  013737  002056  002212  2$:     MOV     ESCO,@#PRESC    ;INSERT ESCO
003324  000704                          BR      GCMD

003326  013737  002116  002212  3$:     MOV     ESCP,@#PRESC    ;INSERT ESCP
003334  000700                          BR      GCMD

003336  012704  177777          SPTN:   MOV     #-1,R4          ;SET FLAG INDICATING I/O
003342  000675                          BR      GCMD            ;SEQUENCES.

003344  005703                  SEQ4:   TST     R3              ;CHECK IF COMMAND = 0
003346  001706                          BEQ     INXMT           ;YES, COMPLETE SEQUENCE ASSEMBLED
003350  110322                          MOVB    R3,(R2)+        ;NO - KEEP ASSEMBLING
003352  000303                          SWAB    R3              ;POSITION HIGH  ORDER BIT
003354  110322                          MOVB    R3,(R2)+        ;AND ASSEMBLE IT
003356  000667                          BR      GCMD            ;GET ANOTHER BYTE

003360  004037  015530          T1ERR:  JSR     R0,CLREG
003364  013737  002212  001124          MOV     PRESC,$GDDAT    ;AND INSERT IN ERROR
003372  000337  001124                  SWAB    $GDDAT          ;REASSEMBLE FAILING SEQUENCES
003376  013737  002214  C01126          MOV     ESSEQ,$BDDAT
003404  105737  002215                  TSTB    ESSEQ+1         ;IF UPPER BYTE IS CLEAR DO NOT SWAP
003410  001402                          BEQ     1$
003412  000337  0u1126                  SWAB    $BDDAT          ;MESSAGE 1
003416  104001                  1$:     ERROR   1               ;ISSUE ERROR MESSAGE
003420  005237  002176                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
```

```
003424  023737  002176  002200          CMP     FTLCNT,ALWCNT   ;FATAL XMITS EXCEEDED ALLOWED?
003432  103003                          BHIS    FTEX1           ;YES-EXIT.
003434  000704                          BR      POPIT           ;CLEAR THE STACK AND TRY ANOTHER COMMAND
003436                          ESTEX:
003436  012637  002160                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
003442  052777  000100  176260  FTEX1:  BIS     #RDENA,@VRCSR   ;SET THE REC. INT. ENABLE FOR TESTS

                                ;*******************************************************
                                        ;ROUTINE TO INSURE ENTERING MAINTENANCE MODE CAUSES SOM AND
                                        ;EOM TO BE APPENDED TO ALL TRANSMITS FROM VT61 UNDER TEST.
                                        ;MAINTENANCE MODE IS ENTERED , THEN AN ESCAPE Z SEQUNECE
                                        ;IS ISSUED TO THE UNIT AND THE RESULTING TRANSMISSION IS
                                        ;CHECKED OF SOM/EOM.
                                ;*******************************************************

                                ;*******************************************************
003450  000004                  TST2:   SCOPE
003452  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
003460  012737  003466  001106          MOV     #CKMNT,$LPADR   ;;SET SCOPE LOOP ADDRESS

003466  004037  015146          CKMNT:  JSR     R0,RESETV       ;RESET THE UNIT AND SETMAINT. MODE.
003472  112777  000002  011442          MOVB    #SOM,@TBUFP     ;ISSUE START OF MESSAGE.
003500  004037  016026                  JSR     R0,XMIT1
003504  113777  002124  011430          MOVB    ESCZ,@TBUFP
003512  004037  016026                  JSR     R0,XMIT1        ;SEND AN IDENT REQUEST.
003516  113777  002125  011416          MOVB    ESCZ+1,@TBUFP
003524  004037  016026                  JSR     R0,XMIT1
003530  112777  000004  011404          MOVB    #EOM,@TBUFP     ;ISSUE END OF MESSAGE.
003536  004037  016026                  JSR     R0,XMIT1
003542  005037  002216                  CLR     DLAY            ;SET UP SOM DELAY OF 100M.S.
003546  032737  040000  002222  1$:     BIT     #RSOM,VSTAT     ;RECEIVED THE START OF MESSAGE?
003554  001003                          BNE     CKEOM           ;YES-GO LOOK FOR EOM.
003556  005337  002216                  DEC     DLAY            ;NO-RUN TIMEOUT DELAY
003562  001371                          BNE     1$              ;AND KEEP LOOKING.

003564  012701  000062          CKEOM:  MOV     #50.,R1         ;SET MAX DELAY FOR 500 M.S.
```

E03

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003570  032737  020000  002222  1$:     BIT     #REOM,VSTAT     ;REECIVED END OF MESSAGE?
003576  001007                          BNE     10$             ;YES-CHECK FOR BOTH RECEIVED.
003600  012737  000001  017074          MOV     #1,DCOUNT       ;DELAY FOR 10 M..S.
003606  004037  017032                  JSR     R0,DELAY
003612  005301                          DEC     R1              ;AND KEEP LOOKING.
003614  001365                          BNE     1$
003616  032737  040000  002222  10$:    BIT     #RSOM,VSTAT     ;RECEIVED SOM?
003624  001404                          BEQ     2$              ;NO ISSUE ERROR
003626  032737  020000  002222          BIT     #REOM,VSTAT     ;RECEIVED EOM?
003634  001007                          BNE     EXMNT           ;YES, NO ERRORS-EXIT.
003636  012737  006001  001124  2$:     MOV     #6001,$GDDAT    ;LOAD ERROR WITH EXPECTED
003644  013737  002222  001126          MOV     VSTAT,$BDDAT    ;AND ACTUAL STATUS.
003652  104022                          ERROR   22

003654  000240                  EXMNT:  NOP
                                ;*******************************************************
                                        ;THIS TEST INSURES THAT THE CURSOR WILL RESPOND
                                        ;TO DIRECT CUSROR ADDRESSING. THE UNIT IS RESET AND THE CURSOR
                                        ;POSITION IS VERIFIED TO BE HOME . THE CURSOR IS THEN MOVED
                                        ;TO POSITION ROW 23 COLUMN 80 AND THE POSITION IS AGAIN
```

```
                                        ;VERIFIED. ERRORS ARE REPORTED IF THE POSITIONS ARE INCORRECT.

                                ;*******************************************************



                                ;*******************************************************
003656  000004                  TST3:   SCOPE
003660  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
003666  012737  003674  001106          MOV     #CURS1,$LPADR   ;;SET SCOPE LOOP ADDRESS

003674  013701  015136          CURS1:  MOV     TBBUF,R1        ;USE R1 AS XMIT BUFFER POINTER.
003700  004037  015146                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
003704  013721  002056                  MOV     ESC0I,(R1)+     ;CLFT. RESET, READ CURSOR
003710  113721  002052                  MOVB    RDCUR,(R1)+     ;POSITION, CURSOR LEFT.
003714  012737  000003  015144          MOV     #3,XMCNT        ;XMIT 3 BYTES

003722  004037  015552                  JSR     R0,XMREC        ;XMIT AND RECEIVE.
003726  000402                          BR      10$             ;NORMAL EXIT.
003730  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
003732  000446                          BR      2$              ;EXIT TEST.
003734  013701  027630          10$:    MOV     RCRLB,R1        ;GET THE CURRENT CURSOR POSITION.
003740  020137  002152                  CMP     R1,CUHME        ;CURSOR REALLY HOME?
003744  001405                          BEQ     1$              ;YES EXIT
003746  104012                          ERROR   12              ;VT61 FAILURE MESSAGE
003750  013746  002152                  MOV     CUHME,-(SP)     ;;PUSH CUHME ON STACK
003754  004037  016216                  JSR     R0,CURER        ;GO LOAD AND ISSUE CURSOR ERROR

003760  013701  015136          1$:     MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
003764  013721  002042                  MOV     DCRAD,(R1)+
003770  013721  002044                  MOV     R23C79,(R1)+    ;CURSOR TO ROW 23,COL.79
003774  013721  002056                  MOV     ESC0I,(R1)+     ;READ CURSOR POSITION
004000  013721  002052                  MOV     RDCUR,(R1)+     ;IT AND CURSOR RIGHT
004004  012737  000007  015144          MOV     #7,XMCNT        ;XMIT 7 BYTES.
004012  004037  015552                  JSR     R0,XMREC        ;XMIT AND RECEIVE
004016  000402                          BR      20$             ;NORMAL EXIT.
004020  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
004022  000412                          BR      2$              ;EXIT TEST.
004024  012701  027630          20$:    MOV     #RCRLB,R1

004030  023711  002044                  CMP     R23C79,(R1)     ;CHECK CURSOR POSITION TO LOWER RT.
004034  001405                          BEQ     2$              ;OK, EXIT
```

F03

```
004036  104012                           ERROR   12              ;VT61 FAILURE MESSAGE
004040  013746  002044                   MOV     R23C79,-(SP)    ;;PUSH R23C79 ON STACK
004044  004037  016216                   JSR     R0,CURER        ;LOAD AND ISSUE CURSOR ERROR .
004050  000240                   2$:     NOP

                                 ;*******************************************************
                                         ;ROUTINE TO INSURE THE UNIT CAN ENTER LINEAR ADDRESSING
                                         ;MODE.  81 CHARACTERS ARE ISSUED TO THE UNIT UNDER TEST
                                         ;THEN THE CURSOR POSITION IS READ AND MUST BE ROW1,COL.0.
                                 ;*******************************************************

                                 ;*******************************************************
004052  000004                   TST4:   SCOPE
004054  012737  000005  001156           MOV     #5,$TIMES       ;;DO 5 ITERATIONS
004062  012737  004070  001106           MOV     #CKLIN,$LPADR   ;;SET SCOPE LOOP ADDRESS

```

```
004070  004037  015146           CKLIN:  JSR     R0,RESETV       ;RESET THE UNIT-SET MAINT AND LINEAR MODES
004074  013701  015136                   MOV     TBBUF,R1
004100  012703  000120                   MOV     #80.,R3
004104  004037  017076                   JSR     R0,BLDINC       ;LOAD XMIT BUFFER WITH 80 CHAR AND
004110  013721  002050                   MOV     RCUR,(R1)+
004114  013721  002052                   MOV     RDCUR,(R1)+     ;READ CURSOR POSINION.
004120  012737  000123  015144           MOV     #83.,XMCNT
004126  004037  015552                   JSR     R0,XMREC        ;XMIT THE BUFFER.
004132  000402                           BR      1$
004134  104011                           ERROR   11              ;LAST XMIT CAUSED UNIT TO HANG.
004136  000421                           BR      LINXT           ;EXIT TEST
004140  023777  002132  010462   1$:     CMP     R01C00,@RBBUF   ;CURSOR  AT ROW1,COL. 0?
004146  001415                           BEQ     LINXT           ;YES-EXIT
004150  013737  002056  001124           MOV     ESC0,$GDDAT
004156  000337  001124                   SWAB    $GDDAT
004162  013737  002012  001126           MOV     DRECT,$BDDAT    ;ISSUE ESC SEQUENCE AND CURSOR
004170  104001                           ERROR   1
004172  013746  002132                   MOV     R01C00,-(SP)    ;;PUSH R01C00 ON STACK
004176  004037  016216                   JSR     R0,CURER
004202  000240                   LINXT:  NOP


                                 ;*******************************************************
                                         ;TEST TO INSURE OPERATION OF XON/XOFF COMMANDS
                                         ;FROM VT61. XOFF IS FORCED BY TRANSMITTING LINE 23 WHILE SIMUL-
                                         ;TANEOUSLY FILLING THE SILO WITH DATA. AFTER SENSING
                                         ;THE XOFF, THE TEST WAITS FOR THE TRANSMIT TO FINISH AND
                                         ;INSURES XON OCCURS BEFORE THE MAX. TRANSFER TIME HAS ELAPSED.
                                         ;(30 SECONDS)
                                 ;*******************************************************

                                 ;*******************************************************
004204  000004                   TST5:   SCOPE
004206  012737  000010  001156           MOV     #10,$TIMES      ;;DO 10 ITERATIONS
004214  012737  004222  001106           MOV     #BASC3,$LPADR   ;;SET SCOPE LOOP ADDRESS
004222  013701  015136           BASC3:  MOV     TBBUF,R1        ;R1 = 1ST XMIT BUFFER ADDRESS.
004226  012737  001001  002224           MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
004234  005037  002222                   CLR     VSTAT
004240  004037  015146                   JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
004244  013721  002042                   MOV     DCAAD,(R1)+
004250  013721  002142                   MOV     R23C00,(R1)+    ;CURSOR TO ROW 23, COL.0
004254  013721  002056                   MOV     ESC0,(R1)+
004260  013721  002060                   MOV     XMTAL,(R1)+     ;TRANSMIT THE LINE.
004264  012703  000050                   MOV     #40.,R3
004270  004037  017076                   JSR     R0,BLDINC       ;40 CHAR. OF INCREMENTING CHAR.
004274  012737  000057  015144           MOV     #47.,XMCNT      ;SET UP TO XMIT 47 BYTES
```

```
004302  052777  000100  175424          BIS     #TENA,@VXCSR     ;TRANSMIT ENABLES
004310  012703  000050                  MOV     #40.,R3          ;MAXIMUM DELAY EQUAL 400 M.S.
004314  012737  000001  017074  2$:     MOV     #1,DCOUNT
004322  004037  017032                  JSR     R0,DELAY         ;DELAY FOR 10 MILLISEC.
004326  032737  100000  002222          BIT     #RXOFF,VSTAT     ;CHECK FOR XOFF
004334  001007                          BNE     3$               ;FOUND IT EXIT THIS SECTION.
004336  005303                          DEC     R3               ;DELAYED 400 M.S.?
004340  001365                          BNE     2$               ;NO-KEEP LOOKING FOR XOFF.
004342  104012                          ERROR   12               ;GENERAL VT61 FAILURE MESSAGE
004344  012746  100000                  MOV     #100000,-(SP)    ;;PUSH #100000 ON STACK
```

```
004350  004037  015366                  JSR     R0,CKSFT         ;GO REPORT ERROR
004354                          3$:
004354  012746  000001                  MOV     #XMDNE,-(SP)     ;;PUSH #XMDNE ON STACK
004360  012746  000062                  MOV     #50.,-(SP)       ;;PUSH #50. ON STACK
004364  004037  020470                  JSR     R0,WTBGND
004370  000411                          BR      EXIT3            ;TIMEOUT-EXIT TEST.
004372  127727  024432  000021          CMPB    @ABUFP,#XON      ;RECEIVED A XON?
004400  001405                          BEQ     EXIT3            ;YES-NO ERROR-EXIT

004402  104012                          ERROR   12               ;GENERAL VT61 FAILURE MESSAGE
004404  012746  000001                  MOV     #000001,-(SP)    ;;PUSH #000001 ON STACK
004410  004037  015366                  JSR     R0,CKSFT
004414  004037  016136          EXIT3:  JSR     R0,RESPTR        ;RESET INTERRUPT POINTERS.


                                ;*******************************************************
                                        ;ROUTINE TO VERIFY OPERATION OF XOFF AND XON TO THE VT61.
                                        ;A FULL SCREEN TRANSMIT IS INITIATED AND A SERIES OF XOFF AND
                                        ;XON ARE ISSUED TO THE TERMINAL SEQUENTIALLY.
                                        ;ERRORS ARE REPORTED IF XOFF DOES NOT STOP OR XON RESTART
                                        ;THE TRANSMISSION. TEST IS ENDED WHEN EOM IS SENSED.
                                ;*******************************************************

                                ;*******************************************************
004420  000004                  TST6:   SCOPE
004422  012737  000001  001156          MOV     #1,$TIMES        ;;DO 1 ITERATION
004430  012737  004436  001106          MOV     #ONOF61,$LPADR   ;;SET SCOPE LOOP ADDRESS

004436  004037  015146          ONOF61: JSR     R0,RESETV        ;RESET THE UNIT AND WAIT FOR XON.
004442  042737  077577  002222          BIC     #77577,VSTAT     ;CLEAR THE FLAGS
004450  013746  002166                  MOV     ZERO,-(SP)       ;;PUSH ZERO ON STACK
004454  013746  002060                  MOV     XMTAL,-(SP)      ;;PUSH XMTAL ON STACK
004460  013746  002056                  MOV     ESCO,-(SP)       ;;PUSH ESCO ON STACK
004464  004037  013322                  JSR     R0,TESC
004470  012737  000010  017074  ONOFLP: MOV     #10,DCOUNT       ;ALLOW 100 M.S. FOR OPERATION
004476  004037  017032                  JSR     R0,DELAY         ;TO BEGIN.
004502  112777  000023  010432          MOVB    #XOFF,@TBUFP
004510  004037  016026                  JSR     R0,XMIT1         ;SEND A XOFF TO VT61.
004514  012704  000036                  MOV     #30.,R4
004520  013705  031030          OFFLP:  MOV     ABUFP,R5         ;ALLOW 300M.S. FOR XMIT TO CEASE
004524  012737  000001  017074          MOV     #1,DCOUNT
004532  004037  017032                  JSR     R0,DELAY
004536  023705  031030                  CMP     ABUFP,R5
004542  001406                          BEQ     ONOFA            ;XMIT STOPPED-GO RESTART IT.
004544  005304                          DEC     R4
004546  001364                          BNE     OFFLP            ;COUNTER NO EQUAL 300 MS-LOOP
004550  013737  002222  001120          MOV     VSTAT,$GDADR     ;UNIT DID NOT RESPOND TO XOFF
004556  104015                          ERROR   15               ;ISSUE ERROR

004560  112777  000021  010354  ONOFA:  MOVB    #XON,@TBUFP
004566  004037  016026                  JSR     R0,XMIT1         ;SEND A XON TO THE VT61.
004572  012704  000036                  MOV     #30.,R4          ;SET UP FOR 300MS DELAY.
```

```
004576  032737  020000  002222  ONLP:   BIT     #REOM,VSTAT             ;EOM RECEIVED?
004604  001020                          BNE     ONOFXT                  ;YES-EXIT
004606  013705  031030                  MOV     ABUFP,R5
004612  012737  000001  017074          MOV     #1,DCOUNT
004620  004037  017032                  JSR     R0,DELAY                ;ALLOW 300 MS FOR XMIT TO RESTART
```

```
004624  023705  031030                  CMP     ABUFP,R5
004630  001317                          BNE     ONOFLP                  ;IT RESTARTED-GO STOP IT.
004632  005304                          DEC     R4
004634  001360                          BNE     ONLP                    ;NOT YET 300 MS LOOP.
004636  013737  002222  001120          MOV     VSTAT,$GDADR            ;XMIT DIT NOT RESTART-ISSUE
004644  104016                          ERROR   16                      ;ERROR AND EXIT
004646  000240                  ONOFXT: NOP


                                ;*******************************************************************
                                        ;ROUTINE TO TEST VT61 RAM AND THE COMMUNICATION PATHS.
                                        ;THIS ROUTINE ISSUES A SERIES OF PATTERNS(77/100,100/77,
                                        ;52/125,INCREMENTING,AND REV. VIDEO INCREMENTING) TO THE VT61.
                                        ;THE SCREEN IS THEN TRANSMITTED TO THE HOST AND AFTER EACH
                                        ;ITERATION RECEIVED DATA IS CHECKED AND ALL ERRORS(INCLUDING
                                        ;TRANSMISSION) ARE REPORTED.
                                        ;MITTED TO THE HOST COMPUTER AND THE RESULTS ARE CHECKED AND
                                        ;ALL ERRORS(INCLUDING TRANSMISSION) REPORTED.
                                ;*******************************************************************

                                ;*******************************************************************
004650  000004                  TST7:   SCOPE
004652  012737  000001  001156          MOV     #1,$TIMES               ;;DO 1 ITERATION
004660  012737  004666  001106          MOV     #MEM1,$LPADR            ;;SET SCOPE LOOP ADDRESS

004666  004037  015146          MEM1:   JSR     R0,RESETV               ;RESET THE UNIT AND WAIT FOR XON.
004672  005005                          CLR     R5                      ;CLEAR PATTERN OFFSET.
004674  016504  005402          MEMA:   MOV     MPATT(R5),R4            ;LOAD PATTERN TO BE TRANSMMITTED
004700  004037  016136                  JSR     R0,RESPTR               ;RESET POINTERS
004704  042737  077577  002222          BIC     #77577,VSTAT            ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
004712  012702  003600                  MOV     #TOTCH,R2               ;LOAD A COUNT OF SCREEN
004716  112777  000002  010216          MOVB    #SOM,@TBUFP             ;ISSUE START OF MESSAGE.
004724  004037  016026                  JSR     R0,XMIT1
004730  005302                  MEMB:   DEC     R2                      ;DECREMENT XMIT COUNT
004732  001414                          BEQ     10$                     ;COUNT = ZERO?

004734  004037  005350          12$:    JSR     R0,PATGN                ;NO-GENERATE NEXT BYTE TO XMIT.
004740  110477  010176                  MOVB    R4,@TBUFP               ;LOAD THE CHARACTER.
004744  004037  016026                  JSR     R0,XMIT1                ;NO-XMIT ANOTHER BYTE.
004750  023737  002176  002200          CMP     FTLCNT,ALWCNT           ;EXCEEDED FATAL ERROR COUNT?
004756  103764                          BLO     MEMB                    ;NO-CHECK IF ANOTHER TRANSMISSION REQUIRED.
004760  000137  005422                  JMP     MEMXT                   ;YES-GO ABORT TEST.
004764  112777  000004  010150  10$:    MOVB    #EOM,@TBUFP             ;ISSUE END OF MESSAGE.
004772  004037  016026                  JSR     R0,XMIT1
004776  004037  016136                  JSR     R0,RESPTR               ;RESET INTERRUPT POINTERS.

005002  013701  015136                  MOV     TBBUF,R1                ;LOAD XMIT BUFFER WITH
005006  013721  002130                  MOV     ESCN,(R1)+
005012  013721  001760                  MOV     CHOM,(R1)+              ;CURSOR HOME
005016  013721  002124                  MOV     ESCZ1,(R1)+             ;ESCAPE Z
005022  013721  002056                  MOV     ESCO,(R1)+
005026  013721  002060                  MOV     XMTAL,(R1)+             ;TRANSMIT ALL
005032  013711  001752                  MOV     LNFED,(R1)              ;LINE FEED.
005036  012737  000010  015144          MOV     #8.,XMCNT               ;SET UP TO XMIT 8 BYTES
005044  004037  015552                  JSR     R0,XMREC                ;XMIT,WAIT FOR REC. EOM
005050  000402                          BR      1$                      ;NORMAL EXIT
005052  104011                          ERROR   11                      ;LAST TRANSMIT CAUSED VT61 TO HANG
```

```
005054  000562                                BR      MEMXT              ;EXIT TEST
005056  042737  077577  002222     1$:        BIC     #77577,VSTAT       ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005064  005002                                CLR     R2                 ;CLEAR RECEIVE COUNTER.
005066  016504  005402                        MOV     MPATT(R5),R4       ;LOAD PATTERN
005072  012703  030630                        MOV     #TCRLB+300,R3      ;SET UT ERROR STORAGE
005076  013701  014630                        MOV     RBBUF,R1           ;SET UP RECEIVE POINTER
005102  005037  002216             MEMC:      CLR     DLAY               ;SET UP TIME OUT DELAY
005106  013737  014630  014634                MOV     RBBUF,RBUFP        ;RESET RECEIVE POINTER
005114  023701  014634             1$:        CMP     RBUFP,R1           ;RECEIVED A CHAR?
005120  001013                                BNE     MEMD               ;YES-GO CHECK IT.
005122  032737  020000  002222                BIT     #REOM,VSTAT        ;HAVE WE RECEIVED EOM?
005130  001033                                BNE     CKDAT              ;YES, GO CHECK FOR DATA ERRORS
005132  005337  002216                        DEC     DLAY               ;RUN TIME OUT DELAY.
005136  001366                                BNE     1$                 ;NOT EXPIRED-KEEP LOOKING.
005140  005237  002176                        INC     FTLCNT             ;TRANSMISSION FAILED-INCR. FATAL COUNT
005144  104011                                ERROR   11
005146  000525                                BR      MEMXT
005150  005202                     MEMD:      INC     R2                 ;DATA IN. INCREMENT COUNTER
005152  004037  005350                        JSR     R0,PATGN           ;GET GOOD CHARACTER ,PUT IN R4 AND
005156  122705  000010                        CMPB    #10,R5             ;CHECKING REV. VIDEO DATA?
005162  001002                                BNE     1$                 ;NO-DO NOT MODIFY
005164  052704  000200                        BIS     #BIT07,R4          ;YES-FORCE BIT 7.
005170  121104                     1$:        CMPB    (R1),R4            ;COMPARE DATA
005172  001743                                BEQ     MEMC
005174  020227  003600                        CMP     R2,#TOTCH          ;COMPARING LAST CHAR?
005200  001740                                BEQ     MEMC               ;YES-NEVER COUNT AS A ERROR.

005202  020327  030700                        CMP     R3,#TCRLB+350      ;STORED 20 ERRORS?
005206  103335                                BHIS    MEMC               ;YES-STORE NO MORE.
005210  110423                                MOVB    R4,(R3)+           ;STORE THE GOOD DATA.
005212  111123                                MOVB    (R1),(R3)+         ;STORE THE BAD DATA.
005214  010223                                MOV     R2,(R3)+           ;STORE THE RECEIVE COUNT.
005216  000731                                BR      MEMC
005220  022703  030630             CKDAT:     CMP     #TCRLB+300,R3
005224  001415                                BEQ     CKMEM
005226  012701  030630                        MOV     #TCRLB+300,R1      ;LOAD FIRST ERROR ADDRESS.
005232  004037  015530             1$:        JSR     R0,CLREG           ;CLEAR ERROR REGISTERS
005236  112137  001124                        MOVB    (R1)+,$GDDAT       ;LOAD THE GOOD DATA.
005242  112137  001126                        MOVB    (R1)+,$BDDAT       ;LOAD THE ERROR BUFFER
005246  012137  001120                        MOV     (R1)+,$GDADR       ;LOAD RECEIVE COUNT
005252  104004                                ERROR   4                  ;ISSUE DATA ERROR MESSAGE.
005254  020103                                CMP     R1,R3              ;ISSUED ALL ERRORS?
005256  103765                                BLO     1$                 ;NO-CONTINUE

005260  020227  003600             CKMEM:     CMP     R2,#TOTCH          ;DID WE XFER 1920 TIMES?
005264  001406                                BEQ     1$                 ;YES - GO CHECK STATUS
005266  012737  003600  001124                MOV     #TOTCH,$GDDAT      ;NO, PUT GOOD COUNT IN GDDAT
005274  010237  001126                        MOV     R2,$BDDAT          ;AND ACTUAL COUNT IN BDDAT.
005300  104005                                ERROR   5                  ;ISSUE COUNT ERROR.

005302                             1$:
005302  012746  060000                        MOV     #60000,-(SP)       ;;PUSH #60000 ON STACK
005306  004037  015366                        JSR     R0,CKSFT
005312  062705  000002                        ADD     #2,R5              ;INCREMENT PATTERN POINTER
005316  005765  005402                        TST     MPATT(R5)          ;TEST NEXT PATTERN
005322  001437                                BEQ     MEMXT              ;ZERO-END OF TEST EXIT.
```

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005324  100007                                BPL     2$                 ;NOT INCRMENTING PATTERN.
005326  122705  000010                        CMPB    #10,R5             ;SET REVERSE VIDEO?
```

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005332  001004                            BNE     2$                ;NO.
005334  012703  005416                    MOV     #SETREV,R3        ;YES-ENTER REVERSE VIDEO
005340  004037  016076                    JSR     R0,LDXMIT         ;AND RE-ISSUE INCREMENTING PATTERN.
005344  000137  004674           2$:      JMP     MEMA              ;NOT ZERO, GO EXERCISE IT.

005350  042704  000200           PATGN:   BIC     #200,R4           ;CLEAR REV. VIDEO BIT IF SET.
005354  005704                            TST     R4                ;CHECK R4 FOR PATTERN
005356  100402                            BMI     1$                ;IF MINUS, DO INCREMENTING.
005360  000304                            SWAB    R4                ;OTHERWISE SWAP BYTES AND
005362  000200                            RTS     R0                ;EXIT.
005364  105204                   1$:      INCB    R4                ;ADD ONE TO INCREMENTING
005366  120427  000177                    CMPB    R4,#177           ;HAVE WE EXCEEDED LIMIT
005372  103402                            BLO     2$                ;NO, EXIT
005374  016504  005402                    MOV     MPATT(R5),R4      ;YES, RESET PATTERN AND
005400  000200                   2$:      RTS     R0                ;EXIT.
                                          .EVEN
        005402                   MPATT    =.
005402  037500                            .WORD   037500            ;PATTERN 77,100
005404  040077                            .WORD   040077            ;PATTERN 100,77
005406  025125                            .WORD   025125            ;PATTERN 52,125
005410  100040                            .WORD   100040            ;PATTERN INCREMENTING
005412  100040                            .WORD   100040            ;PATTERN INCREMENTING-REV. VIDEO.
005414  000000                            .WORD   0                 ;PATTERN TABLE TERMINATOR
                                          ;SEQUENCE TO ENTER REVERSE VIDEO.
005416     033     117     112   SETREV:  .BYTE   .ESC,.O,.EEMP,0
005421     000
005422  000240                   MEMXT:   NOP

                                 ;*************************************************************

                                          ;ROUTINE TO TEST THE ABILITY OF THE VT61 TO CALCULATE
                                          ;AND TRANSMIT CHECKSUMS OF BOTH TRANSMITTED AND RECEIVED
                                          ;DATA.  SUBTEST A TRANSMITS A FULL BUFFER UPDATING A CALCULATED
                                          ;CHECKSUM ON EACH CHARACTER TRANSMITTED.  AN ESCAPE SEQUENCE
                                          ;REQUESTING THE RECEIVER CHECKSUM IS EMBEDDED AT THE END OF
                                          ;XMIT BUFFER AND THE RECEIVED CHECKSUM IS COMPARED TO THE
                                          ;CALCULATED.  SUBTEST B PERFORMS THE SAME TYPE OF CHECK ON
                                          ;THE VT61 TRANSMIT CHECKSUM,UTILIZING THE DATA SENT TO THE VT61
                                          ;IN SUBTEST A,DURING A FULL SCREEN TRANSMIT.

                                 ;*************************************************************


                                 ;*************************************************************
005424  000004                   TST10:   SCOPE
005426  012737  000003  001156            MOV     #3,$TIMES         ;;DO 3 ITERATIONS
005434  012737  005442  001106            MOV     #CKSUMA,$LPADR    ;;SET SCOPE LOOP ADDRESS

005442  004037  015146           CKSUMA:  JSR     R0,RESETV         ;RESET THE UNIT AND WAIT FOR XON.
005446  012737  001001  002224            MOV     #1001,BLKM        ;SET UP TO XMIT A SOM -DATA- EOM.
005454  004037  016136                    JSR     R0,RESPTR         ;RESET INTERRUPT POINTERS
005460  012703  006070                    MOV     #ITSUMA,R3        ;DIS. RECT. MODE AND CLEAR CHECKSUM
005464  004037  016076                    JSR     R0,LDXMIT
005470  042737  077577  002222            BIC     #77577,VSTAT      ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005476  013701  015136                    MOV     TBBUF,R1          ;LOAD XMIT BUFFER WITH
```

```
005502  012703  000473                    MOV     #315.,R3
005506  004037  017076                    JSR     R0,BLDINC         ;314 INCREMENTING CHAR.
005512  113721  002130                    MOVB    ESCN,(R1)+
005516  113721  001760                    MOVB    CHOM,(R1)+        ;CURSOR HOME
005522  113721  002056                    MOVB    ESCO,(R1)+
005526  113721  002057                    MOVB    ESCO+1,(R1)+
005532  113711  002074                    MOVB    TXRCK,(R1)        ;TRANSMIT RECEIVER CHECKSUM.
```

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005536  005004                             CLR     R4              ;CLEAR CHECKSUM REGISTER
005540  012705  000004                     MOV     #EOM,R5         ;PRELOAD CHECKSUM REG. WITH
005544  004037  017516                     JSR     R0,CALCK        ;EOM FROM PRIOR XMIT.
005550  052737  002000  002222             BIS     #CKSUM,VSTAT    ;REQUEST CHECKSUM CALCULATIONS.
005556  012737  000500  015144             MOV     #320.,XMCNT     ;SETUP TO XMIT 320 BYTES
005564  052777  000100  174142             BIS     #TENA,@VXCSR    ;ENABLE XMIT INTERRUPTS
005572  012746  020000                     MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
005576  012746  000012                     MOV     #10.,-(SP)      ;;PUSH #10. ON STACK
005602  004037  020470                     JSR     R0,WTBGND       ;LOOK FOR EOM.
005606  000534                             BR      CKEXT           ;ERROR EXIT IF NOT FOUND
005610  127704  007014                     CMPB    @RBBUF,R4       ;COMPARE CHECKSUMS
005614  001414                             BEQ     CKSUMB          ;GOOD GO TO SUBTEST B
005616  004037  015530                     JSR     R0,CLREG        ;BAD COMPARE
005622  110437  001124                     MOVB    R4,$GDDAT       ;LOAD CALCULATED CHECKSUM
005626  117737  006776  001126             MOVB    @RBBUF,$BDDAT   ;AND VT61 RECEIVER CHECKSUM
005634  104013                             ERROR   13              ;ISSUE ERROR
005636  012746  060001                     MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
005642  004037  015366                     JSR     R0,CKSFT        ;ERROR.

005646  042737  077577  002222  CKSUMB:    BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
005654  005004                             CLR     R4              ;CLEAR CHECKSUM REGISTER
005656  012737  001001  002224             MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
005664  052737  000100  002222             BIS     #TXSUM,VSTAT    ;SET UP FOR XMIT CHECKSUM GENERATION.
005672  013701  015136                     MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH
005676  004037  017564                     JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
005702     033     117     134             .BYTE   .ESC,.O,.CLTCK,.ESC,.O,.XMTAL,.ESC,.O,.TXTCK,0
005705     033     117     126
005710     033     117     136
005713     000
005714  012737  000011  015144             MOV     #9.,XMCNT       ;SET UP TO XMIT 9 BYTES
005722  052777  000100  174004             BIS     #TENA,@VXCSR    ;ALLOW XMIT INTERRUPTS
005730  012746  000001                     MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
005734  012746  000002                     MOV     #2,-(SP)        ;;PUSH #2 ON STACK
005740  004037  020470                     JSR     R0,WTBGND       ;LOOK FOR XMIT DONE.
005744  000455                             BR      CKEXT           ;TIME OUT - EXIT TEST.
005746  005037  002216          CKSRC:     CLR     DLAY            ;SET UP TIME OUT DELAY
005752  013702  031030                     MOV     ABUFP,R2        ;RESET THE RECEIVER FLAG
005756  023702  031030          1$:        CMP     ABUFP,R2        ;RECEIVED A CHAR?
005762  001007                             BNE     2$              ;YES-GO CHECK IT.
005764  005337  002216                     DEC     DLAY            ;RUN TIME OUT DELAY.
```

```
005770  001372                          BNE     1$
005772  005237  002176                  INC     FTLCNT          ;TIMED OUT-INCREMENT FATAL XMIT COUNT
005776  104011                          ERROR   11              ;ISSUE HUNG MESSAGE AND EXIT.
006000  000437                          BR      CKEXT
006002  122777  000004  023020  2$:     CMPB    #EOM,@ABUFP     ;RECEIVED EOM CHAR?
006010  001356                          BNE     CKSRC
006012  042737  020000  002222          BIC     #REOM,VSTAT     ;CLEAR THE EOM FLAG
006020  032737  020000  002222          BIT     #REOM,VSTAT     ;NOW WAIT FOR LAST EOM FLAG
006026  001774                          BEQ     .-6             ;FROM XMIT TRANSMITTER CHECKSUM.
```

```
006030  120477  006574                  CMPB    R4,@RBBUF       ;COMPARE 61 TO HOST CHECKSUM.
006034  001421                          BEQ     CKEXT           ;EQUAL - EXIT TEST
006036  004037  015530                  JSR     R0,CLREG
006042  110437  001124                  MOVB    R4,$GDDAT       ;LOAD THE HOST CALCULATED CHECKSUM
006046  117737  006556  001126          MOVB    @RBBUF,$BDDAT   ;LOAD THE VT61 TRANSMITTED CHECKSUM
006054  104014                          ERROR   14              ;ISSUE VT61 XMIT CHECKSUM ERROR
006056  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
006062  004037  015366                  JSR     R0,CKSFT        ;CHECK FOR STATUS ERROR
006066  000404                          BR      CKEXT

006070     033     117     103  ITSUMA: .BYTE   .ESC,.O,.DRECT,.ESC,.O,.CLRCK,0,0
006073     033     117     133
006076     000     000

006100  004037  016136          CKEXT:  JSR     R0,RESPTR


                                ;*******************************************************
                                        ;ROUTINE TO INSURE BASIC CURSOR COMMANDS
                                        ;RESULT IN CORRECT CURSOR MOVEMENT. COMMANDS
                                        ;ARE ISSUED IN THE SEQUENCE:  RESET, CURSOR RIGHT,
                                        ;CURSOR DOWN, CURSOR LEFT, AND CURSOR UP. THE READ
                                        ;CURSOR POSITION COMMAND IS ISSUED AFTER EVERY
                                        ;CURSOR COMMAND AND CURRENT IS COMPARED TO GOOD
                                        ;AND ANY ERRORS REPORTED.
                                ;*******************************************************

                                ;*******************************************************
006104  000004                  TST11:  SCOPE
006106  012737  000005  001156          MOV     #5,$TIMES       ;;DO 5 ITERATIONS
006114  012737  006122  001106          MOV     #CURS1A,$LPADR  ;;SET SCOPE LOOP ADDRESS

006122  013701  015136          CURS1A: MOV     TBBUF,R1        ;LOAD XMIT BUFFER ADDRESS
006126  004037  015146                  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
006132  004037  017564                  JSR     R0,LDBUF        ;LOAD THE BUFFER WITH:
006136     033     103     033          .BYTE   .ESC,.CRT,.ESC,.O,.RDCUR,.ESC,.CDWN,.ESC
006141     117     131     033
006144     102     033
006146     117     131     033          .BYTE   .O,.RDCUR,.ESC,.CLFT,.ESC,.O,.RDCUR
006151     104     033     117
006154     131
006155     033     101     033          .BYTE   .ESC,.CUP,.ESC,.O,.RDCUR,.BEL,0
006160     117     131     007
006163     000
006164  012737  000024  015144          MOV     #20.,XMCNT      ;SET TO XMIT 20 CHARACTERS
006172  012737  000004  016020          MOV     #4,RECITT       ;SET RECEIVE ITERATION TO 4
006200  012737  030430  016022          MOV     #TCRLB+100,WDSTOR;SET UP WORD STORAGE POINTER
006206  004037  015552                  JSR     R0,XMREC        ;XMIT ,AND WAIT FOR REC.DONE
006212  000402                          BR      11$             ;NORMAL EXIT
006214  104011                          ERROR   11              ;LAST XMIT CAUSED VT61 TO HANG.
006216  000436                          BR      CUR1XT          ;EXIT TEST
006220  012701  006304          11$:    MOV     #GDCURP,R1      ;R1=GOOD POSITION TABLE
```

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006224  012702  030430                    MOV     #TCRLB+100,R2     ;R2=ACTUAL CURSOR POSITION
006230  012703  001762                    MOV     #CRT,R3           ;R3=CURSOR COMMAND TABLE

006234  021112                    12$:    CMP     (R1),(R2)         ;COMPARE GOOD TO ACTUAL
006236  001415                            BEQ     2$                ;OK-GO UPDATE POINTERS.
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 27
DZVTH.P11       ERROR POINTER TABLE                                                              SEQ 0038

006240  113737  002130  001125            MOVB    ESCN,$GDDAT+1
006246  111337  001124                    MOVB    (R3),$GDDAT       ;LOAD COMMAND IN ESC ERROR
006252  005037  001126                    CLR     $BDDAT
006256  104001                            ERROR   1                 ;AND ISSUE IT
006260  011237  027630                    MOV     (R2),RCRLB        ;LOAD BAD CURSOR POSITION
006264  011146                            MOV     (R1),-(SP)        ;;PUSH (R1) ON STACK
006266  004037  016216                    JSR     R0,CURER          ;LOAD AND ISSUE CURSRO ERROR MESSAGE
006272  022122                    2$:     CMP     (R1)+,(R2)+       ;INCREMENT POSITION POINTERS.
006274  022337  001770                    CMP     (R3)+,CUP         ;CHECK FOR COMMAND TERM.(CUP).
006300  001355                            BNE     12$               ;NOT AT TERMINATOR-COMPARE AGAIN
006302  000404                            BR      CUR1XT            ;EXIT TEST


006304  020440                    GDCURP: .WORD   20440             ;ROW 0, COL. 1
006306  020441                            .WORD   20441             ;ROW 1, COL. 1
006310  020041                            .WORD   20041             ;ROW 1, COL. 0
006312  020040                            .WORD   20040             ;ROW 0, COL. 0
006314  000240                    CUR1XT: NOP

                                  ;*************************************************************
                                          ;ROUTINE TO INSURE THAT READ CHARACTER AT CURSOR
                                          ;FUNCTIONS CORRECTLY. COMMAND SEQUENCE IS:  RESET, A, CURSOR
                                          ;LEFT, READ  CHARACTER AT CURSOR.
                                          ;AN ERROR IS REPORTED IF THE LAST READ IS NOT AN "A".
                                  ;*************************************************************


                                  ;*************************************************************
006316  000004                    TST12:  SCOPE
006320  012737  000005  001156            MOV     #5,$TIMES         ;;DO 5 ITERATIONS
006326  012737  006334  001106            MOV     #CURS1B,$LPADR    ;;SET SCOPE LOOP ADDRESS

006334  013701  015136            CURS1B: MOV     TBBUF,R1
006340  004037  015146                    JSR     R0,RESETV         ;RESET THE UNIT AND WAIT FOR XON.
006344  012721  000101                    MOV     #101,(R1)+        ;A
006350  113721  002130                    MOVB    ESCN,(R1)+
006354  113721  001766                    MOVB    CLFT,(R1)+        ;CURSOR LEFT
006360  013721  002056                    MOV     ESCOI,(R1)+
006364  013711  002066                    MOV     TCUCH,(R1)        ;TRANSMIT CH. AT CURSOR
006370  012737  000006  015144            MOV     #6,XMCNT          ;SET UP TO XMIT 6 CHARACTERS
006376  004037  015552                    JSR     R0,XMREC          ;XMIT STRING AND WAIT FOR EOM.
006402  000402                            BR      10$               ;NORMAL EXIT
006404  104011                            ERROR   11                ;LAST XMIT CAUSED VT61 TO HANG/FAIL
006406  000430                            BR      2$                ;EXIT TEST
006410  127727  006214  000101    10$:    CMPB    @RBBUF,#101       ;CHARACTER READ=A
006416  001424                            BEQ     2$                ;YES-NEXT SUBTEST
006420  013737  002056  001124            MOV     ESCOI,$GDDAT
006426  000337  001124                    SWAB    $GDDAT            ;REASSEMBLE ESC DATA
006432  005037  001126                    CLR     $BDDAT
006436  113737  002066  001127            MOVB    TCUCH,$BDDAT+1    ;LOAD FAILING ESC SEQUENCE
006444  104001                            ERROR   1                 ;AND ISSUE IT
006446  004037  015530                    JSR     R0,CLREG
006452  112737  000101  001124            MOVB    #101,$GDDAT       ;LOAD GOOD CH. AND CH.
006460  117737  006144  001126            MOVB    @RBBUF,$BDDAT
006466  104004                            ERROR   4                 ;READ AND ISSUE THEM.

006470  000240                    2$:     NOP                       ;END OF TEST
```

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                                                 ;************************************************************
                                                           ;ROUTINE TO VERIFY OPERATION OF REPLACE AND INSERT MODE.
                                                           ;INITIALLY ROW 0 IS WRITTEN TO 80 INCREMENTING CHAR.
                                                           ;ON THE FIRST PASS(REPLACE MODE) A CHARACTER IS REPLACED
                                                           ;AT HOME AND THE CHAR. AT ROW0,COL.0(172) AND ROW1,COL0(NULL)
                                                           ;ARE VERIFIED. ON THE SECOND PASS, INSERT MODE IS ENTERED
                                                           ;AND THE RESULTING INSERTION(AT HOME) IS VERIFIED.ROW0,COL0
                                                           ;SHOULD BE 172 AND ROW1,COL0 SHOULD BE 161.
                                                 ;************************************************************


                                                 ;************************************************************
006472  000004                                   TST13:  SCOPE
006474  012737  000005  001156                           MOV     #5,$TIMES          ;;DO 5 ITERATIONS
006502  012737  006510  001106                           MOV     #INRPL,$LPADR      ;;SET SCOPE LOOP ADDRESS

006510  004037  015146                           INRPL:  JSR     R0,RESETV          ;RESET THE UNIT
006514  013701  015136                                   MOV     TBBUF,R1
006520  005201                                           INC     R1                 ;LEAVE ROOM IN BUFFER FOR SOM.
006522  012703  000120                                   MOV     #80.,R3            ;CREATE A LINE OF 80 INCREMENTING
006526  004037  017076                                   JSR     R0,BLDINC          ;CHAR. ON THE SCREEN.
006532  105011                                           CLRB    (R1)
006534  013703  015136                                   MOV     TBBUF,R3
006540  004037  016076                                   JSR     R0,LDXMIT
006544  005005                                           CLR     R5                 ;USE R5 AS TEST INDEXER.
006546  012737  000002  016020                   INAG:   MOV     #2,RECITT          ;SET UP TO RECEIVE 2 CHAR.
006554  012737  030530  016024                           MOV     #TCRLB+200,BYSTOR          ;SET UP STORAGE AREA.
006562  013701  015136                                   MOV     TBBUF,R1
006566  004037  017564                                   JSR     R0,LDBUF           ;LOAD THE BUFFER WITH:
006572     033     110     172                           .BYTE   .ESC,.CHOM,172,.ESC,.CHOM,.ESC,.O,.TCUCH
006575     033     110     033
006600     117     127
006602     033     102     033                           .BYTE   .ESC,.CDWN,.ESC,.O,.TCUCH,0
006605     117     127     000
006610  012737  000015  015144                           MOV     #13.,XMCNT         ;SET UP TO XMIT 13 CAHR.
006616  004037  015552                                   JSR     R0,XMREC
006622  000402                                           BR      1$                 ;NORMAL EXIT
006624  104011                                           ERROR   11                 ;LAST XMIT CAUSED UNIT TO HANG.
006626  000433                                           BR      INRXT              ;EXIT TEST.
006630  026537  006706  030530                   1$:     CMP     TDATA(R5),TCRLB+200      ;COMPARE GOOD TO REC.DATA.
006636  001407                                           BEQ     2$                 ;GOOD-LOOP OR EXIT.
006640  016537  006700  001126                           MOV     TFUNCT(R5),$BDDAT
006646  013737  002116  001124                           MOV     ESCP,$GDDAT        ;LOAD ESCAPE SEQ. ERROR.
006654  104001                                           ERROR   1
006656  005725                                   2$:     TST     (R5)+              ;INCREMENT INDEXER.
006660  020527  000004                                   CMP     R5,#4              ;THRU WITH TEST?
006664  001414                                           BEQ     INRXT              ;YES-EXIT.
006666  012703  006712                                   MOV     #ENSRT,R3          ;NO-SECOND PASS- ENTER
006672  004037  016076                                   JSR     R0,LDXMIT          ;INSERT MODE AND DO AGAIN.
006676  000723                                           BR      INAG

006700  000151  000111  177777                   TFUNCT: .WORD   .ERPL,.EINST,-1
006706     172     000     172                   TDATA:  .BYTE   172,0,172,160
006711     160
006712     033     120     111                   ENSRT:  .BYTE   .ESC,.P,.EINST,0
006715     000
006716  000240                                   INRXT:  NOP
```

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                                                 ;************************************************************
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B04

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                                                  ;ROUTINE TO INSURE VT61 WILL SCROLL IF A LINE FEED
                                                  ;IS ISSUED FORM ROW 23 OR A CURSOR RIGHT FROM ROW23,COL. 79.
                                                  ;IN SUBTEST A, ROW 0 IS INTIIALLY WRITTEN TO A 0 AND ROW 1
                                                  ;A 1. AFTER COMPLETION OF A LINE FEED(AND RESULTING SCROLL)
                                                  ;ROW 00,COL.00 IS EXPECTED TO CONTAIN A 1.
                                                  ;IN SUBTEST B, THE CURSOR IS PLACED AT ROW23,COL.79
                                                  ;AND A DATA CHARACTER "A" IS ENTERED. THE CURSOR
                                                  ;POSITION IS THEN READ AND SHOULD BE ROW23,COL.00. THE
                                                  ;CHARACTER AT HOME IS VERIFIED TO BE A NULL.
                                         ;**************************************************************


                                         ;**************************************************************
 006720  000004                          TST14:   SCOPE
 006722  012737  000005  001156                   MOV     #5,$TIMES          ;;DO 5 ITERATIONS
 006730  012737  006736  001106                   MOV     #CKSCRA,$LPADR     ;;SET SCOPE LOOP ADDRESS

 006736  004037  015146                  CKSCRA:  JSR     R0,RESETV          ;RESET THE UNIT.
 006742  013701  015136                           MOV     TBBUF,R1
 006746  004037  017564                           JSR     R0,LDBUF           ;LOAD THE XMIT BUFFER WITH:
 006752     060     033     102                   .BYTE   60,.ESC,.CDWN,.ESC,.CLFT,61,.ESC,.Y,.R23,.C00
 006755     033     104     061
 006760     033     131     067
 006763     040
 006764     012     033     110                   .BYTE   .LNFED,.ESC,.CHOM,.ESC,.0,.TCUCH,.BEL,0
 006767     033     117     127
 006772     007     000
 006774  012737  000020  015144                   MOV     #16.,XMCNT         ;SET UP TO XMIT 16 BYTES.
 007002  004037  015552                           JSR     R0,XMREC
 007006  000402                                   BR      1$                 ;NORMAL EXIT
 007010  104011                                   ERROR   11                 ;LAST XMIT CAUSED UNIT TO HANG.
 007012  000452                                   BR      GDSCRL             ;EXIT TEST.
 007014  127727  005610  000061          1$:      CMPB    @RBBUF,#61         ;CHARACTER AT HOME A 1?
 007022  001401                                   BEQ     CKSCRB             ;YES-NEXT TEST
 007024  104023                                   ERROR   23                 ;NO-ISSUE NO SCROLL ERROR.
 007026  012737  000002  016020          CKSCRB:  MOV     #2,RECITT          ;SET UP FOR TWO REC. LOOPS.
 007034  012737  030530  016022                   MOV     #TCRLB+200,WDSTOR          ;SET UP CURSOR POSITION STROAGE.
 007042  013701  015136                           MOV     TBBUF,R1
 007046  004037  017564                           JSR     R0,LDBUF           ;LOAD XMIT BUFFER WITH:
 007052     033     131     067                   .BYTE   .ESC,.Y,.R23,.C79,101,.ESC,.0,.RDCUR
 007055     157     101     033
 007060     117     131
 007062     033     110     033                   .BYTE   .ESC,.CHOM,.ESC,.0,.TCUCH,0
 007065     117     127     000
 007070  012737  000015  015144                   MOV     #13.,XMCNT         ;SET UP TO XMIT 13 BYTES.
 007076  004037  015552                           JSR     R0,XMREC           ;XMIT AND WAIT FOR RECEIVED DONE.
 007102  000402                                   BR      1$
 007104  104011                                   ERROR   11                 ;LAST XMIT CAUSED VT61 TO HANG.
 007106  000414                                   BR      GDSCRL             ;ERROR EXIT
 007110  127737  005514  002166          1$:      CMPB    @RBBUF,ZERO        ;NULL RECEIVED?
 007116  001410                                   BEQ     GDSCRL             ;YES-EXIT TEST
 007120  104023                                   ERROR   23                 ;NO-ISSUE NO SCROLL ERROR.
 007122  013777  030530  005500                   MOV     TCRLB+200,@RBBUF           ;LOAD RECEIVED CURSOR POSITION.
 007130  013746  002142                           MOV     R23C00,-(SP)       ;;PUSH R23C00 ON STACK
 007134  004037  016216                           JSR     R0,CURER           ;GO ISSUE CURSOR ERROR.
```

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 007140  000240                          GDSCRL:  NOP


                                         ;**************************************************************
                                                  ;THIS TEST INSURES THAT THE VT61 CURSOR CAN BE
                                                  ;POSITIONED TO VERY POSSIBLE ROW/COLUMN POSITON
                                                  ;ON THE SCREEN.  THIS IS TESTED BY FILLING THE
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                                               ;COMPLETE SCREEN WITH CHARACTER(A) AND THEN
                                               ;POSITONING THE CURSOR (VIA DCA) TO EVERY POSITION
                                               ;AND THE "A" AT THAT POSITION IS REPLACED WITH A SPACE.
                                               ;THE SCREEN IS THEN READ TO VERIFY THAT ONLY SPACES
                                               ;EXIST ON THE SCREEN.  ALL POSITIONS CONTAINING
                                               ;NON-SPACES ARE REPORTED.

                                       ;*******************************************************************

                                       ;*******************************************************************
007142  000004                         TST15:  SCOPE
007144  012737  000001  001156                 MOV     #1,$TIMES        ;;DO 1 ITERATION
007152  012737  007160  001106                 MOV     #CURS2,$LPADR    ;;SET SCOPE LOOP ADDRESS

007160  042737  077577  002222         CURS2:  BIC     #77577,VSTAT     ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
007166  004037  015146                         JSR     R0,RESETV        ;RESET THE UNIT AND WAIT FOR XON.
007172  012702  003600                         MOV     #TOTCH,R2        ;LOAD A COUNT OF SCREEN(1920).
007176  112777  000002  005736                 MOVB    #SOM,@TBUFP      ;ISSUE START OF MESSAGE.
007204  004037  016026                         JSR     R0,XMIT1
007210  005302                         1$:     DEC     R2               ;DECREMENT XMIT COUNT
007212  001413                                 BEQ     10$              ;COUNT = ZERO?

007214  112777  000101  005720                 MOVB    #101,@TBUFP      ;LOAD THE CHARACTER(A).
007222  004037  016026                         JSR     R0,XMIT1         ;NO-XMIT ANOTHER BYTE.
007226  023737  002176  002200                 CMP     FTLCNT,ALWCNT    ;EXCEEDED FATAL ERROR COUNT?
007234  103765                                 BLO     1$               ;NO-CHECK IF DONE NOW
007236  000137  007640                         JMP     C2XT             ;YES-ABORT TESTING THIS UNIT.
007242  112777  000004  005672         10$:    MOVB    #EOM,@TBUFP      ;ISSUE END OF MESSAGE.
007250  004037  016026                         JSR     R0,XMIT1
007254  004037  016136                         JSR     R0,RESPTR        ;RESET INTERRUPT POINTERS.
007260  013737  002156  016420                 MOV     R23C78,LNRW      ;SET UP 1ST ADDRESS
007266  013701  015136                         MOV     TBBUF,R1         ;LOAD XMIT BUFFER WITH
007272  013721  002042                         MOV     DCRAD,(R1)+
007276  010102                                 MOV     R1,R2            ;R2 POINTS TO CURSOR ADD. IN BUFFER
007300  013721  002156                         MOV     R23C78,(R1)+     ;CURSOR TO LOWER RIGHT -1.
007304  112721  000040                         MOVB    #40,(R1)+        ;SPACE
007310  012737  000005  015144         2$:     MOV     #5,XMCNT         ;SET UP TO XMIT 5 CHARACTERS
007316  042737  077577  002222                 BIC     #77577,VSTAT     ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
007324  052777  000100  172402                 BIS     #TENA,@VXCSR     ;XMIT INTERRUPTS.
007332  012746  000001                         MOV     #XMDNE,-(SP)     ;;PUSH #XMDNE ON STACK
007336  012746  000002                         MOV     #2,-(SP)         ;;PUSH #2 ON STACK
007342  004037  020470                         JSR     R0,WTBGND        ;LOOK FOR  XMIT DONE
007346  000534                                 BR      C2XT             ;NOT FOUND-ERROR EXIT
007350  021237  002152                         CMP     (R2),CUHME       ;DELETED TO HOME?
007354  001405                                 BEQ     3$               ;YES
007356  004037  016314                         JSR     R0,CMPOS         ;NO-GET NEXT POSITION TO BE DELETED
007362  013712  016420                         MOV     LNRW,(R2)        ;LOAD IT IN XMIT BUFFER
007366  000750                                 BR      2$               ;AND DELETE IT.
007370  004037  016136                 3$:     JSR     R0,RESPTR        ;RESET INTERRUPT POINTERS
```

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007374  013737  002152  016420                 MOV     CUHME,LNRW       ;LOAD INITIAL CHECK POSITION(HOME)
007402  012737  001001  002224                 MOV     #1001,BLKM       ;SET UP TO XMIT A SOM -DATA- EOM.
007410  013701  015136                         MOV     TBBUF,R1         ;LOAD XMIT BUFFER WITH
007414  010102                                 MOV     R1,R2            ;STORE ERRORS IN XMIT BUFFER
007416  042737  077577  002222                 BIC     #77577,VSTAT     ;CLEAR ALL FLAGS BUT XOFF AND XMKIL
007424  013721  002130                         MOV     ESCN,(R1)+
007430  013721  001760                         MOV     CHOM,(R1)+       ;CURSOR HOME
007434  013721  002056                         MOV     ESCO,(R1)+
007440  013721  002060                         MOV     XMTAL,(R1)+      ;TRANSMIT ALL
007444  012737  000005  015144                 MOV     #5,XMCNT
007452  052777  000100  172254                 BIS     #TENA,@VXCSR     ;SET XMIT ENABLE
007460  012746  000001                         MOV     #XMDNE,-(SP)     ;;PUSH #XMDNE ON STACK
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```
007464  012746  000003                  MOV     #3,-(SP)          ;;PUSH #3 ON STACK
007470  004037  020470                  JSR     R0,WTBGND         ;LOOK FOR SOM OR XMIT DONE
007474  000461                          BR      C2XT              ;NOT FOUND-ERROR EXIT
007476  013701  014634          4$:     MOV     RBUFP,R1          ;SET UP RECEIVE FLAG
007502  005037  002216                  CLR     DLAY              ;SET UP TIME OUT DELAY
007506  020137  014634          40$:    CMP     R1,RBUFP          ;CHARACTER RECEIVED?
007512  103411                          BLO     41$               ;YES-GO CHECK IT.
007514  032737  020000  002222          BIT     #REOM,VSTAT       ;LOOK FOR END OF MESSAGE
007522  001025                          BNE     C2CK              ;FOUND IT, EXIT TEST
007524  005337  002216                  DEC     DLAY              ;RUN TIME OUT DELAY.
007530  001366                          BNE     40$               ;AND LOOK FOR RECEIVED CH.
007532  104011                          ERROR   11                ;LAST XMIT CAUSED VT61 TO HANG.
007534  000420                          BR      C2CK              ;GO SEE IF ANY ERRORS STORED.
007536  013737  014630  014634  41$:    MOV     RBBUF,RBUFP       ;RESET RECEIVE POINTER
007544  127727  005060  000040          CMPB    @RBBUF,#40        ;CHAR EQUAL A SPACE?
007552  001003                          BNE     6$                ;NOT A SPACE-MUST BE ERROR-STORE IT
007554  004037  016356          5$:     JSR     R0,CPPOS          ;UPDATE CURSOR POSITION
007560  000746                          BR      4$
007562  022702  030354          6$:     CMP     #TCRLB+20.,R2     ;STORED 10 ERRORS?
007566  101772                          BLOS    5$                ;YES-IGNORE ANY FURTHER ERRORS.
007570  013722  016420                  MOV     LNRW,(R2)+        ;STORE FAILING CURSOR POSITION
007574  000767                          BR      5$

007576  020237  015136          C2CK:   CMP     R2,TBBUF          ;ANY ERRORS STORED?
007602  001416                          BEQ     C2XT              ;NO EXIT TEST
007604  013701  015136                  MOV     TBBUF,R1          ;USE R1 AS ERROR POINTER
007610  021137  002044          1$:     CMP     (R1),R23C79       ;CURSOR TO LOWER RIGHT?
007614  001411                          BEQ     C2XT              ;YES-NOT AN ERROR.
007616  104012                          ERROR   12                ;NO-ISSUE ERROR MESSAGES
007620  012746  020040                  MOV     #20040,-(SP)      ;;PUSH #20040 ON STACK
007624  012177  005000                  MOV     (R1)+,@RBBUF      ;LOAD FAILING POS.
007630  004037  016216                  JSR     R0,CURER          ;ISSUE CURSOR ERROR
007634  020102                          CMP     R1,R2             ;DONE WITH ERRORS?
007636  103764                          BLO     1$                ;NO, DUMP ANOTHER.
007640  000240                  C2XT:   NOP                       ;EXIT TEST

                                ;*******************************************************
                                                ;ROUTINE TO INSURE PROPER OPERATION OF CARRIAGE RETURN
                                                ;AND LINE FEED DURING NORMAL MODE. INITIALLY THE CURSOR IS
                                                ;SET(VIA D.C.A.) TO ROW0,COL 20 AND A LINE FEEL IS ISSUED
                                                ;THE CURSOR POSITION IS THEN READ AND MUST BE ROW1,COL20.
                                                ;A CARRIAGE RETURN IS THEN ISSUED AND CURSOR POSITION VERIFIED
                                                ;TO BE ROW1,COL0.

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                                ;*******************************************************


                                ;*******************************************************
007642  000004                  TST16:  SCOPE
007644  012737  000005  001156          MOV     #5,$TIMES         ;;DO 5 ITERATIONS
007652  012737  007660  001106          MOV     #NWLN,$LPADR      ;;SET SCOPE LOOP ADDRESS

007660  004037  015146          NWLN:   JSR     R0,RESETV         ;RESET THE UNIT AND ENTER MAINT.MODE
007664  013701  015136                  MOV     TBBUF,R1
007670  004037  017564                  JSR     R0,LDBUF          ;LOAD XMIT BUFFER WITH-
007674     033     131     040          .BYTE   .ESC,.Y,.R00,.C20
007677     064
007700     012     033     117          .BYTE   .LNFED,.ESC,.O,.RDCUR,.BEL,0
007703     131     007     000
007706  012737  000011  015144          MOV     #9.,XMCNT         ;SETUP TO XMIT 9 CHARACTERS
007714  004037  015552                  JSR     R0,XMREC          ;GO DO IT
007720  000402                          BR      30$               ;NORMAL EXIT.
```

E04

```
007722  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
007724  000454                          BR      4$              ;EXIT TEST
007726  023777  002134  004674  30$:    CMP     R01C20,@RBBUF   ;CHECK CURSOR POS. S/B ROW 1, COL 20.
007734  001412                          BEQ     3$
007736  005037  001124                  CLR     $GDDAT
007742  013737  001752  001126          MOV     LNFED,$BDDAT
007750  104001                          ERROR   1               ;ISSUE IT
007752  013746  002134                  MOV     R01C20,-(SP)    ;;PUSH R01C20 ON STACK
007756  004037  016216                  JSR     R0,CURER        ;SETUP AND ISSUE CURSOR ERROR
007762  013701  015136          3$:     MOV     TBBUF,R1
007766  013721  001750                  MOV     CARRT,(R1)+     ;LOAD XMIT BUFFER WITH
007772  013721  002056                  MOV     ESC0I,(R1)+     ;CARRIAGE RETURN, READ CURSOR
007776  013721  002052                  MOV     RDCUR,(R1)+     ;POSITION
010002  012737  000004  015144          MOV     #4,XMCNT        ;SET UP TO TRANSMIT 4 CHARACTERS
010010  004037  015552                  JSR     R0,XMREC        ;GO DO IT
010014  000402                          BR      40$             ;NORMAL EXIT.
010016  104011                          ERROR   11              ;TRANSMISSION CAUSED VT61 TO FAIL/HANG
010020  000416                          BR      4$              ;EXIT TEST
010022  023777  002132  004600  40$:    CMP     R01C00,@RBBUF   ;CHECK CURSOR POS. S/B ROW1, COL 0.
010030  001412                          BEQ     4$              ;EXIT TEST IF GOOD.
010032  005037  001124                  CLR     $GDDAT
010036  013737  001750  001126          MOV     CARRT,$BDDAT
010044  104001                          ERROR   1               ;ISSUE IT
010046  013746  002132                  MOV     R01C00,-(SP)    ;;PUSH R01C00 ON STACK
010052  004037  016216                  JSR     R0,CURER        ;SET UP AND ISSUE CURSOR ERROR
010056  000240                  4$:     NOP


                                ;***********************************************************

                                        ;ROUTINE TO VERIFY PROPER OPERATION OF ERASE TO END-OF-
                                        ;SCREEN. SCREEN IS WRITTEN TO 1920 INCREMENTING CHAR.
                                        ;ERASE TO END OF SCREEN IS THEN ISSUED AND THE
                                        ;ENTIRE SCREEN IS READ VERIFYING THAT IT IS ALL NULLS.
                                ;***********************************************************

                                ;***********************************************************
010060  000004                  TST17:  SCOPE
010062  012737  000003  001156          MOV     #3,$TIMES       ;;DO 3 ITERATIONS
```

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010070  012737  010076  001106          MOV     #ERSE,$LPADR    ;;SET SCOPE LOOP ADDRESS


010076  004037  015146          ERSE:   JSR     R0,RESETV       ;RESET THE UNIT -SET MAINT. MODE.
010102  005077  004522                  CLR     @RBBUF          ;CLEAR THE CHECK LOCATION.
010106  004037  017124                  JSR     R0,DATSC        ;FILL THE SCREEN.
010112  013701  015136                  MOV     TBBUF,R1
010116  004037  017564                  JSR     R0,LDBUF        ;LOAD XMIT BUFFER WITH:
010122     033     110     033          .BYTE   .ESC,.CHOM,.ESC,.EOS,.ESC,.0,.XMTAL,0
010125     112     033     117
010130     126     000
010132  113737  002130  001125          MOVB    ESCN,$GDDAT+1
010140  113737  001772  001124          MOVB    EOS,$GDDAT      ;LOAD ERROR WITH ERASE TO EOS
010146  005037  001126                  CLR     $BDDAT
010152  005077  004452                  CLR     @RBBUF
010156  012737  000007  015144          MOV     #7,XMCNT        ;SET UP TO XMIT 7 BYTES
010164  004037  015552                  JSR     R0,XMREC        ;XMIT AND WAIT FOR REC. DONE
010170  000402                          BR      5$
010172  104011                          ERROR   11              ;ESC ERROR
010174  000413                          BR      ERSXT           ;EXIT TEST
010176  127737  004426  002166  5$:     CMPB    @RBBUF,ZERO     ;VT61 XMITTED SOM/EOM ONLY?
010204  001407                          BEQ     ERSXT           ;YES-EXIT TEST.
```

F04

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010206  104001                                ERROR   1               ;NO-ERASE TO END OF SCREEN
010210  004037  015530                        JSR     R0,CLREG        ;GO CLEAR ERROR STORAGE
010214  117737  004410  001126                MOVB    @RBBUF,$BDDAT
010222  104004                                ERROR   4               ;ISSUE DATA ERROR
010224  000240                        ERSXT:  NOP



                                      ;*************************************************************
                                              ;ROUTINE TO SET UP END OF PASS INDICATION.
                                              ;SELF TEST(ESC P T) IS ISSUED TO THE UNIT UNDER TEST
                                              ;AND AN ERROR IS ISSUED IF THE UNIT CANNOT RESPOND AFTER
                                              ;SELF TEST IS COMPLETE. IF SELF TEST IS SUCCESSFUL THE
                                              ;SCREEN IS WRITTEN TO 23 LINES OF INCREMENTING CHARACTERS
                                              ;AND 23 LINES OF INCREMENTING CHAR. IN REVERSE VIDEO.
                                              ;THE IDENT IS THEN CHECKED AND IF A COPIER IS PRESENT A
                                              ;COPY SCREEN  COMMAND IS ISSUED(NOTE: THIS COMMAND WILL CAUSE
                                              ;THE UNIT TO BE "BUSY" AND NOT RESPOND TO ANY FURTHER COMMANDS
                                              ;UNTIL THE SCREEN HAS BEEN COMPLETELY COPIED.)
                                      ;*************************************************************


                                      ;*************************************************************
010226  000004                        TST20:  SCOPE
010230  012737  000001  001156                MOV     #1,$TIMES       ;;DO 1 ITERATION
010236  012737  010244  001106                MOV     #LSTST,$LPADR   ;;SET SCOPE LOOP ADDRESS

010244                                LSTST:
010244  013746  002166                        MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
010250  013746  002120                        MOV     TSTER,-(SP)     ;;PUSH TSTER ON STACK
010254  013746  002056                        MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
010260  004037  013322                        JSR     R0,TESC         ;TRANSMIT IT.
010264  004037  015256                        JSR     R0,GETON        ;GO LOOK FOR A XON.
010270  000407                                BR      1$              ;VT61RESPONDED-NOT HUNG
010272  013737  001730  001124                MOV     VRCSR,$GDDAT    ;LOAD THE ADDRESS
```

```
010300  013737  001740  001126                MOV     VECT,$BDDAT     ;LOAD THE VECTOR
010306  104010                                ERROR   10              ;REPORT SELF TEST FAILURE
010310  004037  015146                1$:     JSR     R0,RESETV       ;RESET AND SET MAINT. MODE.
010314  005037  002206                        CLR     BUBCT           ;SET UP HALF-SCREEN FLAG.
010320  042737  077577  002222        2$:     BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
010326  012737  001001  002224                MOV     #1001,BLKM      ;SET UP TO XMIT A SOM -DATA- EOM.
010334  013701  015136                        MOV     TBBUF,R1        ;SET UP BEG. OF XMIT BUFFER
010340  012703  000500                        MOV     #320.,R3        ;FILL BUFFER WITH INCREMENTING CHAR.
010344  004037  017076                        JSR     R0,BLDINC
010350  012737  001700  015144                MOV     #960.,XMCNT     ;SEND 12 LINE TO VT61
010356  052777  000100  171350                BIS     #TENA,@VXCSR    ;ENABLE XMIT INTERRUPTS
010364  012746  000001                        MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
010370  012746  000012                        MOV     #10.,-(SP)      ;;PUSH #10. ON STACK
010374  004037  020470                        JSR     R0,WTBGND       ;LOOK FOR XMDNE.
010400  000430                                BR      ENDSEL          ;NOT FOUND-EXIT.
010402  005737  002206                        TST     BUBCT           ;DONE WITH SCREEN?
010406  001007                                BNE     3$              ;YES-EXIT
010410  012703  005416                        MOV     #SETREV,R3      ;NO-ISSUE ENTER REVERSE VIDEO
010414  004037  016076                        JSR     R0,LDXMIT       ;ESCAPE SEQUENCE.
010420  005237  002206                        INC     BUBCT           ;INCREMENT SCREEN HALF FLAG.
010424  000735                                BR      2$              ;AND ISSUE SECOND HALF IN REV. VIDEO.
010426  032737  000001  002122        3$:     BIT     #BIT00,IDENT    ;IDENT = COPIER?
010434  001412                                BEQ     ENDSEL          ;NO
010436  013746  002166                        MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
010442  012746  000135                        MOV     #.CPYSC,-(SP)   ;;PUSH #.CPYSC ON STACK
010446  013746  002130                        MOV     ESCN,-(SP)      ;;PUSH ESCN ON STACK
010452  004037  013322                        JSR     R0,TESC
```

```
010456  004037  017572                 JSR     R0,CKABRT        ;CHECK FOR A PERIPHERAL ABORT.
010462  105737  002174         ENDSEL: TSTB    MODE             ;IF IN MAN MODE DO NOT ENTER EOP.
010466  001402                         BEQ     ENDPS
010470  000137  003062                 JMP     ASTRT
010474  042777  000100  171226 ENDPS:  BIC     #RDENA,@VRCSR    ;CLEAR REC.INT. BEFORE NEXT UNIT SELECT.
                               ;*************************************************************


                               .SBTTL  END OF PASS ROUTINE

                               ;*INCREMENT THE PASS NUMBER ($PASS)
                               ;*INDICATE END-OF-PROGRAM AFTER 1 PASSES THRU THE PROGRAM
                               ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                               ;*IF THERES A MONITOR GO TO IT
                               ;*IF THERE ISN'T JUMP TO MODCA

010502                         $EOP:
010502  000004                         SCOPE
010504  005037  001102                 CLR     $TSTNM           ;;ZERO THE TEST NUMBER
010510  005037  001156                 CLR     $TIMES           ;;ZERO THE NUMBER OF ITERATIONS
010514  005237  001100                 INC     $PASS            ;;INCREMENT THE PASS NUMBER
010520  042737  100000  001100         BIC     #100000,$PASS    ;;DON'T ALLOW A NEG. NUMBER
010526  005327                         DEC     (PC)+            ;;LOOP?
010530  000001                 $EOPCT: .WORD   1
010532  003022                         BGT     $DOAGN           ;;YES
010534  012737                         MOV     (PC)+,@(PC)+     ;;RESTORE COUNTER
010536  000001                 $ENDCT: .WORD   1
010540  010530                         $EOPCT
010542  104400  010604                 TYPE    ,$ENDMG          ;;TYPE "END PASS #"
010546  013746  001100                 MOV     $PASS,-(SP)      ;;SAVE $PASS FOR TYPEOUT
```

```
010552  104404                         TYPDS                    ;;GO TYPE--DECIMAL ASCII WITH SIGN
010554  104400  010621                 TYPE    ,$ENULL          ;;TYPE A NULL CHARACTER
010560                         $GET42:

010560  013700  000042                 MOV     @#42,R0          ;;GET MONITOR ADDRESS
010564  001405                         BEQ     $DOAGN           ;;BRANCH IF NO MONITOR
010566  000005                         RESET                    ;;CLEAR THE WORLD
010570  004710                 $ENDAD: JSR     PC,(R0)          ;;GO TO MONITOR
010572  000240                         NOP                      ;;SAVE ROOM
010574  000240                         NOP                      ;;FOR
010576  000240                         NOP                      ;;ACT11
010600                         $DOAGN:
010600  000137  002516                 JMP     @#MODCA          ;;RETURN
010604  005015  047105  020104 $ENDMG: .ASCIZ  <15><12>/END PASS #/
010612  040520  051523  021440
010620     000
010621     377     377     000 $ENULL: .BYTE   -1,-1,0          ;;NULL CHARACTER STRING
                               ;*************************************************************
                                       ;ROUTINE TO ECHO THE KEYBOARD. KEYS FOR TAB,BELL,CARRIAGE
                                       ;AND LINE FEED ECHO A MNEMONIC,NON-DISPLAY CHAR. ECHO OCTAL
                                       ;EQUIVALENTS AND DISPLAY CHAR. ECHO THEMSELVES.
                                       ;(EXAMPLES-CHAR.,SPACE, ESC, SPACE OR 037, SPACE.) A
                                       ;CONTROL C (003) WILL CAUSE A TEST EXIT.

                               ;*************************************************************


                               ;*************************************************************
010624  000004                 TST21:  SCOPE
010626  012737  000001  001156         MOV     #1,$TIMES        ;;DO 1 ITERATION
010634  012737  010642  001106         MOV     #KYBD,$LPADR     ;;SET SCOPE LOOP ADDRESS

010642  004037  016136         KYBD:   JSR     R0,RESPTR
```

```
010646  012702  025634                    MOV     #DKYBD,R2       ;LOAD MESSAGE ADDRESS INR2
010652  004037  017172                    JSR     R0,DSMES        ;DISPLAY KEYBOARD MESSAGE
010656  012703  026222                    MOV     #DCNTZ,R3       ;ISSUE CONTROL C EXIT MESSAGE
010662  004037  016076                    JSR     R0,LDXMIT
010666  012703  011124                    MOV     #EXMAIN,R3
010672  004037  016076                    JSR     R0,LDXMIT       ;ISSUE EXIT MAINTENANCE MODE.
010676  042737  077577  002222  KYSTRT:   BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
010704  105777  020120                    TSTB    @ABUFP          ;SEE IF A CHAR. RECEIVED
010710  001001                            BNE     11$             ;YES-GO PROCESS IT
010712  000001                            WAIT                    ;WAIT FOR A CH.
010714  117701  020110          11$:      MOVB    @ABUFP,R1       ;GET RAW RECEIVED DATA
010720  004037  020414                    JSR     R0,EXTST        ;CHECK FOR EXIT CONDITIONS
010724  000402                            BR      10$             ;NO EXIT -CONTINUE.
010726  000137  003062                    JMP     ASTRT           ;EXIT TEST 4
010732  105077  020072          10$:      CLRB    @ABUFP          ;CLEAR CHAR FROM BUFFER
010736  032737  000400  002222            BIT     #ESC,VSTAT      ;CHAR.=ESC(033)?
010744  001405                            BEQ     12$             ;NO
010746  005037  014636                    CLR     ESAMB           ;YES - RESET ESC ASSEMBLY FLAG
010752  012703  025627                    MOV     #DESC,R3        ;LOAD ESC MESSAGE ADDRESS
010756  000454                            BR      KYBXMT
010760  120127  000041          12$:      CMPB    R1,#41          ;CHAR. LESS THAN 41 OR
010764  103415                            BLO     2$              ;HIGHER THAN 176, GO ECHO
010766  120127  000176                    CMPB    R1,#176         ;OCTAL EQUIVALENT
010772  101012                            BHI     2$
```

```
010774  110177  004142                    MOVB    R1,@TBUFP       ;LOAD CHAR. IN XMIT BUFF.
011000  004037  016026                    JSR     R0,XMIT1        ;GO XMIT IT
011004  112777  000040  004130            MOVB    #40,@TBUFP      ;LOAD A SPACE
011012  004037  016026                    JSR     R0,XMIT1        ;AND XMIT IT.
011016  000727                            BR      KYSTRT
011020  120137  001746          2$:       CMPB    R1,BEL          ;CHAR.=BELL?
011024  001003                            BNE     3$
011026  012703  026103                    MOV     #DBELL,R3       ;LOAD BELL MESSAGE ADDRESS
011032  000426                            BR      KYBXMT
011034  120137  001754          3$:       CMPB    R1,TAB          ;CHAR. =TAB?
011040  001003                            BNE     4$
011042  012703  026064                    MOV     #DTAB,R3        ;YES-ECHO 'TAB'
011046  000420                            BR      KYBXMT
011050  123701  001750          4$:       CMPB    CARRT,R1        ;CHAR.=CARRIAGE RETURN?
011054  001003                            BNE     5$
011056  012703  026071                    MOV     #DCR,R3         ;YES - ECHO 'C/R'.
011062  000412                            BR      KYBXMT
011064  120137  001752          5$:       CMPB    R1,LNFED        ;CHAR.=LINE FEED?
011070  001003                            BNE     6$              ;NO CHECK FOR CONTROL Z
011072  012703  026076                    MOV     #DLF,R3         ;YES - ECHO 'L/F'.
011076  000404                            BR      KYBXMT
011100  004037  017266          6$:       JSR     R0,BINOCT       ;CONVERT BINARY TO OCTAL
011104  012703  002162                    MOV     #SVER1,R3
011110  042737  077577  002222  KYBXMT:   BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
011116  004037  016076                    JSR     R0,LDXMIT       ;GO XMIT BUFFER
011122  000665                            BR      KYSTRT          ;WAIT FOR NEXT CHAR.

                                          ;SEQUENCE TO EXIT MAINTENANCE MODE.
011124     033     117     141  EXMAIN:   .BYTE   .ESC,.O,.DMAIN,0
011127     000

                                ;*************************************************************
                                          ;ROUTINE TO UTILIZE THE VT61 AS A PRINTER CONTROLLER.
                                          ;AFTER TEST MESSAGE IS DISPLAYED, THE TEST WAITS
                                          ;FOR A C/R BEFORE ACTUALLY ENTERING TEST. A PATTERN
                                          ;OF INCREMENTING, ROLLING CHAR. WILL BE OUTPUTTED UNTIL A
                                          ;CONTROL C(003) IS RECEIVED.
```

```

                                                ;*******************************************************************

                                                ;*******************************************************************
 011130  000004                                 TST22:  SCOPE
 011132  012737  000001  001156                         MOV     #1,$TIMES               ;;DO 1 ITERATION
 011140  012737  011146  001106                         MOV     #TPRNT,$LPADR           ;;SET SCOPE LOOP ADDRESS

 011146  012702  026266                         TPRNT:  MOV     #DPRNT,R2               ;LOAD PRINTER MESSAGE ADDRESS
 011152  004037  017172                                 JSR     R0,DSMES                ;AND ISSUE IT
 011156  012703  011124                                 MOV     #EXMAIN,R3
 011162  004037  016076                                 JSR     R0,LDXMIT               ;ISSUE EXIT MAINTENANCE MODE.
 011166  004037  017364                                 JSR     R0,GTCR                 ;GO SET CARRIAGE RETURN
 011172                                         3$:
 011172  013746  002166                                 MOV     ZERO,-(SP)              ;;PUSH ZERO ON STACK
 011176  013746  001774                                 MOV     EPNT,-(SP)              ;;PUSH EPNT ON STACK
 011202  013746  002130                                 MOV     ESCN,-(SP)              ;;PUSH ESCN ON STACK
 011206  004037  013322                                 JSR     R0,TESC
 011212  013701  015136                                 MOV     TBBUF,R1                ;LOAD R1 WITH XMIT BUFFER
```

```
 011216  012705  000041                         4$:     MOV     #41,R5                  ;R5=1ST CHAR
 011222  042737  077577  002222                 5$:     BIC     #77577,VSTAT            ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
 011230  013701  015136                                 MOV     TBBUF,R1
 011234  012703  000132                                 MOV     #132,R3                 ;R3= LINE WIDTH
 011240  004037  017102                                 JSR     R0,BLDINA               ;GO BUILD A SLIDING PATTERN.
 011244  013721  001750                                 MOV     CARRT,(R1)+             ;LOAD A C/R AND L/F
 011250  013721  001752                                 MOV     LNFED,(R1)+
 011254  012737  000134  015144                         MOV     #134,XMCNT              ;SET UP TO XMIT BY BYTES.
 011262  052777  000100  170444                         BIS     #TENA,@VXCSR
 011270  032737  000001  002222                         BIT     #XMDNE,VSTAT            ;WAIT FOR XMIT DONE
 011276  001774                                         BEQ     .-6
 011300  004037  017572                                 JSR     R0,CKABRT               ;CHECK FOR A PERIPHERAL ABORT.
 011304  004037  020414                                 JSR     R0,EXTST                ;CHECK FOR EXIT REQUEST.
 011310  000402                                         BR      6$                      ;NO-CONTINUE
 011312  000137  003062                                 JMP     ASTRT                   ;YES-EXIT TEST!!
 011316  122705  000177                         6$:     CMPB    #177,R5                 ;EXCEEDED PATT. LIMIT?
 011322  001337                                         BNE     5$                      ;NO
 011324  000734                                         BR      4$                      ;YES RESET IT

                                                ;*******************************************************************

                                                        ;ROUTINE TO LOOP DATA/COMMANDS FROM THE VT61 BACK TO
                                                        ;THE VT61. DATA TRANSMISSIONS RESULTING FROM A ESC
                                                        ;SEQUENCE WILL ALSO BE LOOPED AND WILL ENTER THE SCREEN
                                                        ;AT THE CURSOR POSITION.THIS TEST CAN BE USED TO SIMULATE,
                                                        ;OR CREATE, SPECIFIC SCREEN PATTERNS AND OPERATIONS.
                                                ;*******************************************************************

                                                ;*******************************************************************
 011326  000004                                 TST23:  SCOPE
 011330  012737  000001  001156                         MOV     #1,$TIMES               ;;DO 1 ITERATION
 011336  012737  011344  001106                         MOV     #LPTST,$LPADR           ;;SET SCOPE LOOP ADDRESS

 011344  004037  016136                         LPTST:  JSR     R0,RESPTR               ;RESET POINTERS
 011350  012702  026111                                 MOV     #DLOOP,R2               ;LOAD LOOP MESSAGE ADDRESS
 011354  004037  017172                                 JSR     R0,DSMES                ;DISPLAY IT
 011360  012703  011124                                 MOV     #EXMAIN,R3
 011364  004037  016076                                 JSR     R0,LDXMIT               ;ISSUE EXIT MAINTENANCE MODE.
 011370  004037  020164                                 JSR     R0,LOOP                 ;GO LOOP VT61
 011374  000137  003062                                 JMP     ASTRT                   ;ENTER MAN MODE VIA SCOPE ROUTINE.

                                                ;*******************************************************************
```

```
                                                          ;PRODUCTION KEYBOARD TEST.  ALL KEYS MUST BE DEPRESSED
                                                          ;IN THE SEQUENCE INDICATED ON THE SCREEN.  ALL ERRORS
                                                          ;OR MISTAKES ARE DISPLAYED IN OCTAL POSITIONAL FORMAT AND THE
                                                          ;CORRECT KEY POSITION IN THE ROW  IS DISPLAYED IN DECIMAL.
                                                          ;THIS TEST IS RUN IN MAINTENANCE MODE, THEREFORE THE KEYS
                                                          ;WILL ECHO THEIR POSITION ,NOT THEIR INDICATED MNEMONIC. 10
                                                          ;ERRORS WILL CAUSE AN AUTOMATIC EXIT FROM TEST.
                                                ;**********************************************************************

                                                ;**********************************************************************
 011400  000004                                 TST24:  SCOPE
 011402  012737  000001  001156                         MOV     #1,$TIMES             ;;DO 1 ITERATION
 011410  012737  011416  001106                         MOV     #PDKBD,$LPADR         ;;SET SCOPE LOOP ADDRESS
```

```
 011416  012702  026502                 PDKBD:  MOV     #DKBD   ,R2
 011422  004037  017172                         JSR     R0      ,DSMES  ;DISPLAY KEYBOARD TEST MESSAGE.
 011426  005037  002206                         CLR     BUBCT           ;CLEAR ERROR COUNT LOCATION.
 011432  005005                                 CLR     R5

 011434  016504  011560                 DOAROW: MOV     DTTBL(R5),R4    ;SET UP 'GOOD' CHAR. POINTER
 011440  016503  011532                         MOV     MSTBL(R5),R3
 011444  001414                                 BEQ     FEXIT           ;MESSAGE WAS ZERO-EXIT.
 011446  100421                                 BMI     CLMAIN          ;IF MESSAGE IS -1,CLEAR MAINT. MODE.
 011450  004037  016076                         JSR     R0,LDXMIT       ;ISSUE 'ROW OR FUNCTION' MESSAGE.
 011454  004037  017716                         JSR     R0,CKKBD        ;GO CHECK IT.
 011460  123727  002206  000012                 CMPB    BUBCT,#10.      ;TEN ERROR EXIT?
 011466  103401                                 BLO     1$              ;NO-CONTINUE.
 011470  000402                                 BR      FEXIT           ;YES-EXIT TEST.
 011472  005725                         1$:     TST     (R5)+           ;INCREMENT OFFSET.
 011474  000757                                 BR      DOAROW          ;NO-DO NEXT ROW/FUNCTION.
 011476  012702  026253                 FEXIT:  MOV     #DEXT,R2
 011502  004037  017172                         JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
 011506  000137  003062                         JMP     ASTRT
 011512  012703  011526                 CLMAIN: MOV     #RSMAIN,R3      ;SET UP TO EXIT MAINT. MODE.
 011516  004037  016076                         JSR     R0,LDXMIT
 011522  005725                                 TST     (R5)+           ;INCREMENT OFFSET.
 011524  000743                                 BR      DOAROW          ;NOW TEST CONTROL AND SHIFT FUNCTIONS.
 011526     033     117     141         RSMAIN: .BYTE   .ESC,.O,.DMAIN,0
 011531     000



                                                ;TABLE OF MESSAGE ADDRESSES.

 011532  026705  027012  027047         MSTBL:  .WORD   DTOP,DSEC,DTHRD,DBOT
 011540  027176
 011542  027254  027300  177777                 .WORD   DSPCE,DKPD,-1,DCONT,DLSHFT,DRSHFT,0
 011550  027126  026633  026737
 011556  000000

 011560  027501  027522  027542         DTTBL:  .WORD   ROW1,ROW2,ROW3,ROW4,SPCB
 011566  027560  027602
 011572  027604  000000  027576                 .WORD   KYPD,0,CNTRA,SHFTA,SHFTA
 011600  027600  027600

                                        ;**********************************************************************
                                                ;SUBROUTINE TO ALLOW SETUP FROM MULTIPLE ENTRIES
                                        ;**********************************************************************

 011604                                 SETA:
```

K04

```
011604  012706  001100                     MOV     #$CMTAG,R6         ;;FIRST LOCATION TO BE CLEARED
011610  005026                             CLR     (R6)+              ;;CLEAR MEMORY LOCATION
011612  022706  001126                     CMP     #$BDDAT,R6         ;;DONE?
011616  001374                             BNE     .-6                ;;LOOP BACK IF NO
011620  012706  001100                     MOV     #STACK,SP          ;;SETUP THE STACK POINTER
011624  012737  020604  000020             MOV     #$SCOPE,@#IOTVEC   ;;IOT VECTOR FOR SCOPE ROUTINE
011632  012737  000340  000022             MOV     #340,@#IOTVEC+2    ;;LEVEL 7
011640  012737  021060  000030             MOV     #$ERROR,@#EMTVEC   ;;EMT VECTOR FOR ERROR ROUTINE
011646  012737  000340  000032             MOV     #340,@#EMTVEC+2    ;;LEVEL 7
```

```
011654  012737  022436  000034             MOV     #$TRAP,@#TRAPVEC   ;;TRAP VECTOR FOR TRAP CALLS
011662  012737  000340  000036             MOV     #340,@#TRAPVEC+2;LEVEL 7
011670  012737  022276  000024             MOV     #$PWRDN,@#PWRVEC   ;;POWER FAILURE VECTOR
011676  012737  000340  000026             MOV     #340,@#PWRVEC+2    ;;LEVEL 7
011704  013737  010536  010530             MOV     $ENDCT,$EOPCT      ;;SETUP END-OF-PROGRAM COUNTER
011712  005037  001156                     CLR     $TIMES             ;;INITIALIZE NUMBER OF ITERATIONS
011716  005037  001160                     CLR     $ESCAPE            ;;CLEAR THE ESCAPE ON ERROR ADDRESS
011722  112737  000001  001115             MOVB    #1,$ERMAX          ;;ALLOW ONE ERROR PER TEST
011730  012737  011730  001106             MOV     #.,$LPADR          ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
011736  012737  011736  001110             MOV     #.,$LPERR          ;;SETUP THE ERROR LOOP ADDRESS
011744  013746  000004                     MOV     @#4,-(SP)          ;;SAVE ERROR VECTOR
011750  013746  000006                     MOV     @#6,-(SP)
011754  012737  011770  000004             MOV     #1$,4              ;;SET UP TIMEOUT VECTOR
011762  005777  167150                     TST     @SWR               ;;TRY TO REFERENCE HARDWARE SWR
011766  000407                             BR      2$                 ;;BRANCH IF NO TIMEOUT TRAP OCCURS
011770  012737  000176  001136     1$:     MOV     #SWREG,SWR         ;;POINT TO SOFTWARE SWITCH REG.
011776  012737  000174  001140             MOV     #DISPREG,DISPLAY   ;;POINT TOSOFTWARE DISPLAY REG.
012004  022626                             CMP     (SP)+,(SP)+        ;;RESTORE STACK
012006  012637  000006             2$:     MOV     (SP)+,@#6          ;;RESTORE ERROR VECTOR
012012  012637  000004                     MOV     (SP)+,@#4
012016  104400  022542                     TYPE    ,STUPM   ;ISSUE SET-UP MESSAGE.
012022  012737  012042  000010             MOV     #TRPA,@#10         ;AND VECTOR
012030  000230                             SPL     0                  ;PROCESSOR IS 11/45?
012032  012737  000004  017072             MOV     #4,PMULT           ;YES-DELAY MULTIPLIER = 4
012040  000416                             BR      RTRP

012042  022626                     TRPA:   POP2SP                     ;NO
012044  012737  012066  000010             MOV     #TRPB,@#10         ;RELOAD TRAP ADDRESS
012052  006737  002160                     SXT     CHRD               ;PROCESSOR IS 11/40 OR 35?
012056  012737  000002  017072             MOV     #2,PMULT           ;YES-DELAY MULTIPLIER=2
012064  000404                             BR      RTRP

012066  022626                     TRPB:   POP2SP
012070  012737  000001  017072             MOV     #1,PMULT           ;PROCESSOR MUST BE 11/05
012076  012737  000012  000010     RTRP:   MOV     #12,@#10           ;RESTORE TRAP CATCHER
012104  105737  002174                     TSTB    MODE               ;CHECK MODE FOR CORRECT EXIT.
012110  001402                             BEQ     70$
012112  000137  002274                     JMP     MANSA              ;EXIT TO MANUAL SELECT
012116  000137  002240             70$:    JMP     AUTOA              ;EXIT TO AUTO MODE.
                                   ;************************************************************
                                           ;THIS ROUTINE MAPS ALL POSSIBL. DL11 ADDRESSES AND STORES
                                           ;THEM IN A TABLE (INTAB). ALL ADDRESSES WHICH DO NOT
                                           ;RESULT IN TIMEOUTS ARE STORED.
                                   ;************************************************************

012122  012701  000300             TRPVEC: MOV     #300,R1            ;START AT BEG. OF FLOATING VECTORS
012126  012702  000302                     MOV     #302,R2            ;
012132  012703  000004                     MOV     #4,R3              ;R3 CONTAINS IOT TRAP INST.
012136  010221                     1$:     MOV     R2,(R1)+           ;START LOADING ADDRESSES
012140  010321                             MOV     R3,(R1)+           ;LOAD THE TRAP
012142  062702  000004                     ADD     #4,R2              ;ASSUME 4 REGISTERS PER INTERFACE
012146  020127  001000                     CMP     R1,#1000           ;DONE?
```

```
012152  002771                            BLT     1$                ;NO CONTINUE LOADING TRAPS
012154  012737  000340  000006            MOV     #340,@#6          ;SET TIMEOUT TRAP TO A PSW OF 7.
012162  012737  012222  000004            MOV     #TPENT,@#4        ;SET UP TIME-OUT TRAP ADDRESS
012170  005001                            CLR     R1                ;CLEAR THE TABLE POINTER
```

```
012172  012705  001650                    MOV     #INTAB,R5         ;R5=DESTINATION TABLE
012176  016102  001714            FADD:   MOV     STRTAB(R1),R2     ;PUT THE ADDRESS TO BE TESTED IN R2
012202  026102  001722            TRPE:   CMP     ENDTAB(R1),R2     ;HAVE WE EXCEEDED END OF TABLE ADDRESS?
012206  103407                            BLO     TBLCK             ;YES GET NEXT BASE ADDRESS.
012210  005712                            TST     @R2               ;ADDRESS THE DEVICE IF POSSIBLE
012212  010225                            MOV     R2,(R5)+          ;IF WE GOT THIS FAR THERE IS A DEVICE THERE-SAVE IT
012214  062702  000010            FADD1:  ADD     #10,R2            ;INCREMENT TO THE NEXT POSSIBLE ADDRESS
012220  000770                            BR      TRPE              ;GO TEST THE NEXT ADDRESS
012222  022626                    TPENT:  POP2SP                    ;RESTORE THE STACK AND TEST
012224  000773                            BR      FADD1             ;NEXT ADDRESS
012226  005721                    TBLCK:  TST     (R1)+             ;BUMP AREA COUNTER BY 2.
012230  032701  000004                    BIT     #BIT02,R1         ;SEE IF BOTH DL11 AREAS CHECKED.
012234  001760                            BEQ     FADD              ;NO-GO CHECK THE OTHER AREA
012236  005015                            CLR     (R5)              ;SET UP TABLE TERMINATOR OF  ZEROS.
012240  000200                            RTS     R0
                                  ;*************************************************************
                                          ;THIS ROUTINE WILL INSURE THAT THE DEVICE(DL11)
                                          ;WILL INTERRUPT WHEN XMIT INT. ENABLE BIT IS SET.
                                  ;*************************************************************

012242  005046                    CDEV:   CLR     -(SP)             ;CLEAR THE PSW,LSI11 STYLE.
012244  012746  012252                    MOV     #100$,-(SP)
012250  000002                            RTI
012252  012737  000004  000004    100$:   MOV     #4,@#4            ;INSTALL IOT TRAP INST. AT LOCATION 4.
012260  012737  012356  000020            MOV     #TDEV,@#IOTVEC    ;SET UP IOT TRAP EXIT ADDRESS
012266  012737  000340  000022            MOV     #340,@#IOTVEC+2   ;SET PSW TO 7-ALLOW NO OTHER INTERRUPTS
012274  000005                            RESET                     ;INSURE ALL XMIT FLAGS HIGH.
012276  012703  001550                    MOV     #VVECT,R3         ;VECTOR STORAGE ADDRESS SET
012302  012702  001650                    MOV     #INTAB,R2         ;PRIMARY DEVICE TABLE ADDRESS SET
012306  012705  001610                    MOV     #DLTBL,R5         ;FIN DEVICE TABLE ADDRESS SET.
012312  012701  001730            CDEVA:  MOV     #VRCSR,R1         ;VT61 DEVICE ADDRESS SET.
012316  005712                            TST     (R2)              ;CHECKED ALL DEVICES?
012320  001506                            BEQ     AOUT              ;YES-EXIT
012322  100403                            BMI     1$                ;INSURE ADDRESS IS IN PROPER RANGE(17XXXX)

012324  062702  000002                    ADD     #2,R2             ;ADDRESS IS DEFINITELY NOT GOOD -PURGE
012330  000770                            BR      CDEVA             ;AND LOOK FOR ANOTHER.
012332  004037  013040            1$:     JSR     R0,LDADD          ;LOAD NEXT ADDRESSES TO BE CHECKED
012336  012701  001200                    MOV     #1200,R1          ;NOW USE R1 AS FAILSAFE COUNTER
012342  052777  000100  167364            BIS     #TENA,@VXCSR      ;SET XMIT ENABLE
012350  005301                            DEC     R1                ;IF DEVICE DOES NOT INTERRUPT WITHIN
012352  001376                            BNE     .-2               ;APPROX. 200US IT IS NOT A DL11.
012354  000756                            BR      CDEVA             ;THEREFORE, GO TRY ANOTHER DEVICE.
012356  042777  000100  167350    TDEV:   BIC     #TENA,@VXCSR      ;CLEAR XMIT ENABLE.
012364  162716  000010                    SUB     #10,(R6)          ;RESET TO RECEIVER VECTOR ADDRESS
012370  012613                            MOV     (R6)+,(R3)        ;STORE IT IN VECTOR TABLE(VVECT).
012372  005726                            TST     (R6)+             ;POP THE OLD PSW AND DISCARD
012374  022626                            POP2SP                    ;POP THE ADD. AND PSW PRIOR TO INTERRUPT.
                                  ;*************************************************************
                                          ;THIS ROUTINE IS A QUICK TEST OF ANY DL11 ENCOUNTERED
                                          ;A DATA PATTERN WILL BE RUN ON ALL ENTRIES IN INTAB
                                  ;*************************************************************
012376  005046                            CLR     -(SP)             ;CLEAR THE PSW,LSI11 STYLE.
012400  012746  012406                    MOV     #100$,-(SP)
012404  000002                            RTI
012406  012301                    100$:   MOV     (R3)+,R1          ;GET THE RECEIVE VECTOR ADDRESS
```

```
012410  012721  013650                   MOV     #RECAD,(R1)+        ;AND STORE SAME.
012414  012721  000340                   MOV     #340,(R1)+          ;SET RECEIVE PSW TO 7.
012420  012721  013732                   MOV     #TSMAD,(R1)+        ;STORE THE XMIT VECTOR ADDRESS
012424  012711  000340                   MOV     #340,(R1)           ;SET XMIT PSW TO 7.
012430  012704  000001                   MOV     #BIT00,R4           ;R4 IS NOW DATA PATTERN OF 1.
012434  005001                           CLR     R1                  ;SET UP FAILSAFE DELAY.
012436  052777  000100  167264           BIS     #RDENA,@VRCSR       ;SET RECEIVE ENABLE.
012444  052777  000104  167262           BIS     #TCOMB,@VXCSR       ;ENABLE XMIT INT. AND MAINTENACE .
012452  105704                   1$:     TSTB    R4                  ;XMIT PATTERN COMPLETE?
012454  001423                           BEQ     GDAD                ;YES GO STORE THIS ADDRESS
012456  005301                           DEC     R1                  ;CYCLE TIMEOUT DELAY
012460  001374                           BNE     1$                  ;NOT YET 'TIMEOUT',KEEP CYCLING.
012462  162703  000002                   SUB     #2,R3               ;RESET VECTOR POINTER
012466  042777  000104  167240           BIC     #TCOMB,@VXCSR       ;CLEAR XMIT AND RECEIVE INT. ENABLES.
012474  042777  000100  167226           BIC     #RDENA,@VRCSR
012502  104400  023020                   TYPE    ,DLERR              ;ISSUE DL11 FAILURE MESSAGE.
012506  013746  001730                   MOV     VRCSR,-(SP)         ;;SAVE VRCSR FOR TYPEOUT
                                                                     ;;TYPE BD. ADDRESS
012512  104402                           TYPOS                       ;;GO TYPE--OCTAL ASCII
012514     006                           .BYTE   6                   ;;TYPE 6 DIGIT(S)
012515     001                           .BYTE   1                   ;;TYPE LEADING ZEROS
012516  104400  001167                   TYPE    ,$CRLF
012522  000673                           BR      CDEVA               ;GO TRY ANOTHER SET OF ADDRESSES.
012524  013725  001730           GDAD:   MOV     VRCSR,(R5)+         ;SAVE GOOD ADDRESS IN DL TABLE
012530  005077  167176                   CLR     @VRBUF              ;CLEAR ANY RECEIVE FLAG STILL SET.
012534  000666                           BR      CDEVA               ;;CHECK ANOTHER DL11
012536  005015                   AOUT:   CLR     (R5)                ;SET A ZERO TABLE TERMINTATOR.
012540  012737  000006  000004           MOV     #6,@#4              ;RESTORE LOCATION 4 TO HALT CONDITION
012546  005037  000006                   CLR     @#6                 ;TO CATCH ERRORS AND ILLEGAL INTERRUPTS.
012552  012737  020604  000020           MOV     #$SCOPE,@#IOTVEC        ;RELOAD IOT VECTOR FOR SCOPE
012560  012737  000340  000022           MOV     #340,@#IOTVEC+2 ;LOOP.
012566  012701  000300                   MOV     #300,R1
012572  012702  000302                   MOV     #302,R2
012576  010221                   1$:     MOV     R2,(R1)+
012600  005021                           CLR     (R1)+               ;RESTORE HALTS TO ALL LOCATIONS CONTAINING IOTS
012602  062702  000004                   ADD     #4,R2
012606  020127  001000                   CMP     R1,#1000            ;TO LOCATION 1000
012612  103771                           BLO     1$
012614  000005                           RESET                       ;CLEAR ALL FLAGS
012616  000200                           RTS     R0

                                 ;*************************************************************
                                         ;INITIALIZATION ROUTINE FOR AUTO SELECTION. THIS ROUTINE
                                         ;WILL INSURE THAT ALL DL11S IN DLTBL HAVE A VT61 CONNECTED
                                         ;ALL UNITS WHICH CANNOT CORRECTLY RESPOND WILL BE PURGED.
                                 ;*************************************************************

012620  012702  001610           INITA:  MOV     #DLTBL,R2           ;R2 POINTS TO DL11 ADDRESS TABLE
012624  012703  001550                   MOV     #VVECT,R3           ;R3 POINTS TO DL11 VECTOR
012630  012701  001730           11$:    MOV     #VRCSR,R1           ;POINTER TO VT61 DL11
012634  005712                           TST     (R2)                ;SEE IF ALL CHECKED
012636  001447                           BEQ     INTXT               ;YES-EXIT
012640  004037  013040                   JSR     R0,LDADD            ;NO-GO LOAD THE ADDRESSES
012644  062703  000002                   ADD     #2,R3               ;UPDATE VECTOR COUNT
012650  004037  015326                   JSR     R0,ZFLAG            ;ISSUE ESCZ AND LOOK FOR RESPONSE.
012654                           2$:
```

```
012654  012637  002160                   MOV     (SP)+,CHRD          ;;POP STACK INTO CHRD
012660  100414                           BMI     5$                  ;TIMEOUT OCCURRED NO CHARACTER
012662  123727  002160  000140           CMPB    CHRD,#140           ;CHECK IDENT FOR VT61 IDENTIFIERS
```

```
012670  103410                                  BLO     5$              ;NOT A VT61-SET UP TO PURGE ADDRESS
012672  123727  002160  000172                  CMPB    CHRD,#172       ;IDENTS ARE SMALL A THRU Z
012700  101004                                  BHI     5$              ;NOT A VT61-PURGE
012702                                  4$:
012702  012637  002160                          MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
012706  001375                                  BNE     4$
012710  000747                                  BR      11$             ;TEST ANOTHER ADDRESS
012712                                  5$:
012712  012637  002160                          MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
012716  001375                                  BNE     5$
012720  162702  000002                          SUB     #2,R2           ;RESET ADDRESS AND VECTOR FOINTERS'
012724  162703  000002                          SUB     #2,R3
012730  010246                                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
012732  012746  000001                          MOV     #1,-(SP)        ;;PUSH #1 ON STACK
012736  004037  013250                          JSR     R0,BBLUP
012742  010346                                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
012744  012746  000001                          MOV     #1,-(SP)        ;;PUSH #1 ON STACK
012750  004037  013250                          JSR     R0,BBLUP
012754  000725                                  BR      11$             ;TRY ANOTHER DL11 ADDRESS.

012756  005737  001610                  INTXT:  TST     DLTBL           ;CHECK TO INSURE GOOD ADDRESSES
012762  001012                                  BNE     EXINT           ;YES-GO TO NEXT TEST
012764  104400  022727                          TYPE    ,NOVT           ;NO-ISSUE NO VT61 MESSAGE.
012770  012737  005670  017074                  MOV     #3000.,DCOUNT   ;SET DELAY TO 30 SEC.
012776  004037  017032                          JSR     R0,DELAY        ;AND DO IT.
013002  062700  000004                          ADD     #4,R0           ;SET UP 'NO VT61 FOUND' EXIT
013006  000200                                  RTS     R0
013010  012702  001610                  EXINT:  MOV     #DLTBL,R2       ;LOAD AND ISSUE GOOD ADDRESSES
013014  104400  022656                          TYPE    ,DUNTST         ;OF RESPONSIVE VT61S.
013020                                  1$:
013020  012246                                  MOV     (R2)+,-(SP)     ;;SAVE (R2)+ FOR TYPEOUT
                                                                        ;;TYPE AN ADDRESS
013022  104402                                  TYPOS                   ;;GO TYPE--OCTAL ASCII
013024     006                                  .BYTE   6               ;;TYPE 6 DIGIT(S)
013025     001                                  .BYTE   1               ;;TYPE LEADING ZEROS
013026  104400  001167                          TYPE    ,$CRLF
013032  005712                                  TST     (R2)            ;AT END OF GOOD UNITS?
013034  001371                                  BNE     1$              ;NO PRINT ANOTHER ADDRESS.
013036  000200                                  RTS     R0
                                        ;*************************************************************
```

```
                                                    ;SUBOUTINE TO LOAD 4 ADRESSES FROM THE LOCATION AT (R2).
                                                    ;TO 4 LOCATION POINTED TO BY R1(TO VXBUFF+2).ROUTINE USES R4 AS
                                                    ;WORK REG AND EXITSD WITH R2 INCREMENTED BY 2.
                                            ;*******************************************************

 013040  012204                             LDADD:  MOV     (R2)+,R4                ;LOAD THE ADDRESS
 013042  010421                             1$:     MOV     R4,(R1)+                ;STORE AN ADDRESS
 013044  062704  000002                             ADD     #2,R4                   ;INCREMENT ADDRESS
 013050  020127  001740                             CMP     R1,#VXBUF+2             ;LOADED 4?
 013054  002772                                     BLT     1$                      ;NO LOAD ANOTHER
 013056  000200                                     RTS     R0                      ;YES-EXIT

                                            ;*******************************************************
```

```
                                                    ;ROUTINE TO RECEIVE CHARACTER(S).  ENTERED WITH
                                                    ;NUMBER OF CHARACTERS TO RECEIVE ON THE STACK.
                                                    ;ROUTINE EXITS WITH CARACTER(S) ON STACK.  IF A
                                                    ;PROGRAM TIME-OUT (100 M.S.) OCCURS BEFORE A CHARACTER
                                                    ;IS RECEIVED ROUTINE EXITS WITH -1 ON STACK. FORMAT
                                                    ;FOR DATA IS (BYTE2, BYTE1) ETC.  A WORD OF ZEROS TERMINATES
                                                    ;DATA STRING ON THE STACK. SOM/EOM, IF SENT, ARE RECEIVED
                                                    ;BUT NOT STORED.

                                            ;*******************************************************

 013060                                     RECTM:
 013060  012637  002220                             MOV     (SP)+,ROSVE             ;;POP STACK INTO ROSVE
 013064  012637  002206                             MOV     (SP)+,@#BUBCT           ;;POP STACK INTO @#BUBCT
 013070  013746  002166                             MOV     ZERO,-(SP)              ;;PUSH ZERO ON STACK
 013074  005037  002160                     1$:     CLR     CHRD                    ;CLEAR CHARACTER STORAGE LOCATION.
 013100  005037  002216                             CLR     DLAY                    ;SET UP FAILSAFE DELAY
 013104  032777  000200  166616             3$:     BIT     #RECDN,@VRCSR           ;SEE IF DONE FLAG SET
 013112  001007                                     BNE     4$
 013114  005337  002216                             DEC     DLAY                    ;DECREMENT FAILSAFE CNTR.
 013120  001371                                     BNE     3$                      ;NOT AT ZERO-CONTINUE WAITING.
 013122  012737  177777  002160             31$:    MOV     #-1,CHRD                ;SET UP FOR FAILSAFE EXIT.
 013130  000442                                     BR      RECEX                   ;EXIT ROUTINE.
 013132  117737  166574  002160             4$:     MOVB    @VRBUF,CHRD             ;STORE THIS CHARACTER.
 013140  042737  000200  002160                     BIC     #200,CHRD               ;STRIP PARITY BIT.
 013146  122737  000057  002160                     CMPB    #SLSH,CHRD              ;RECEIVED A IDENT SLASH(57)?
 013154  001007                                     BNE     41$                     ;NO-STORE A CHARACTER.
 013156  105337  002207                             DECB    BUBCT+1                 ;DECREMENT ALLOWABLE SLASH COUNT.
 013162  001757                                     BEQ     31$                     ;COUNT EQUAL ZERO-SET UP ERROR EXIT.
 013164  123727  002207  000213                     CMPB    BUBCT+1,#139.           ;RECEIVED FIRST SLASH?
 013172  103740                                     BLO     1$                      ;YES-IGNORE THIS ONE.
 013174  122737  000002  002160             41$:    CMPB    #SOM,CHRD               ;IS CHAR. ACTUALLY SOM?
 013202  001003                                     BNE     5$                      ;NO
 013204  105237  002206                             INCB    BUBCT                   ;YES -SET UP TO RECEIVE EOM ALSO
 013210  000731                                     BR      1$                      ;AND RECEIVE NEXT CHAR.
 013212  122737  000004  002160             5$:     CMPB    #EOM,CHRD               ;CHAR. = EOM?
 013220  001410                                     BEQ     RECEXA                  ;YES- DO NOT PUSH IT ON STACK
 013222  105337  002206                             DECB    BUBCT                   ;DECREMENT CHARACTER COUNT.
 013226  001403                                     BEQ     RECEX                   ;COUNT=0. EXIT WERE DONE.
 013230  013746  002160                             MOV     CHRD,-(SP)              ;;PUSH CHRD ON STACK
 013234  000717                                     BR      1$                      ;GO READ AGAIN.

 013236                                     RECEX:
 013236  013746  002160                             MOV     CHRD,-(SP)              ;;PUSH CHRD ON STACK
 013242                                     RECEXA:
 013242  013746  002220                             MOV     ROSVE,-(SP)             ;;PUSH ROSVE ON STACK
 013246  000200                                     RTS     R0
```

```
                                        ;**********************************************************
                                                ;THIS ROUTINE WILL 'BUBBLE UP' XX WORDS TO
                                                ;ELIMINATE NON-RESPONSIVE ADDRESSES.  ENTERED
                                                ;WITH ADDRESS TO BE 'BUBBLED' TO ON THE STACK. LOCATIONS
                                                ;ELIMINATED WILL BE FILLED WITH ZEROS.  THE STACK MUST ALSO
                                                ;BE LOADED WITH THE NUMBER OF POSITIONS TO BUBBLE.
                                        ;**********************************************************
```

```
013250                                  BBLUP:
013250  012637  002220                          MOV     (SP)+,ROSVE             ;;POP STACK INTO ROSVE
013254  012637  002206                          MOV     (SP)+,BUBCT             ;;POP STACK INTO BUBCT
013260  012637  002204                          MOV     (SP)+,TOADD             ;;POP STACK INTO TOADD
013264  010446                                  MOV     R4,-(SP)                ;;PUSH R4 ON STACK
013266  013704  002204                  2$:     MOV     @#TOADD,R4              ;PUT LAST GOOD DL11 ADDRESS IN R4
013272  012437  002160                          MOV     (R4)+,CHRD              ;MOVE NEXT WORD TO CHRD FOR STORAGE
013276  012464  177774                  1$:     MOV     (R4)+,-4(R4)            ;BUBBLE UP DATA.
013302  001375                                  BNE     1$                      ;BUBBLE UNTIL ZERO BYTE MOVED.
013304  005337  002206                          DEC     BUBCT                   ;SUBTRACT ONE FROM BUBBLE COUNT.
013310  001366                                  BNE     2$                      ;IF BUBBLE COUNT NOT ZERO - DO AGAIN.
013312                                  3$:
013312  012604                                  MOV     (SP)+,R4                ;;POP STACK INTO R4
013314  013746  002220                          MOV     ROSVE,-(SP)             ;;PUSH ROSVE ON STACK
013320  000200                                  RTS     R0                      ;YES-EXIT

                                        ;**********************************************************
                                                ;THIS ROUTINE OUTPUTS THE ESC SEQNENCE FOUND ON
                                                ;THE STACK. A WORD OF ZEROS MUST TERMINATE THE SEQUENCE.
                                                ;FORMAT FOR STACK WORD IS SEQ-ESC, IE-XXX033.
                                        ;**********************************************************

013322                                  TESC:
013322  012637  002220                          MOV     (SP)+,ROSVE             ;;POP STACK INTO ROSVE
013326  010437  002206                          MOV     R4,BUBCT                ;SAVE R4.
013332  112777  000002  166376                  MOVB    #SOM,@VXBUF             ;SEND A START OF MESSAGE.
013340  012705  177777                  1$:     MOV     #-1,R5                  ;ALL ONES THO CHECK LOCATION.
013344  012604                                  MOV     (R6)+,R4                ;GET COMMAND FROM STACK.
013346  001415                                  BEQ     3$                      ;IF ZERO TERMINATOR FOUND-EXIT.
013350  110405                                  MOVB    R4,R5                   ;LOAD CHECK BYTE.
013352  105704                          2$:     TSTB    R4                      ;CHECK BYTE FOR A ZERO.
013354  001406                                  BEQ     20$                     ;IF ZERO-DO NOT XMIT IT.
013356  032777  000200  166350                  BIT     #TRDY,@VXCSR
013364  001774                                  BEQ     .-6                     ;WAIT FOR XMIT READY BIT
013366  110477  166344                          MOVB    R4,@VXBUF               ;XMMIT A BYTE.
013372  000304                          20$:    SWAB    R4                      ;GET THE OTHER BYTE .
013374  120405                                  CMPB    R4,R5                   ;IF GOOD COMPARE WE HAVE CHECKED BOTH
013376  001760                                  BEQ     1$                      ;BYTES SO POP ANOTHER WORD.
013400  000764                                  BR      2$                      ;GO XMIT ANOTHER BYTE
013402  032777  000200  166324  3$:     BIT     #TRDY,@VXCSR            ;SEE IF READY SET
013410  001774                                  BEQ     .-6
013412  012777  000004  166316                  MOV     #EOM,@VXBUF             ;SEND A EOM.
013420  032777  000200  166306                  BIT     #TRDY,@VXCSR            ;SEE IF READY SET
013426  001774                                  BEQ     .-6
013430  013704  002206                          MOV     BUBCT,R4                ;RESTORE R4.
013434  013746  002220                          MOV     ROSVE,-(SP)             ;;PUSH ROSVE ON STACK
013440  000200                                  RTS     R0

                                        ;**********************************************************
                                                ;ROUTINE TO READ A CHARACTER FROM THE CONSOLE.
                                                ;EXITS WITH CHARACTER ON THE STACK.
```

D05

```
                                         ;*************************************************************

013442                                   CONRD:
013442  012637  002220                           MOV     (SP)+,ROSVE             ;;POP STACK INTO ROSVE
```

```
013446  032777  000200  165466                   BIT     #RECDN,@$TKS            ;LOOK FOR DONE BIT
013454  001774                                   BEQ     .-6                     ;WAIT FOR IT
013456  117746  165462                           MOVB    @$TKB,-(R6)             ;PUSH CHARACTER TO STACK
013462  042716  000200                           BIC     #200,(R6)               ;STRIP ANY PARITY BIT.
013466  013746  002220                           MOV     ROSVE,-(SP)             ;;PUSH ROSVE ON STACK
013472  000200                                   RTS     R0

                                         ;*************************************************************
                                                 ;MANUAL TEST SELECT MONITOR
                                                 ;SELECTS TESTS TO BE EXECUTED FROM THOSE ENTERED IN
                                                 ;INITIAL DIALOGE. IF TEST 377 WAS REQUESTED THE TESTS WILL
                                                 ;REPEAT INFINITELY.
                                         ;*************************************************************

013474  105737  002174                   MONIT:  TSTB    MODE                    ;TEST MODE SWITCH
013500  001012                                   BNE     1$                      ;MANUAL MODE
013502  023737  002176  002200                   CMP     FTLCNT,ALWCNT           ;COMPARE FATAL XMITS WITH ALLOWED.
013510  103405                                   BLO     100$                    ;FATALS LESS THAN ALLOWED-CONTINUE.
013512  104400  024461                           TYPE    ,DABRT                  ;ISSUE ABORT MESSAGE.
013516  000005                           200$:   RESET                           ;CLEAR ALL INTERFACE FLAGS.
013520  000137  011604                           JMP     SETA                    ;SET UP TO RESTART TEST.
013524  000200                           100$:   RTS     R0                      ;AUTO MODE
013526  005726                           1$:     TST     (R6)+                   ;POP THE STACK
013530  022626                                   POP2SP                          ;POP SCOPE RETURN AND VECTOR
013532  005037  002176                           CLR     FTLCNT                  ;DO NOT INC. FATAL COUNT IN MANUAL MODE.
013536  032777  000200  165376           10$:    BIT     #RECDN,@$TKS            ;CONSOLE ACTIVE?
013544  001407                                   BEQ     11$
013546  117701  165372                           MOVB    @$TKB,R1                ;STORE INPUT BUFFER
013552  042701  000200                           BIC     #200,R1                 ;CLEAR THE PARITY BIT
013556  122701  000003                           CMPB    #3,R1                   ;CHAR. EQUAL ESC. C?
013562  001755                                   BEQ     200$                    ;YES-EXIT
013564  117701  166402                   11$:    MOVB    @TSTPTR,R1              ;GET THE NEXT TEST #
013570  003005                                   BGT     2$                      ;NOT AT END OF LIST
013572  042777  000100  166130                   BIC     #RDENA,@VRCSR           ;CLEAR REC. INTERRUPTS BEFORE NEXT UNIT SELECT.
013600  000137  002516                           JMP     MODCA                   ;END OF LIST-GO SET UP NEXT 61
013604  005301                           2$:    DEC     R1                      ;ADJUST OFFSET
013606  006301                                   ASL     R1                      ;USE TEST # TO FORM ADDRESS OFFSET
013610  016137  022472  013646                   MOV     TSTADD(R1),JMPADD+2     ;LOAD NEW ADDRESS
013616  062737  000002  013646                   ADD     #2,JMPADD+2             ;BYPASS INITIAL SCOPE LOOP
013624  005237  002172                           INC     TSTPTR                  ;INCREMENT TEST OPINTER
013630  005037  177776                           CLR     PSW                     ;SET NON-INT. PRIORITY TO ZERO
013634  005046                                   CLR     -(SP)                   ;CLEAR THE PSW,LSI 11 STYLE.
013636  012746  013644                           MOV     #JMPADD,-(SP)
013642  000002                                   RTI
013644  000137  013644                   JMPADD: JMP     JMPADD                  ;EXIT TO NEXT SELECTED TEST
                                         ;************************************************************
                                         ;************************************************************
                                                         ;FOLLOWING ROUTINES ARE INTERRUPT HANDLERS FOR THE
                                                         ;DL11 QUICK-TEST.

                                         ;************************************************************
                                         ;************************************************************
013650  117737  166056  002160           RECAD:  MOVB    @VRBUF,CHRD             ;GET THE RECEIVED CHAR.
013656  042737  000200  002160                   BIC     #200,CHRD               ;CLEAR ANY PARITY.
013664  120437  002160                           CMPB    R4,CHRD                 ;COMPARE RECEIVED TO XMITTED
013670  001407                                   BEQ     UPD4                    ;AND UPDATE PATTERN IF OK.
013672  042777  000104  166034           TOFF:   BIC     #TCOMB,@VXCSR           ;DATA ERROR OCCURED OR WE ARE DONE
```

```
013700  042777  000100  166022          BIC     #RDENA,@VRCSR     ;EITHER WAY-EXIT.
013706  000002                  REEX:   RTI
013710  052777  000100  166016  UPD4:   BIS     #TENA,@VXCSR      ;ENABLE XMIT INT.
013716  106304                          ASLB    R4                ;UPDATE DATA PATTERN.
013720  032704  000200                  BIT     #BIT07,R4         ;ROTATED TO PARITY BIT?
013724  001770                          BEQ     REEX              ;NO-CONTINUE TESTING
013726  005004                          CLR     R4                ;YES-SET UP COMPLETE FLAG
013730  000760                          BR      TOFF              ;AND EXIT.
013732  110477  166000          TSMAD:  MOVB    R4,@VXBUF         ;XMIT DATA
013736  042777  000100  165770          BIC     #TENA,@VXCSR      ;CLEAR XMIT INT. UNTIL LAST BIT REC.
013744  000002                          RTI


                                ;*****************************************************************
                                        ;RECEIVE INTERRUPT ROUTINE.AFTER EACH RECEIVE
                                        ;CYCLE BUFFER POINTER (RBUFP) WILL BE SET TO (RBBUF).
                                        ;MAX. EXECUTION TIME IS APPROX 200US, AVERAGE =100US.
                                        ;UPON RECEIPT OF XON, XMTKIL BIT IS CHECKED IN VSTAT
                                        ;AND IF SET, WILL BE CLEARED AND XMIT INT. ENABLE SET.
                                        ;LOCATION ESAMB IS USED FOR ESC ASSEMBLY FLAGS. IE. BIT
                                        ;00 SET MEANS A033 WAS RECEIVED, BIT 01 SET MEANS AN ESCP
                                        ;SEQUENCE IS BEING ASSEMBLED. BIT 03
                                        ;SET INDICATES AND ESCAPE O SEQUENCE IS BEING ASSEMBLED.
                                        ;LOCATIONS STRO AND STRP ARE USED TO STORE ESCAPE
                                        ;O AND ESCAPE P SEQUENCES DETECTED,BUT NOT UTILIZED IN TEST.
                                ;*****************************************************************

013746                          INTRC:
013746  010146                          MOV     R1,-(SP)          ;;PUSH R1 ON STACK
013750  017701  165756                  MOV     @VRBUF,R1         ;USE R1 FOR  STORAGE OF STATUS AND CH.
013754  042701  000200                  BIC     #200,R1           ;STRIP PARITY BIT.
013760  032737  000100  002222          BIT     #TXSUM,VSTAT      ;CHECKSUM CALCULATION REQUESTED?
013766  001403                          BEQ     11$               ;NO
013770  010105                          MOV     R1,R5             ;YES-STORE CHAR. AND
013772  004037  017516                  JSR     R0,CALCK          ;CALCULATE THE CHECKSUM.
013776  005237  031030          11$:    INC     ABUFP             ;INCREMINT THE RAW DATA POINTER
014002  023727  031030  031114          CMP     ABUFP,#ABBUF+50.          ;AT THE END OF BUFFER?
014010  001003                          BNE     12$               ;NO
014012  012737  031032  031030          MOV     #ABBUF,ABUFP      ;YES-RESET IT
014020  110177  015004          12$:    MOVB    R1,@ABUFP         ;STORE THE RAW DATA
014024  001505                          BEQ     6$                ;IF CHAR. IS NULL-GO STORE IT
014026  032737  000013  014636          BIT     #BIT00+BIT01+BIT03,ESAMB        ;ESC OR ESC O?
014034  001150                          BNE     ASESC             ;YES-KEEP ASSEMBLING
014036  120137  002130                  CMPB    R1,ESCN           ;BYTE = ESCN?
014042  101076                          BHI     6$                ;NO-PROBABLY A DISPLAY CH.-STORE IT.
014044  001007                          BNE     1$                ;NO-DECODE FOR XON,XOFF,SOM,EOM
014046  012737  000001  014636          MOV     #1,ESAMB          ;YES SET ESC ASSEMBLY FLAG.
014054  052737  000400  002222          BIS     #ESC,VSTAT        ;SET ESC RECEIVED FLAG
014062  000515                          BR      RSTER             ;AND EXIT
014064  120127  000023          1$:     CMPB    R1,#XOFF          ;SEE IF RECEIVED BYTE WAS XOFF
014070  001004                          BNE     2$                ;NO
014072  052737  100000  002222          BIS     #RXOFF,VSTAT      ;YES, SET XOFF IN STATUS REG.
014100  000506                          BR      RSTER             ;EXIT
014102  120127  000021          2$:     CMPB    R1,#XON           ;SEE IF BYTE WAS XON
014106  001016                          BNE     3$                ;NO
014110  042737  100000  002222          BIC     #RXOFF,VSTAT      ;YES, CLEAR XOFF IN VSTAT.
014116  032737  000200  002222          BIT     #XMKIL,VSTAT      ;CHECK XMIT KILL BIT.
```

```
014124  001474                          BEQ     RSTER             ;NOT SET, EXIT
014126  052777  000100  165600          BIS     #TENA,@VXCSR      ;SET XMIT INT. ENABLE.
014134  042737  000200  002222          BIC     #XMKIL,VSTAT      ;CLEAR THE XMIT KILLED FLAG
```

F05

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014142  000465                                BR      RSTER            ;EXIT
014144  120127  000002            3$:         CMPB    R1,#SOM          ;SEE IF BYTE WAS SOM
014150  001004                                BNE     4$               ;NO
014152  052737  040000  002222    31$:        BIS     #RSOM,VSTAT      ;YES, SET SOM IN VSTAT.
014160  000456                                BR      RSTER            ;EXIT

014162  120127  000004            4$:         CMPB    R1,#EOM          ;WAS BYTE EOM?
014166  001012                                BNE     5$               ;NO
014170  052737  020000  002222                BIS     #REOM,VSTAT      ;NOW SET EOM IN VSTAT.
014176  013737  014630  014634                MOV     RBBUF,RBUFP      ;RESET THE BUFFER POINTER.
014204  042737  000100  002222                BIC     #TXSUM,VSTAT     ;CLEAR CHECKSUM REQUEST BIT.
014212  000441                                BR      RSTER            ;AND EXIT
014214  123701  001750            5$:         CMPB    CARRT,R1         ;CHAR. =CARRIAGE RETURN?
014220  001403                                BEQ     51$              ;YES-GO SET END OF LINE FLAG
014222  123701  001752                        CMPB    LNFED,R1         ;CHAR.= LINEFEED?
014226  001004                                BNE     6$               ;NO- GO STORE IT
014230  052737  001000  002222    51$:        BIS     #EPL,VSTAT       ;SET END OF LINE INDICATOR
014236  000427                                BR      RSTER

014240  023737  014634  014632    6$:         CMP     RBUFP,REBUF      ;IS CIRCULAR BUFFER FILLED?
014246  001003                                BNE     61$              ;NO
014250  013737  014630  014634                MOV     RBBUF,RBUFP      ;YES, RESET POINTER TO BEGINNING
014256  032737  000020  002222    61$:        BIT     #COMGP,VSTAT     ;RECEIVING GRAPHICS CHAR.?
014264  001402                                BEQ     7$               ;NO
014266  162701  000137                        SUB     #137,R1          ;YES-SUBTRACT 137 FROM RECEIVED CHAR.

014272  032737  000040  002222    7$:         BIT     #REVID,VSTAT     ;REVERSE VIDEO MODE?
014300  001402                                BEQ     70$              ;NO STORE RECEIVED BYTE.
014302  052701  000200                        BIS     #200,R1          ;YES-FORCE BIT7 AS REV. VIDEO IND.
014306  110177  000322            70$:        MOVB    R1,@RBUFP        ;STORE BYTE AND
014312  005237  014634                        INC     RBUFP            ;INCREMENT POINTER.

014316  005701                    RSTER:      TST     R1               ;CHECK FOR STATUS ERROR
014320  100014                                BPL     RECXT            ;NO, EXIT ROUTINE

014322  052737  004000  002222                BIS     #RSTT,VSTAT      ;SET STATUS ERROR FLAG IN VSTAT
014330  027727  000326  177777                CMP     @STTEP,#-1       ;IS ERROR TABLE FULL?
014336  001405                                BEQ     RECXT            ;YES, EXIT ROUTINE
014340  010177  000316                        MOV     R1,@STTEP        ;NO, STORE STATUS ERR. AND CHECK
014344  062737  000002  014662                ADD     #2,STTEP         ;INCREMENT STATUS ERR. POINTER

014352                            RECXT:
014352  012601                                MOV     (SP)+,R1         ;;POP STACK INTO R1
014354  000002                                RTI                      ;EXIT
014356  032737  000002  014636    ASESC:      BIT     #2,ESAMB         ;ASSEMBLING ESC P?
014364  001063                                BNE     AESCP            ;YES-GO GET LAST CH,
014366  032737  000010  014636                BIT     #BIT03,ESAMB     ;ASSEMBLING ESC O?
014374  001062                                BNE     AESCO            ;YES
014376  122701  000120                        CMPB    #120,R1          ;CH.= A P?
014402  001004                                BNE     10$              ;NO KEEP CHECKING
014404  052737  000002  014636                BIS     #BIT01,ESAMB     ;YES-SET ESCP ASSEMBLY FLAG
014412  000741                                BR      RSTER            ;AND EXIT
014414  122701  000077            10$:        CMPB    #77,R1           ;CHAR.IS AN ESC ? ?
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DZVTH.P11       END OF PASS ROUTINE                                                                    SEQ 0059

014420  001403                                BEQ     110$             ;YES-FAKE AN ESC O.
014422  122701  000117                        CMPB    #117,R1          ;CHAR = O?
014426  001004                                BNE     11$              ;NO
014430  052737  000010  014636    110$:       BIS     #BIT03,ESAMB     ;YES SET ESC O ASSEMBLY FLAG
014436  000727                                BR      RSTER            ;AND EXIT
014440  123701  002052            11$:        CMPB    RDCUR,R1         ;BYTE= CURSOR POSITION?
014444  001004                                BNE     1$               ;NO-
014446  052737  000004  002222                BIS     #CURPOS,VSTAT    ;YES-SET RECEIVED CURSOR POSITION.
```

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014454  000424                          BR      CESAM
014456  122701  000057          1$:     CMPB    #SLSH,R1        ;BYTE=TERMINAL ID ESC?
014462  001004                          BNE     2$              ;NO-CHECK FOR GRAPHICS SEQUENCE.
014464  052737  000002  002222          BIS     #TRMID,VSTAT    ;YES-SET TERM. IDENT FLAG IN VSTAT
014472  000415                          BR      CESAM
014474  122701  000106          2$:     CMPB    #CKGP,R1        ;RECEIVED GRAPHICS CHAR. SEQUENCE?
014500  001004                          BNE     3$              ;NO
014502  052737  000020  002222          BIS     #COMGP,VSTAT    ;YES-SET GRAPHICS DATA FLAG.
014510  000406                          BR      CESAM
014512  122701  000107          3$:     CMPB    #NCKGP,R1       ;RECEIVED RESET GRAPHICS SEQ.?
014516  001003                          BNE     CESAM           ;NO
014520  042737  000020  002222          BIC     #COMGP,VSTAT    ;YES-SET NORMAL CHAR. RECEIVE.
014526  005037  014636          CESAM:  CLR     ESAMB           ;CLEAR ASSEMBLY FLAG.
014532  000671                          BR      RSTER           ;AND EXIT.

014534  110137  014666          AESCP:  MOVB    R1,STRP         ;STORE ANY UNCHECKED FOR  ESC. P
014540  000772                          BR      CESAM

014542  123701  002020          AESCO:  CMPB    EEMP,R1         ;BYTE=ESC O  -REV. VIDEO- ?
014546  001004                          BNE     1$              ;NO
014550  052737  000040  002222          BIS     #REVID,VSTAT    ;YES-SET REVERSE VIDEO MODE IN VSTAT.
014556  000763                          BR      CESAM

014560  123701  002022          1$:     CMPB    DEMP,R1         ;BYTE=ESC O DISABLE REV. VIDEO MODE?
014564  001004                          BNE     2$              ;NO
014566  042737  000040  002222          BIC     #REVID,VSTAT    ;YES-CLEAR REVERSE VIDEO MODE IN VSTAT.
014574  000754                          BR      CESAM
014576  122701  000171          2$:     CMPB    #CPABRT,R1      ;COPIER ABORT?
014602  001403                          BEQ     3$              ;YES-SET ABORT FLAG IN VSTAT
014604  122701  000172                  CMPB    #PRABRT,R1      ;PRINTER ABORT?
014610  001004                          BNE     4$              ;NO
014612  052737  010000  002222  3$:     BIS     #PABRT,VSTAT    ;YES-SET THE ABORT FLAG.
014620  000742                          BR      CESAM           ;AND EXIT.
014622  110137  014664          4$:     MOVB    R1,STRO         ;STORE ESCAPE O COMMAND .
014626  000737                          BR      CESAM

014630  000000                  RBBUF:  .WORD                   ;ADDRESS OF STAT OF BUFFER
014632  000000                  REBUF:  .WORD                   ;ADDRESS OF END OF BUFFER.
014634  000000                  RBUFP:  .WORD                   ;READ BUFFER POINTER.
014636  000000                  ESAMB:  .WORD   0               ;ESCAPE SEQ.ASSEMBLY AREA

014640                          STTER:
014640  000000                          0
014642  000000                          0
014644  000000                          0
014646  000000                          0
014650  000000                          0
014652  000000                          0
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014654  000000                          0
014656  000000                          0
014660  177777                          .WORD   -1              ;STATUS REGISTER DELIMITER.
014662  000000                  STTEP:  .WORD                   ;STATUS ERROR POINTER.
014664  000000                  STRO:   .WORD   0               ;ESCAPE O STORAGE
014666  000000                  STRP:   .WORD                   ;ESCAPE P STORAGE

                                ;*************************************************************
                                        ;TRANSMIT INTERRUPT ROUTINE.
                                        ;  IF XOFF BIT IS SET IN VSTAT , TRANSMISSION WILL NOT OCCUR
                                        ;AND XMIT INT. ENABLE BIT WILL BE CLEARED AND THE ROUTINE
                                        ;WILL BE EXITED IMMEDIATELY. IF AFTER THE TRANSMISSION
                                        ;OF THE CHARACTER DURING THIS INTERRUPT CYCLE, THE
```

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                                         ;XMIT COUNT (XMCNT) IS EQUAL TO ZERO,
                                         ;THE XMIT DONE BIT WILL BE SET IN VSTAT AND XMIT
                                         ;INT ENABLE BIT WILL CLEARED. TRANSMIT COUNT(XMCNT) MUST BE
                                         ;SET TO THE NUMBER OF BYTE/CHARACTER TO TRANSMIT.
                                         ;IF LOCATION BLKM IS SET TO 1001,A SOM WILL PRECEED THE
                                         ;DATA AND A EOM WILL FOLLOW IT. IF XMZER IS SET TO NON-
                                         ;ZERO, ALL DATA(INCLUDING ZEROS) WILL BE XMITTED.
                                 ;*******************************************************
014670  005737  002222          INTXM:  TST     VSTAT           ;HAS 61 TRANSMITTED XOFF?
014674  100004                          BPL     NOKIL           ;NO XMIT ANOTHER
014676  052737  000200  002222          BIS     #XMKIL,VSTAT    ;SET XMIT KILLED BIT IN VSTAT
014704  000510                          BR      KIENA           ;GO KILL XMIT ENABLE

014706  105737  002225          NOKIL:  TSTB    BLKM+1          ;SOM/EOM TRANSMIT?
014712  001406                          BEQ     NOSOM           ;NO
014714  112777  000002  165014          MOVB    #SOM,@VXBUF     ;YES-ISSUE START OF MESSAGE.
014722  105037  002225                  CLRB    BLKM+1          ;AND CLEAR SOM FLAG.
014726  000002                          RTI
014730  005737  015144          NOSOM:  TST     XMCNT           ;XMITTED THE BUFFER?
014734  001006                          BNE     100$            ;NO-XMIT A NORMAL CHAR.
014736  112777  000004  164772          MOVB    #EOM,@VXBUF     ;YES SEND EOM AND EXIT
014744  105037  002224                  CLRB    BLKM
014750  000452                          BR      2$
014752  105777  000164          100$:   TSTB    @TBUFP          ;CHECK FOR CH.= ZERO. IF SO DO NOT XMIT
014756  001016                          BNE     1$              ;OR COUNT BYTE. OR ARE WE
014760  005737  020466                  TST     XMZER           ;XMITTING ZEROS?
014764  001023                          BNE     22$             ;YES-XMIT NEXT BYTE
014766  023737  015142  015140          CMP     TBUFP,TEBUF     ;AT END OF BUFFER?
014774  001004                          BNE     10$             ;NO
014776  013737  015136  015142          MOV     TBBUF,TBUFP     ;YES-RESET BUFFER POINTER
015004  000740                          BR      NOKIL
015006  005237  015142          10$:    INC     TBUFP
015012  000735                          BR      NOKIL           ;LOOK FOR NON-ZERO BYTE TO TRANSMIT.

015014  032737  002000  002222  1$:     BIT     #CKSUM,VSTAT    ;CHECKSUM REQUESTED?
015022  001404                          BEQ     22$
015024  117705  000112                  MOVB    @TBUFP,R5       ;YES,LOAD THE BYTE
015030  004037  017516                  JSR     R0,CALCK        ;AND CALCULATE THE NEW CHECKSUM.
015034  117777  000102  164674  22$:    MOVB    @TBUFP,@VXBUF   ;TRAMSMIT A CHARACTER
015042  023737  015142  015140          CMP     TBUFP,TEBUF     ;AT END OF CIRCULAR BUFFER?
015050  001004                          BNE     11$             ;NO
015052  013737  015136  015142          MOV     TBBUF,TBUFP     ;YES, RESET IT TO START.
015060  000402                          BR      12$             ;BY-PASS INCREMENT BUFF. POINTER
```

```
015062  005237  015142          11$:    INC     TBUFP           ;INCREMENT BUFFER POINTER.

015066  005337  015144          12$:    DEC     XMCNT           ;DECREMENT THE TRANSMIT COUNT
015072  001401                          BEQ     2$              ;YES,CLEANUP,REQUEST ERRORS AND EXIT.
015074  000002                          RTI                     ;NO, CONTINUE
015076  105737  002224          2$:     TSTB    BLKM            ;SOM/EOM XMIT?
015102  001014                          BNE     TXEX            ;YES-DO NOT SET XMDNE UNTIL EOM SENT.
015104  052737  000001  002222          BIS     #XMDNE,VSTAT    ;SET THE DONE BIT IN VSTAT.
015112  042737  002000  002222          BIC     #CKSUM,VSTAT    ;CLEAR THE CHECKSUM FLAG WHEN DONE.
015120  013737  015136  015142          MOV     TBBUF,TBUFP     ;RESET BUFFER POINTER.
015126  042777  000100  164600  KIENA:  BIC     #TENA,@VXCSR    ;CLEAR XMIT. INT. ENABLE
015134  000002                  TXEX:   RTI



015136  000000                  TBBUF:  .WORD                   ;CONTAINS INITIAL ADDRESS
015140  000000                  TEBUF:  .WORD                   ;CONTAIN LAST ADDRESS
015142  000000                  TBUFP:  .WORD                   ;CONTAINS CURRENT LOCATION

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I05

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015144  000000                          XMCNT:  .WORD   0       ;LOADED WITH NUMBER OF XMITS.
                                        ;*************************************************************


                                                ;SUBROUTINE TO ISSUE RESET TO THE VT61, ENTERS MAINTENANCE MODE
                                                ;AND FORCES LINEAR ADDRESSING.
                                        ;*************************************************************

015146  113737  001102  002226          RESETV: MOVB    $TSTNM,TSTNM    ;LOAD THE TEST NUMBER IN ERROR PRINT AREA.
015154  013746  002166                          MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
015160  013746  002126                          MOV     RESET,-(SP)     ;;PUSH RESET ON STACK
015164  013746  002056                          MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
015170  004037  013322                          JSR     RO,TESC         ;GO XIMT IT
015174  004037  015256                          JSR     RO,GETON        ;GO LOOK FOR XON.
015200  000405                                  BR      1$              ;FOUND IT.
015202  005237  002176                          INC     FTLCNT          ;ADD 1 TO FATAL XMIT COUNT.
015206  010037  001120                          MOV     RO,$GDADR       ;NO XON ISSUE XON ERROR
015212  104017                                  ERROR   17
015214                                  1$:
015214  013746  002166                          MOV     ZERO,-(SP)      ;;PUSH ZERO ON STACK
015220  013746  002002                          MOV     EMAIN,-(SP)     ;;PUSH EMAIN ON STACK
015224  013746  002056                          MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
015230  013746  002012                          MOV     DRECT,-(SP)     ;;PUSH DRECT ON STACK
015234  013746  002056                          MOV     ESCO,-(SP)      ;;PUSH ESCO ON STACK
015240  004037  013322                  2$:     JSR     RO,TESC
015244  005037  002222                          CLR     VSTAT           ;CLEAR INT. FLAGS AFTER TERMINAL RESET
015250  005037  016746                          CLR     HDFLG           ;CLEAR PRINT HEADER FLAG.
015254  000200                                  RTS     RO

                                        ;*************************************************************
                                                ;SUBROUTINE TO WAIT FOR AN XON. NO XON EXIT IS PC +2.
                                        ;*************************************************************

015256  012737  000454  002206          GETON:  MOV     #300.,BUBCT     ;SET UP TO LOOK FOR 3 SEC.
015264  105077  013540                          CLRB    @ABUFP
015270  127727  013534  000021          1$:     CMPB    @ABUFP,#XON     ;RECEIVED A XON?
015276  001412                                  BEQ     GOTON           ;YES-EXIT.
015300  012737  000001  017074                  MOV     #1,DCOUNT       ;NO-DELAY 10 M.S.
```

```
015306  004037  017032                          JSR     RO,DELAY
015312  005337  002206                          DEC     BUBCT           ;AT END OF DELAY?
015316  001364                                  BNE     1$              ;NO
015320  062700  000002                          ADD     #2,RO           ;YES-SET UP ERROR EXIT.
015324  000200                          GOTON:  RTS     RO

                                        ;*************************************************************

                                                ;SUBROUTINE TO ISSUE ESCZ AND LOOK FOR A RESPONSE-EITHER
                                                ;A -1 OR THE RETURNED IDENT. THE -1 INDICATES NO
                                                ;RESPONSE FROM THE UNIT UNDER TEST.
                                        ;*************************************************************

015326                                  ZFLAG:
015326  012637  015364                          MOV     (SP)+,ROSV1     ;;POP STACK INTO ROSV1
015332  013746  002166                          MOV     @#ZERO,-(SP)    ;;PUSH @#ZERO ON STACK
015336  013746  002124                          MOV     @#ESCZ,-(SP)    ;;PUSH @#ESCZ ON STACK
015342  004037  013322                          JSR     RO,TESC         ;GO ISSUE ESZ SEQUENCE
015346  012746  106003                          MOV     #106003,-(SP)   ;;PUSH #106003 ON STACK
015352  004037  013060                          JSR     RO,RECTM        ;GO READ THE CHARACTER
015356  013746  015364                          MOV     ROSV1,-(SP)     ;;PUSH ROSV1 ON STACK
015362  000200                                  RTS     RO
015364  000000                          ROSV1:  .WORD   0
```

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                                  ;**********************************************************
                                                 ;ROUTINE TO CHECK SOFTWARE STATUS REGISTER (VSTAT)
                                                 ;RECEIVE FLAGS ONLY.  ENTERED WITH ANTICIPATED
                                                 ;STATUS WORD ON THE STACK.
                                  ;**********************************************************

015366                            CKSFT:
015366  012637  002220                   MOV     (SP)+,ROSVE       ;;POP STACK INTO ROSVE
015372  010137  002162                   MOV     R1,SVER1          ;SAVE R1
015376  010237  002164                   MOV     R2,SVER2          ;SAVE R2

015402  012601                           MOV     (SP)+,R1          ;;POP STACK INTO R1
015404  013702  002222                   MOV     VSTAT,R2          ;SET R2 EQUAL TO VSTAT

015410  042702  003576                   BIC     #003576,R2        ;CLEAR NON-ERROR BITS
015414  020102                           CMP     R1,R2             ;COMPARE ANTICIPATED TO ACTUAL.
015416  001432                           BEQ     NOER              ;NO UNUSAL BITS EXIT

015420  010137  001124                   MOV     R1,$GDDAT         ;MOVE GOOD STATUS TO MESSAGE
015424  013737  002222  001126           MOV     VSTAT,$BDDAT      ;MOVE BAD STATUS TO MESSAGE
015432  104003                           ERROR   3                 ;ISSUE ERROR MESSAGE.


                                  ;**********************************************************
                                                 ;ROUTINE TO PRINT THE STATUS REGISTER IN THE FOLLOWING
                                                 ;FORMAT: STATUS BITS (XXX 000), CHARACTER TRANSFERRED (000  X X)
                                  ;**********************************************************

015434  012701  014640                   MOV     #STTER,R1         ;SET R1 EQUAL TO FIRST ENTRY
015440  013702  014662                   MOV     STTEP,R2          ;SET R2 EQUAL LAST ENTRY
015444  020102                    1$:    CMP     R1,R2             ;ARE THEY EQUAL
015446  001416                           BEQ     NOER              ;YES-RESET POINTERS AND EXIT.
```

```
015450  004037  015530                   JSR     R0,CLREG          ;CLEAR ERROR PRINT LOC.
015454  013737  001730  001120           MOV     VRCSR,$GDADR      ;LOAD ADDRESS
015462  017737  164242  001124           MOV     @VRCSR,$GDDAT     ;LOAD CSR
015470  112137  001126            2$:    MOVB    (R1)+,$BDDAT      ;MOVE CHARACTER AND
015474  112137  001123                   MOVB    (R1)+,$BDADR+1    ;STATUS BITS TO ERROR REGISTERS.
015500  104002                           ERROR   2                 ;ISSUE ERROR MESSAGE
015502  000760                           BR      1$                ;DO AGAIN
015504  013701  002162            NOER:  MOV     SVER1,R1          ;RESTORE R1 AND
015510  013702  002164                   MOV     SVER2,R2          ;R2.
015514  012737  014640  014662           MOV     #STTER,STTEP      ;RESET STATUS ERROR POINTER.
015522  013746  002220                   MOV     ROSVE,-(SP)       ;;PUSH ROSVE ON STACK
015526  000200                           RTS     R0                ;EXIT

                                  ;**********************************************************
                                                 ;SUBROUTINE TO CLEAR ERROR/DATA OUTPUT LOCATIONS. NEEDED
                                                 ;ONLY WHEN DISPLAYING BYTES IN WORD LOCATIONS.
                                  ;**********************************************************

015530  005037  001120            CLREG: CLR     $GDADR
015534  005037  001122                   CLR     $BDADR
015540  005037  001124                   CLR     $GDDAT
015544  005037  001126                   CLR     $BDDAT
015550  000200                           RTS     R0
                                  ;**********************************************************
                                                 ;SUBROUTINE TO TRANSMIT THE BUFFER AND WAIT FOR XMIT DONE
                                                 ;AND END OF RECEIVE MESSAGE. SUBROUTINE WILL LOOP IF LOCATION
                                                 ;RECITT IS PRE-LOADED WITH A NUMBER HIGHER THAN1(IE. MULTIPLE
                                                 ;RECEIVES CAN BE ACCOMPLISHED WITH ONLY ONE ENTRY TO SUB-
```

K05

```
                                                        ;ROUTINE).WDSTOR AND BYSTOR ARE THE WORD(CURSOR POS.) AND BYTE
                                                        ;STORAGE LOCATIONS,RESPECTIVELY.DEFAULT STORAGE IS THE REC. BUFFER.

                                        ;**************************************************************

015552                                  XMREC:
015552  010546                                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
015554  012737  001001  002224                  MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
015562  042737  077577  002222                  BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
015570  013701  016024                          MOV     BYSTOR,R1       ;LOAD THE STORAGE POINTERS
015574  013702  016022                          MOV     WDSTOR,R2
015600  052777  000100  164126                  BIS     #TENA,@VXCSR    ;SET INTERRUPT ENABLES
015606  042737  061466  002222  XMITT:  BIC     #61466,VSTAT    ;CLEAR SOM,EOM,EPL,ESC,REV.VID., PARA. DELIM.,IDENT,CUR.
015614  005037  002216          1$:     CLR     DLAY            ;SET UP TIME OUT DELAY.
015620  032737  000001  002222          BIT     #XMDNE,VSTAT    ;IS XMIT DONE?
015626  001015                                  BNE     3$              ;YES-LOOK FOR RECEIVE DONE.
015630  032737  020000  002222  2$:     BIT     #REOM,VSTAT     ;RECEIVED AN EOM?
015636  001401                                  BEQ     20$             ;NO
015640  000435                                  BR      CKSTR           ;YES-GO HANDLE DATA
015642  032737  100000  002222  20$:    BIT     #RXOFF,VSTAT    ;NO- IS XOFF SET?
015650  001761                                  BEQ     1$              ;NO-STILL TRANSMITTONG.
015652  005337  002216                          DEC     DLAY            ;YES- RUN DELAY
015656  001364                                  BNE     2$              ;WAITING FOR XON
015660  000416                                  BR      XMAD2           ;NO XON-REPORT VT61 FAILURE.

015662  013705  031030          3$:     MOV     ABUFP,R5        ;LOAD CH. RECEIVED FLAG.
015666  005037  002216                          CLR     DLAY            ;SET UP RECEIVE DELAY.
015672  032737  020000  002222  4$:     BIT     #REOM,VSTAT     ;RECEIVE END OF MESSAGE?
```

```
015700  001015                                  BNE     CKSTR           ;YES-CHECK DATA STORAGE POINTERS
015702  020537  031030                          CMP     R5,ABUFP        ;RECEIVED ANOTHER CHARACTER?
015706  001365                                  BNE     3$              ;YES-RESET CH. FLAG AND DELAY
015710  005337  002216          5$:     DEC     DLAY            ;RUN DELAY
015714  001366                                  BNE     4$              ;AND KEEP LOOKING FOR EOM.
015716  062700  000002          XMAD2:  ADD     #2,R0           ;TIME OUT OCCURRED-SET UP ERROR EXIT.
015722  005237  002176                          INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
015726  004037  016136                          JSR     R0,RESPTR       ;AND REST ALL INTERRUPT POINTERS.
015732  000422                                  BR      CKVST
015734  020102                  CKSTR:  CMP     R1,R2           ;STORAGE POINTERS CLEARED?
015736  001413                                  BEQ     CHKITT          ;YES--LEAVE DATA IN REC. BUFFER.
015740  032737  000004  002222                  BIT     #CURPOS,VSTAT   ;RECEIVED A CURSOR POSITION?
015746  001403                                  BEQ     STRBYT          ;NO-GO STORE A BYTE.
015750  017722  176654                          MOV     @RBBUF,(R2)+    ;YES,STORE IT.
015754  000404                                  BR      CHKITT          ;AND CHECK ITERATION COUNT.
015756  005701                  STRBYT: TST     R1              ;STORING A CHAR?
015760  001402                                  BEQ     CHKITT          ;NO
015762  117721  176642                          MOVB    @RBBUF,(R1)+    ;STORE A RECEIVED BYTE
015766  005337  016020          CHKITT: DEC     RECITT          ;DONE RECEIVING?
015772  001305                                  BNE     XMITT           ;NO-LOOP SUBROUTINE
015774  004037  020560                          JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
016000                                  CKVST:
016000  012746  060001                          MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
016004  004037  015366                          JSR     R0,CKSFT
016010  004037  016136                          JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
016014  012605                                  MOV     (SP)+,R5        ;;POP STACK INTO R5
016016  000200                  XMXT:   RTS     R0              ;EXIT SUBROUTINE.
016020  000000                  RECITT: .WORD   0               ;RECEIVE ITERATION COUNT.
016022  000000                  WDSTOR: .WORD   0               ;WORD STORAGE POINTER
016024  000000                  BYSTOR: .WORD   0               ;BYTE STORAGE POINTER

                                        ;**************************************************************
                                                ;SUBROUTINE TO  XMIT THE BYTE AT TBUFP.
                                        ;************************************************************

016026  042737  000001  002222  XMIT1:  BIC     #1,VSTAT        ;CLEAR XMIT DONE FLAG
016034  012737  000001  015144          MOV     #1,XMCNT        ;SET UP TO XMIT 1 BYTE
016042  052777  000100  163664          BIS     #TENA,@VXCSR
016050                          1$:
016050  012746  000001                  MOV     #XMDNE,-(SP)    ;;PUSH #XMDNE ON STACK
016054  012746  000001                  MOV     #1,-(SP)        ;;PUSH #1 ON STACK
016060  004037  020470                  JSR     R0,WTBGND       ;LOOK FOR XMIT DONE
016064  000401                          BR      FTLEXT          ;HUNG TRANSMIT-CLEAR FLAGS AND EXIT
016066  000402                          BR      NORXT           ;NORMAL EXIT.
016070  005037  002222          FTLEXT: CLR     VSTAT           ;CLEAR ANY FLAGS
016074  000200                  NORXT:  RTS     R0              ;AND EXIT

                                ;************************************************************
                                        ;SUBROUTINE TO ISSUE A BYTE AT A TIME UNTIL A ZERO
                                        ;BYTE IS ENCOUNTERED.
                                ;************************************************************

016076  112777  000002  177036  LDXMIT: MOVB    #SOM,@TBUFP     ;SEND THE START OF MESSAGE.
016104  000403                          BR      2$
016106  112377  177030          1$:     MOVB    (R3)+,@TBUFP    ;MOVE A BYTE TO XMIT BUFFER
016112  001403                          BEQ     LDOUT           ;IF A ZERO BYTE-EXIT
```

```
016114  004037  016026          2$:     JSR     R0,XMIT1        ;GO XMIT A BYTE
016120  000772                          BR      1$              ;XMIT AGAIN.
016122  112777  000004  177012  LDOUT:  MOVB    #EOM,@TBUFP     ;SEND THE END OF MESSAGE.
016130  004037  016026                  JSR     R0,XMIT1
016134  000200                          RTS     R0

                                ;************************************************************
                                        ;ROUTINE TO RESET ALL INTERRUPT POINTERS.
                                ;************************************************************

016136  042777  000100  163570  RESPTR: BIC     #TENA,@VXCSR    ;CLEAR INTERRUPT ENABLES
016144  013737  014630  014634          MOV     RBBUF,RBUFP     ;RESET RECEIVE BUF POINTER
016152  013737  015136  015142          MOV     TBBUF,TBUFP     ;RESET XMMT BUF POINTER
016160  012737  014640  014662          MOV     #STTER,STTEP    ;RESET RECEIVE STATUS ERR POINTER
016166  005037  015144                  CLR     XMCNT           ;CLEAR TRANSMIT COUNT
016172  005037  014636                  CLR     ESAMB           ;CLEAR ESC ASSEMBLY FLAGS
016176  012737  000001  016020          MOV     #1,RECITT       ;RESET REC. ITERATION COUNT
016204  005037  016022                  CLR     WDSTOR          ;CLEAR STORAGE POINTERS
016210  005037  016024                  CLR     BYSTOR
016214  000200                          RTS     R0



                                ;************************************************************
                                        ;SUBROUTINE TO ISSUE CURSOR POSITION ERROR. GOOD
                                        ;LINE/COLUMN MUST BE A WORD ON STACK. ERROR
                                        ;POSITION IS EXPECTED TO BE @ RBBUF.
                                ;************************************************************

016216                          CURER:
016216  012637  002220                  MOV     (SP)+,R0SVE     ;;POP STACK INTO R0SVE
016222  012637  002160                  MOV     (SP)+,CHRD      ;;POP STACK INTO CHRD
016226  162737  020040  002160          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM GOOD POSITION
016234  004037  015530                  JSR     R0,CLREG
016240  113737  002161  001124          MOVB    CHRD+1,$GDDAT   ;LOAD MESSAGE WITH GOOD
016246  113737  002160  001120          MOVB    CHRD,$GDADR     ;LINE AND COLUMN
016254  017737  176350  002160          MOV     @RBBUF,CHRD     ;LINE AND COLUMN.
016262  162737  020040  002160          SUB     #20040,CHRD     ;EXTRACT MOD 40 FROM BAD POSITION.
016270  113737  002161  001126          MOVB    CHRD+1,$BDDAT   ;LOAD MESSAGE WITH BAD
```

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016276  113737  002160  001122                  MOVB    CHRD,$BDADR     ;LINE AND COLUMN.
016304  104006                                  ERROR   6               ;ISSUE ERROR
016306  013746  002220                          MOV     R0SVE,-(SP)     ;;PUSH R0SVE ON STACK
016312  000200                                  RTS     R0


                                        ;*************************************************************

                                        ;*************************************************************
                                                ;SUBROUTINE TO DECREMENT CUSROR POSITION IN A
                                                ;LINEAR SEQUENCE. (IE. ROW 20, COL 1 ;ROW 20 COLD ;ROW 17, COL 157).
                                        ;*************************************************************

016314  123727  016421  000040          CMPOS:  CMPB    LNRW+1,#40      ;AT LEFT EDGE OF ROW?
016322  001403                                  BEQ     1$              ;YES, GO ADJUST COL., ROW.
016324  105337  016421                          DECB    LNRW+1          ;NO, DECREMENT COL. AND EXIT
016330  000200                                  RTS     R0
016332  123727  016420  000040          1$:     CMPB    LNRW,#40        ;AT ROW 0?
016340  001405                                  BEQ     2$              ;YES, NO DECREMENT POSSIBLE-EXIT.
```

```
016342  105337  016420                          DECB    LNRW            ;NO, DECREMENT ROW AND
016346  112737  000157  016421                  MOVB    #157,LNRW+1     ;SET COL. TO RIGHT EDGE.
016354  000200                          2$:     RTS     R0

                                        ;*************************************************************
                                                ;SUBROUTINE TO INCREMENT CURSOR POSITION IN A LINEAR
                                                ;SEQUENCE (IE. ROW 10, COL 78, ROW 10. COL 79, ROW 11 , COL 0).
                                        ;*************************************************************

016356  123727  016421  000157          CPPOS:  CMPB    LNRW+1,#157     ;AT RIGHT EDGE OF ROW
016364  001403                                  BEQ     1$              ;YES, ADJUST ROW AND COLUMN.
016366  105237  016421                          INCB    LNRW+1          ;NO, INCREMENT COL. COUNT
016372  000200                                  RTS     R0              ;AND EXIT
016374  123727  016420  000067          1$:     CMPB    LNRW,#67        ;AT BOTTOM ROW?
016402  001405                                  BEQ     2$              ;YES, NO INCREMENT POSSIBLE-EXIT.
016404  105237  016420                          INCB    LNRW            ;NO, INCREMENT ROW COUNT AND
016410  112737  000040  016421                  MOVB    #40,LNRW+1      ;SET COL. TO LEFT EDGE.
016416  000200                          2$:     RTS     R0

016420  000000                          LNRW:   .WORD   0               ;CONTAINS UPDATED CURSOR POSITION.
                                        ;*************************************************************

                                                ;SUBROUTINE TO XMIT, RECEIVE AND COMPARE. DATA ERRORS
                                                ;ARE REPORTED FROM SUBROUTINE. IF THE TRANSMIT OR
                                                ;RECEIVE LOOPS 'TIME OUT', EXIT FROM SUBROUTINE WILL
                                                ;BE NORMAL EXIT +2. SUBROUTINE ENTERED WITH (R1)=
                                                ;GOOD DATA BUFFER, (R2)=RECEIVE DATA BUFFER AND
                                                ;R3=COMPARE COUNT. IF THE VT61 DOES NOT HANG,THE ROUTINE
                                                ;WILL WAIT FOR END OF REC. MESSAGE(EOM).



                                        ;*************************************************************

016422                                  XRCMP:
016422  010446                                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
016424  005004                                  CLR     R4              ;USE R4 A RECEIVE COUNTER.
016426  012737  001001  002224                  MOV     #1001,BLKM      ;SET UP FOR A SOM/EOM TRANSMIT.
016434  042737  077577  002222                  BIC     #77577,VSTAT    ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
016442  052777  000100  163264                  BIS     #TENA,@VXCSR    ;SET INTERRUPT ENABLES.
016450  005037  016746                          CLR     HDFLG           ;CLEAR ERROR 13 PRINT FLAG
016454  012705  031000                          MOV     #TCRLB+450,R5   ;R5 IS ERROR STORAGE POINTER
016460  005037  002216                  1$:     CLR     DLAY            ;SET UP TIME OUT DELAY
016464  032737  000001  002222                  BIT     #XMDNE,VSTAT    ;XMIT DONE?
```

N05

```
016472  001014                          BNE     XREC            ;YES-GO RECEIVE
016474  023737  014630  014634  2$:     CMP     RBBUF,RBUFP     ;HAS RECEIVE OPERATION BEGUN?
016502  103410                          BLO     XREC            ;YES-GO RECEIVE
016504  032737  100000  002222          BIT     #RXOFF,VSTAT    ;XMIT XOFF SET?
016512  001762                          BEQ     1$              ;NO-KEEP LOOKING FOR XMIT DONE?
016514  005337  002216                  DEC     DLAY            ;YES RUN DELAY AND LOOK
016520  001365                          BNE     2$              ;FOR XON OR RECEIVED CH.
016522  000432                          BR      XRERR           ;TRANSMIT TIMEOUT-SET UP ERROR EXIT

016524  005037  002216          XREC:   CLR     DLAY            ;SET UP TIME OUT DELAY
016530  020237  014634          1$:     CMP     R2,RBUFP        ;INSURE COMPARE POINTER
016534  103410                          BLO     2$              ;LESS THAN RECEIVE POINTER
016536  032737  020000  002222          BIT     #REOM,VSTAT     ;RECEIVE EOM?
```

```
016544  001030                          BNE     XREXT           ;YES-SET UP TO EXIT
016546  005337  002216                  DEC     DLAY            ;RUN TIMEOUT DELAY
016552  001416                          BEQ     XRERR           ;TIME OUT OCCURRED-ERROR EXIT
016554  000765                          BR      1$              ;RETURN TO CHECK RECEIVE COUNT
016556  005204                  2$:     INC     R4              ;ADD 1 TO RECEIVE COUNTER.
016560  122122                          CMPB    (R1)+,(R2)+     ;COMPARE CHARACTERS
016562  001407                          BEQ     4$              ;EQUAL-COMPARE AGAIN
016564  020527  031030                  CMP     R5,#TCRLB+500   ;ALLREADY STORED 50 ERRORS?
016570  103004                          BHIS    4$              ;YES-BYPASS STORAGE
016572  114125                          MOVB    -(R1),(R5)+     ;STORE GOOD DATA
016574  114225                          MOVB    -(R2),(R5)+     ;STORE BAD DATA
016576  010425                          MOV     R4,(R5)+        ;LOAD RECEIVE COUNT
016600  132122                          BITB    (R1)+,(R2)+     ;RESET POINTERS AND
016602  005303                  4$:     DEC     R3              ;CHECK COMPARE COUNT
016604  001410                          BEQ     XREXT           ;ALL DONE-EXIT
016606  000746                          BR      XREC            ;COMPARE ANOTHER
016610  062700  000002          XRERR:  ADD     #2,R0           ;SET UP ERROR EXIT
016614  005237  002176                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
016620  004037  016136                  JSR     R0,RESPTR       ;RESET INTERRUPT POINTERS.
016624  000440                          BR      XROUT
016626                          XREXT:
016626  012746  020000                  MOV     #REOM,-(SP)     ;;PUSH #REOM ON STACK
016632  012746  000004                  MOV     #4,-(SP)        ;;PUSH #4 ON STACK
016636  004037  020470                  JSR     R0,WTBGND
016642  000431                          BR      XROUT           ;NO EOM-ISSUE ERROR AND EXIT.
016644  162705  031000                  SUB     #TCRLB+450,R5   ;NOW EXTRACT ERROR COUNT-IF ANY.
016650  010501                          MOV     R5,R1           ;AND STORE IT IN R1
016652  012705  031000                  MOV     #TCRLB+450,R5   ;RELOAD ERROR POINTER
016656  005701                          TST     R1              ;TEST FOR ERRORS
016660  001422                          BEQ     XROUT           ;NO-CHECK STATUS AND EXIT
016662  005737  016746                  TST     HDFLG           ;;DATA ERROR HEADER PRINTED?
016666  001003                          BNE     1$              ;YES-BYPASS HEADER PRINT
016670  104012                          ERROR   12              ;PRINT DATA ERROR HEADER
016672  005237  016746                  INC     HDFLG           ;SET HEADER PRINT FLAG
016676  004037  015530          1$:     JSR     R0,CLREG        ;ERROR WAS LEGTIMATE. LOAD
016702  112537  001124                  MOVB    (R5)+,$GDDAT    ;ERROR MESSAGE AND ISSUE
016706  112537  001126                  MOVB    (R5)+,$BDDAT    ;IT.
016712  012537  001120                  MOV     (R5)+,$GDADR    ;LOAD RECEIVE COUNT
016716  104004                          ERROR   4               ;ISSUE DATA COMPARE ERROR
015720  162701  000004                  SUB     #4,R1           ;DECREMENT ERROR COUNT
016724  001364                          BNE     1$              ;PRINT ANOTHER IF NOT AT ZERO
016726  004037  020560          XROUT:  JSR     R0,CKOFF        ;SEE IS XOFF IS UP.
016732  012746  060001                  MOV     #60001,-(SP)    ;;PUSH #60001 ON STACK
016736  004037  015366                  JSR     R0,CKSFT        ;CHECK FOR VSTAT /STATUS ERR.
016742  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
016744  000200                          RTS     R0              ;EXIT SUBROUTINE

016746  000000                  HDFLG:  0                       ;INHIBIT PRINT FLAG.
```

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                                        ;*******************************************************
                                        
                                                ;SUBROUTINE TO CREATE A 'RULER' IN LOCATIONS 200
                                                ;TO 317.
                                        
                                        ;*******************************************************
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 016750  012701  030530         CRRUL:  MOV     #TCRLB+200,R1           ;LOAD STARTING ADDRESS
 016754  012702  130461                 MOV     #130461,R2              ;LOAD INITIAL RULER ASCII CODES.
 016760  110221                 1$:     MOVB    R2,(R1)+                ;STORE A RULER BYTE IN XMIT BUF.
 016762  022701  030650                 CMP     #TCRLB+320,R1           ;RULER COMPLETE?
 016766  103001                         BHIS    2$                      ;NO
 016770  000200                         RTS     R0                      ;AND EXIT.
 016772  105202                 2$:     INCB    R2                      ;INCREMENT ASCII BYTE
 016774  122702  000272                 CMPB    #272,R2                 ;END OF REVERSE VIDEO?
 017000  001003                         BNE     3$                      ;NO-SEE IF END OF NORMAL.
 017002  012702  030660                 MOV     #030660,R2              ;SET UP TO ISSUE REVERSE D.
 017006  000405                         BR      5$
 017010  122702  000072         3$:     CMPB    #72,R2                  ;END OF NORMAL VIDEO?
 017014  001361                         BNE     1$                      ;NOT AT END OF A VIDEO STRING.
 017016  012702  130460                 MOV     #130460,R2                      ;YES-SET UP TO ISSUE NORMAL D.
 017022  110221                 5$:     MOVB    R2,(R1)+                ;DO IT
 017024  105202                         INCB    R2                      ;SET BYTE TO NEXT ASCII CODE
 017026  000302                         SWAB    R2                      ;REVERSE VIDEO MODE.
 017030  000753                         BR      1$                      ;BEGIN NEXT STRING

                                ;*******************************************************
                                        ;SUBROUTINE TO DELAY 10 M.S. TIME THE NUMBER INLOCATION
                                        ;DCOUNT. THE PROCESSOR TYPE PRE-DETERMINES THE # OF LOOPS
                                        ;REQUIRED TO DELAY 10 M.S. FOR ONE ITERATION. LOCATION
                                        ;PMULT IS PRE-LOADED WITH : 11/45 = 4, 11/40 = 2
                                        ;AND 11/10 =1.
                                ;*******************************************************

 017032                         DELAY:
 017032  010146                         MOV     R1,-(SP)                ;;PUSH R1 ON STACK
 017034  010246                         MOV     R2,-(SP)                ;;PUSH R2 ON STACK
 017036  013702  017072         1$:     MOV     PMULT,R2                ;LOAD PROCESSOR MULTIPLIER
 017042  012701  002570         2$:     MOV     #1400.,R1               ;LOAD 10 M.S. DELAY
 017046  005301                         DEC     R1                      ;RUN BASIC DELAY
 017050  001376                         BNE     .-2
 017052  005302                         DEC     R2                      ;RUN MULTIPLIER DELAY
 017054  001372                         BNE     2$
 017056  005337  017074                 DEC     DCOUNT                  ;RUN ITERATION COUNT
 017062  001365                         BNE     1$
 017064  012602                         MOV     (SP)+,R2                ;;POP STACK INTO R2
 017066  012601                         MOV     (SP)+,R1                ;;POP STACK INTO R1
 017070  000200                         RTS     R0

 017072  000000                 PMULT:  0                               ;PROCESSOR MULTIPLIER
 017074  000000                 DCOUNT: 0                               ;ITERATION COUNT

                                ;*******************************************************

                                        ;SUBROUTINE TO GENERATE A INCREMENTING PATTERN AT
                                        ;(R1)+.  ENTER WITH R3 EQUAL TO # OF CH. TO CREATE.
                                        ;R5 IS UTILIZED AS A WORK REGISTER.

                                ;*******************************************************
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C06

```
017076  012705  000041            BLDINC: MOV     #41,R5          ;LOAD R5 WITH INITIAL CH.
017102  110521                    BLDINA: MOVB    R5,(R1)+        ;MOVE A CH. TO BUFFER
017104  005303                            DEC     R3              ;DECREMENT BYTE COUNT
```

```
017106  001001                            BNE     2$              ;NOT DONE-UPDATE PATTERN
017110  000200                            RTS     R0              ;EXIT-DONE.
017112  105205                    2$:     INCB    R5              ;UPDATE CH. PATTERN
017114  122705  000177                    CMPB    #177,R5         ;PATTERN EXCEEDED MAX?
017120  001766                            BEQ     BLDINC          ;YES-RESET IT.
017122  000767                            BR      BLDINA          ;NO-ISSUE CURRENT PATTERN.


                                  ;*************************************************************

                                          ;SUBROUTINE TO FILL THE SCREEN WITH INCREMENTING DATA

                                  ;*************************************************************

017124  042737  077577  002222    DATSC:  BIC     #77577,VSTAT            ;CLEAR INTERRUPT FLAGS.
017132  013701  015136                    MOV     TBBUF,R1
017136  012703  000500                    MOV     #320.,R3        ;FILL XMIT BUFFER WITH INCRE-
017142  004037  017076                    JSR     R0,BLDINC       ;MENTING PATTERN
017146  012737  003600  015144    10$:    MOV     #TOTCH,XMCNT    ;SET UP TO XMIT 1920 BYTES
017154  052777  000100  162552            BIS     #TENA,@VXCSR

017162  032737  000001  002222    1$:     BIT     #XMDNE,VSTAT    ;XMIT DONE?
017170  001774                            BEQ     .-6             ;NO

                                  ;*************************************************************

                                          ;SUBROUTINE TO RESET VT61 AND DISPLAY MESSAGE
                                          ;POINTED TO BY R2.

                                  ;*************************************************************

017172  004037  015146            DSMES:  JSR     R0,RESETV       ;RESET THE UNIT AND WAIT FOR XON.
017176  042737  077577  002222            BIC     #77577,VSTAT    ;CLEAR ALL FLAGS EXCEPT XOFF AND XMKIL.
017204  012737  000005  015144            MOV     #5,XMCNT        ;PRE-LOAD XMIT COUNT.
017212  013701  015136                    MOV     TBBUF,R1        ;LOAD XMIT BUFFER WITH:
017216  012721  000002                    MOV     #SOM,(R1)+      ;START OF MESSAGE
017222  013721  002056                    MOV     ESCO,(R1)+
017226  013721  002012                    MOV     DRECT,(R1)+     ;DISABLE RECTANGULAR MODE
017232  005237  015144            1$:     INC     XMCNT           ;INCREMENT TRANSMIT COUNT
017236  112221                            MOVB    (R2)+,(R1)+     ;DISPLAY MESSAGE
017240  001374                            BNE     1$
017242  112711  000004                    MOVB    #EOM,(R1)       ;TERMINATE WITH END OF MESSAGE.
017246  052777  000100  162460            BIS     #TENA,@VXCSR    ;XMIT IT AND WAIT FOR
017254  032737  000001  002222    2$:     BIT     #XMDNE,VSTAT    ;DONE
017262  001774                            BEQ     2$
017264  000200                            RTS     R0


                                  ;*************************************************************

                                          ;SUBROUTINE TO CONVERT A BINARY CHARACTER
                                          ;TO 3 OCTAL CHARACTERS. R1 CONTAINS BINARY
                                          ;NUMBER. RESULT IS STORED IN LOCATIONS SVER1,
                                          ;SVER2

                                  ;*************************************************************
017266                            BINOCT:
017266  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
```

```
017270  012705  000002                 MOV     #2,R5           ;LOAD ITERATION COUNT
017274  000403                         BR      2$              ;BYPASSS SHIFTS FOR 1ST CONVERSION
017276  106201                 1$:     ASRB    R1
017300  106201                         ASRB    R1              ;SHIFT A CHAR INTO POSITION
017302  106201                         ASRB    R1
017304  110165  002162         2$:     MOVB    R1,SVER1(R5)    ;STORE THE BINARY OFFSET
017310  142765  000370  002162         BICB    #370,SVER1(R5)  ;CLEAR NON ESSENTIAL BITS
017316  152765  000060  002162         BISB    #60,SVER1(R5)   ;CONVERT OFFSET TO OCTAL
017324  005305                         DEC     R5              ;DECREMENT CONVERSION COUNT
017326  100363                         BPL     1$              ;NOT DONE CONVERT ANOTHER
017330  112737  000040  002165         MOVB    #40,SVER2+1     ;LOAD A SPACE
017336  012605                         MOV     (SP)+,R5        ;;POP STACK INTO R5
017340  000200                         RTS     R0

                               ;*************************************************************
                                       ;SUBROUTINE TO CONVERT AN OCTAL CHAR. TO BINARY.  REG
                                       ;R1 CONTAINS OCTAL AND REG R2 IS BINARY ASSEMBLY AREA.
                               ;*************************************************************

017342  042701  177770         OCTBIN: BIC     #177770,R1      ;EXTRACT OCTAL COMPONENT
017346  005702                         TST     R2              ;FIRST CONVERSION?
017350  001403                         BEQ     NOSHFT          ;YES - DO NOT SHIFT
017352  006302                         ASL     R2              ;NO - SHIFT PREVIOUS CHAR.
017354  006302                         ASL     R2
017356  006302                         ASL     R2
017360  060102                 NOSHFT: ADD     R1,R2           ;ADD CURRENT CHAR.
017362  000200                         RTS     R0

                               ;*************************************************************
                                       ;ROUTINE TO WAIT FOR C/R FROM VT61 UNDER TEST
                               ;*************************************************************

017364  032777  000200  162336 GTCR:   BIT     #RECDN,@VRCSR   ;WAIT FOR REVEIVE DONE
017372  001774                         BEQ     .-6
017374  127737  162332  001750         CMPB    @VRBUF,CARRT    ;CHAR = CARRIAGE RETURN?
017402  001370                         BNE     GTCR            ;NO-KEEP LOOKING
017404  000200                         RTS     R0              ;YES-EXIT


```

```
                                    ;*****************************************************************
                                          ;SUBROUTINE TO GET A CHARACTER (NUMERIC) FROM THE
                                          ;CONSOLE.  IF OTHER THAN A NUMERIC IS TYPED A
                                          ;"?" WILL BE ECHOED.
                                    ;*****************************************************************

017406  004037  013442              GTNUM:  JSR     R0,CONRD        ;GET A CHAR
017412  012601                              MOV     (SP)+,R1        ;;POP STACK INTO R1
017414  122701  000054                      CMPB    #54,R1          ;CHAR. =COMMA?
017420  001411                              BEQ     1$              ;YES-GO PRINT IT
017422  123701  001750                      CMPB    CARRT,R1        ;CHAR. = CARRIAGE RETURN?
017426  001406                              BEQ     1$
017430  120127  000060                      CMPB    R1,#60
017434  103421                              BLO     QUST            ;IF CHAR. IS LESS THAN 60
017436  120127  000067                      CMPB    R1,#67          ;OR MORE THAN 67, TYPE
017442  101016                              BHI     QUST            ;A QUESTION MARK
017444  110137  017514              1$:     MOVB    R1,TYPNUM
```

```
017450  104400  017514                      TYPE    ,TYPNUM
017454  123701  001752                      CMPB    LNFED,R1
017460  001406                              BEQ     GTEXT
017462  123701  001750                      CMPB    CARRT,R1        ;IF CHAR. - C/R SET UP TO ISSUE
017466  001003                              BNE     GTEXT           ;LINE FEED BEFORE EXITING.
017470  113701  001752                      MOVB    LNFED,R1
017474  000763                              BR      1$
017476  000200                      GTEXT:  RTS     R0              ;GOOD CHAR., EXIT
017500  112737  000077  017514      QUST:   MOVB    #77,TYPNUM
017506  104400  017514                      TYPE    ,TYPNUM         ;TYPE QUESTION MARK AND
017512  000735                              BR      GTNUM           ;KEEP LOOKING.
017514     000                      TYPNUM: .BYTE   0
017515     000                              .BYTE   0


                                    ;*****************************************************************
                                          ;SUBROUTINE TO CALCULATE CHECKSUM ON THE LOWER
                                          ;BYTE OF R5.  R4 IS STORAGE FOR THE CHECKSUM
                                          ;CHARACTER. ALGORITHM FOR CHECKSUM IS ROTATE
                                          ;CURRENT ONE PLACE LEFT AND XOR NEW CHAR. CHECKSUM
                                          ;IS THE LOWER 7 BITS OF R4

                                    ;*****************************************************************

017516  042705  177400              CALCK:  BIC     #177400,R5      ;CLEAR UPPER BYTE OF R5
017522  120527  000021                      CMPB    R5,#XON         ;CHAR. =XON?
017526  001415                              BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM
017530  120527  000023                      CMPB    R5,#XOFF        ;CHAR =XOFF?
017534  001412                              BEQ     NOCALC          ;YES DO NOT CALCULATE CHECKSUM

017536  000241                              CLC                     ;INSURE CARRY BIT INITIALLLY CLEAR
017540  105704                              TSTB    R4              ;SET UP TO ROTATE R4
017542  100001                              BPL     1$              ;A FULL 8 BYTES

017544  000261                              SEC                     ;R4 WAS NEG. SO ROTATE A ONE
017546  106104                      1$:     ROLB    R4              ;INTO LOW ORDER BIT.
017550  010403                              MOV     R4,R3
017552  040503                              BIC     R5,R3           ;NOT A AND B
017554  040405                              BIC     R4,R5           ;NOT B AND A
017556  050305                              BIS     R3,R5           ;ORED
017560  010504                              MOV     R5,R4           ;EQUAL NEW CHECKSUM
017562  000200                      NOCALC: RTS     R0
                                    ;*****************************************************************
```

```
                                                ;SUBROUTINE TO LOAD XMIT BUFFER FROM R0 THRU R1
                                        ;*******************************************************

017564  112021                          LDBUF:  MOVB    (R0)+,(R1)+     ;LOAD A BYTE
017566  001376                                  BNE     .-2             ; UNTIL ZERO BYTE FOUND.
017570  000200                                  RTS     R0
                                        ;*******************************************************
                                                ;SUBROUTINE TO CHECK THE VT61 FOR A PERIPHERAL ABORT.
                                        ;*******************************************************

017572  032737  010000  002222          CKABRT: BIT     #PABRT,VSTAT    ;ABORT FLAG RECEIVED?
017600  001445                                  BEQ     2$              ;NO-EXIT
```

```
017602  010037  001124                          MOV     R0,$GDDAT
017606  162737  000004  001124                  SUB     #4,$GDDAT       ;POINT ERR PC TO MAIN ROUTINE.
017614  013737  002222  001126                  MOV     VSTAT,$BDDAT
017622  104020                                  ERROR   20              ;ISSUE PERIPHERAL ABORT ERROR

017624  013701  015136                          MOV     TBBUF,R1
017630  004037  017564                          JSR     R0,LDBUF        ;LOAD THE XMIT BUFFER WITH:
017634     033     117     137                  .BYTE   .ESC,.O,.IABT,.ESC,.O,.RABT
017637     033     117     140
017642     033     117     145                  .BYTE   .ESC,.O,.UNLKKB,0
017645     000
017646  012737  000011  015144                  MOV     #9.,XMCNT       ;SET UP TO XMIT 9 BYTES.
017654  004037  015552                          JSR     R0,XMREC        ;XMIT AND RECEIVE.
017660  000240                                  NOP
017662  123727  014664  000170                  CMPB    STR0,#NABRT     ;ABORT FLAG CLEARED?
017670  001411                                  BEQ     2$              ;YES-EXIT
017672  010037  001124                          MOV     R0,$GDDAT       ;NO-SET UP AND ISSUE A CANT
017676  162737  000004  001124                  SUB     #4,$GDDAT       ;CLEAR ABORT FLAG ERROR MESSAGE.
017704  013737  002222  001126                  MOV     VSTAT,$BDDAT
017712  104021                                  ERROR   21
017714  000200                          2$:     RTS     R0


                                        ;*******************************************************
                                                ;SUBROUTINE TO COMPARE RECEIVED KEYBOARD POSITION WITH
                                                ;EXPECTED KEYBOARD POSITION. ERRORS ARE REPORTED
                                                ;AS POSITIONAL ERRORS AND NOT DATA COMPARE ERRORS.
                                        ;*******************************************************


017716  105077  011106                  CKKBD:  CLRB    @ABUFP          ;CLEAR RECEIVE BYTE
017722  005037  002160                          CLR     CHRD            ;CLEAR INPUT STORAGE.
017726  105777  011076                  KBDLP:  TSTB    @ABUFP          ;WAIT FOR A INPUT.
017732  001775                                  BEQ     .-4

017734  117737  011070  002160                  MOVB    @ABUFP  ,CHRD   ;STORE IT AND
017742  105077  011062                          CLRB    @ABUFP          ;CLEAR THE INPUT AREA.
017746  123714  002160                  1$:     CMPB    CHRD    ,(R4)   ;RECEIVED EQUAL EXPECTED?
017752  001500                                  BEQ     GDSTRK          ;NO-UPDATE POINTERS.
017754  005237  002206                          INC     BUBCT           ;INCREMENT ERROR COUNT.
017760  023727  002206  000012                  CMP     BUBCT,#10.      ;COUNT = 10?
017766  103075                                  BHIS    CNTF            ;YES-EXIT SUBROUTINE.
017770  010401                                  MOV     R4,R1
017772  166501  011560                          SUB     DTTBL(R5),R1    ;EXTRACT KEY POSITION FROM ROW LOC.
017776  005201                                  INC     R1              ;CONVERT LOGICAL POS. TO ACTUAL.
020000  004037  017266                          JSR     R0,BINOCT       ;GET KEY POSITION IN OCTAL.
020004  113737  002164  002162                  MOVB    SVER2,SVER1     ;RE-ASSEMBLE OCTAL BYTES.
020012  123727  002163  000060                  CMPB    SVER1+1,#60     ;POSITION LESS THAN 8?
020020  001413                                  BEQ     LDPOS           ;YES-GO LOAD IT.
```

```
 020022 123727  002162  000062            CMPB    SVER1,#62        ;POSITION GREATER THAN 8 AND LESS THAN12?
 020030 103404                            BLO     BOROW            ;YES-SET UP TO BORROW.
 020032 162737  000002  002162            SUB     #2,SVER1         ;NO-JUST SUBTRACT 2.
 020040 000403                            BR      LDPOS
 020042 162737  000370  002162  BOROW:    SUB     #370,SVER1       ;SUBTRACT AND BORROW.
 020050 113737  002162  027441  LDPOS:    MOVB    SVER1,KYSTRK+1   ;LOAD THE CONVERTED DECIMAL #.
 020056 113737  002163  027440            MOVB    SVER1+1,KYSTRK
 020064 012703  027363          DMPOCT:   MOV     #DKBERR ,R3
```

```
 020070 004037  016076                    JSR     R0      ,LDXMIT  ;ISSUE BODY OF KEYBOARD ERROR.
 020074 111401                            MOVB    (R4)    ,R1
 020076 004037  017266                    JSR     R0      ,BINOCT
 020102 012703  002162                    MOV     #SVER1  ,R3
 020106 004037  016076                    JSR     R0      ,LDXMIT  ;CONVERT AND ISSUE GOOD CHAR.
 020112 012703  027472                    MOV     #DSPC6,R3
 020116 004037  016076                    JSR     R0,LDXMIT        ;INSERT 6 SPACES IN MESSAGE.
 020122 113701  002160                    MOVB    CHRD    ,R1
 020126 004037  017266                    JSR     R0      ,BINOCT
 020132 012703  002162                    MOV     #SVER1  ,R3
 020136 004037  016076                    JSR     R0      ,LDXMIT  ;CONVERT AND ISSUE RECEIVED CHAR.
 020142 012703  001167                    MOV     #$CRLF  ,R3
 020146 004037  016076                    JSR     R0      ,LDXMIT  ;ISSUE C/R AND L/F.
 020152 000665                            BR      KBDLP            ;LOOK FOR SAME KEY AGAIN.

 020154 005204                  GDSTRK:   INC     R4               ;INCREMENT KEYBOARD ROW COUNTER.
 020156 105714                            TSTB    (R4)             ;REACHED END OF ROW?
 020160 001262                            BNE     KBDLP            ;NO-LOOK FOR NEXT INPUT
 020162 000200                  CNTF:     RTS     R0               ;YES-EXIT.

                                ;*****************************************************************

                                          ;SUBROUTINE TO LOOP DATA THROUGH HOST COMPUTER. ALL
                                          ;FUNCTIONS ARE ALLOWED, BUT BLOCK TRANSMITS WHICH
                                          ;EXCEED 552 BYTES WILL RESULT IN THE TERMINATION
                                          ;OF THE OPERATION AFTER 552 RECEIVED BYTES.

                                ;*****************************************************************

 020164 005237  020466          LOOP:     INC     XMZER            ;SET UP TO XMIT NULLS.
 020170 012737  031030  014632            MOV     #TCRLB+500,REBUF         ;RESET BUFFER POINTERS
 020176 012737  027630  015136            MOV     #RCRLB,TBBUF
 020204 004037  016136                    JSR     R0,RESPTR        ;RELOAD ALL INTERRUPT POINTERS
 020210 042737  077577  002222            BIC     #77577,VSTAT     ;CLEAR ALL FLAGS BUT XOFF AND XMKIL.
 020216 013704  014634          LOOPT:    MOV     RBUFP,R4         ;SET UP RECEIVE FLAG
 020222 032737  000001  002222  LOOPTA:   BIT     #XMDNE,VSTAT     ;XMIT COMPLETE?
 020230 001407                            BEQ     LOOPR            ;NO
 020232 042737  000001  002222            BIC     #XMDNE,VSTAT     ;YES RESET FLAG
 020240 013737  014630  014634            MOV     RBBUF,RBUFP      ;RESET THE REC. BUFFER POINTER
 020246 000763                            BR      LOOPT
 020250 032737  001400  002222  LOOPR:    BIT     #EPL+ESC,VSTAT   ;RECEIVED AN ESC OR EPL?
 020256 001004                            BNE     LPSTR            ;YES-GO CHECK IT
 020260 023704  014634                    CMP     RBUFP,R4         ;RECEIVED A DISPLAY CHAR?
 020264 001756                            BEQ     LOOPTA           ;NO-LOOP
 020266 000426                            BR      BUMPCT
 020270 117777  010534  174336  LPSTR:    MOVB    @ABUFP,@RBUFP    ;YES LOAD IT IN THE BUFFER
 020276 005237  014634                    INC     RBUFP            ;AND INCREMENT BUFFER POINTER
 020302 005037  014636                    CLR     ESAMB            ;CLEAR ESC ASSEMBLY WORD
 020306 042737  001400  002222            BIC     #EPL+ESC,VSTAT   ;CLEAR THE FLAGS
 020314 005237  015144                    INC     XMCNT            ;INCREMENT XMIT COUNT
 020320 123777  002130  010502            CMPB    ESCN,@ABUFP      ;CHAR. A ESC(033)?
 020326 001733                            BEQ     LOOPT            ;YES WAIT FOR NEXT PART OF FUNCTION
 020330 113777  001752  174276            MOVB    LNFED,@RBUFP     ;CHAR. WAS EPL ADD A LINE FEED.
```

```
020336  005237  014634                  INC     RBUFP
020342  000407                          BR      FRCECT          ;AND ISSUE THEM.
020344  023727  015144  000764  BUMPCT: CMP     XMCNT,#500.     ;BUFFER ABOUT FILLED?
```

```
020352  103403                          BLO     FRCECT          ;NO
020354  005337  014634          1$:     DEC     RBUFP           ;YES-RESET THE RECEIVE POINTER
020360  000716                          BR      LOOPT
020362  005237  015144          FRCECT: INC     XMCNT           ;INCREMENT THE XMIT COUNT
020366  023727  015144  000002          CMP     XMCNT,#2        ;FIRST CHAR TO XMIT?
020374  101003                          BHI     XMWT            ;NO
020376  052777  000100  161330          BIS     #TENA,@VXCSR    ;YES-SET THE XMIT ENABLE
020404  004037  020414          XMWT:   JSR     R0,EXTST        ;LOOK FOR END OF TEST COMMAND.
020410  000702                          BR      LOOPT           ;NONE FOUND.
020412  000200                          RTS     R0              ;AND EXIT

                                ;*************************************************************
                                        ;SUBROUTINE TO CHECK FOR END OF TEST COMMAND. THE CONTROL
                                        ;C KEY EXITS ALL TESTS EXCEPT THE BLOCK MODE TEST
                                        ;WHICH IS EXITED ON A @ KEY.
                                ;*************************************************************

020414  127727  010410  000003  EXTST:  CMPB    @ABUFP,#3       ;LOOK FOR CONTROL C.
020422  001020                          BNE     NOROUT

020424  012737  030327  014632  ABSXT:  MOV     #RCRLB+477,REBUF        ;RESET THE BUFFERS
020432  012737  030330  015136          MOV     #TCRLB,TBBUF
020440  004037  016136                  JSR     R0,RESPTR       ;RESET ALL POINTERS
020444  012702  026253                  MOV     #DEXT,R2
020450  004037  017172                  JSR     R0,DSMES        ;ISSUE EXIT MESSAGE
020454  005037  020466                  CLR     XMZER           ;CLEAR THE ZERO TRANSMIT FLAG.
020460  062700  000002                  ADD     #2,R0           ;SET UP TEST EXIT.
020464  000200                  NOROUT: RTS     R0              ;EXIT SUBROUTINE.

020466  000000                  XMZER:  .WORD   0
                                ;*************************************************************
                                        ;SUB-ROUTINE TO LOOK FOR VSTAT BIT ON THE STACK
                                        ;DELAY FACTOR IS FIRST WORD ON THE STACK AND VSTAT BIT
                                        ;IS THE SECOND. MIN. DELAY IS 4 U.S FOR A MOS 11/45.
                                ;*************************************************************

020470                          WTBGND:
020470  012637  002220                  MOV     (SP)+,R0SVE     ;;POP STACK INTO R0SVE
020474  012637  020556                  MOV     (SP)+,VDLAY     ;;POP STACK INTO VDLAY
020500  012637  020554                  MOV     (SP)+,VBIT      ;;POP STACK INTO VBIT
020504  005037  002216          1$:     CLR     DLAY
020510  033737  020554  002222  2$:     BIT     VBIT,VSTAT      ;SENSED THE CONDITION?
020516  001012                          BNE     FNDBT           ;YES-EXIT.
020520  005337  002216                  DEC     DLAY            ;NO-RUN DELAY.
020524  001371                          BNE     2$
020526  005337  020556                  DEC     VDLAY           ;DELAY FACTOR EXPIRED?
020532  001364                          BNE     1$              ;NO-LOOP
020534  104011                          ERROR   11              ;DELAY EXPIRED-ISSUE HUNG NIT
020536  005237  002176                  INC     FTLCNT          ;INCREMENT FATAL XMIT COUNT.
020542  000401                          BR      TIMEXT
020544  005720                  FNDBT:  TST     (R0)+           ;SET UP FOR NORMAL EXIT
020546                          TIMEXT:
020546  013746  002220                  MOV     R0SVE,-(SP)     ;;PUSH R0SVE ON STACK
020552  000200                          RTS     R0
020554  000000                  VBIT:   0
020556  000000                  VDLAY:  0
```

```
                                    ;*************************************************************
                                    ;       ;SUBROUTINE TO LOOK FOR XOFF BEFORE EXITING A RECEIVE ROUTINE.
                                    ;*************************************************************

020560  005037  002216              CKOFF:  CLR     DLAY
020564  032737  100000  002222      1$:     BIT     #RXOFF,VSTAT    ;IS XOFF SET?
020572  001403                              BEQ     2$              ;NO-EXIT
020574  005337  002216                      DEC     DLAY            ;RUN DELAY.
020600  001371                              BNE     1$
020602  000200                      2$:     RTS     R0

                                    ;*************************************************************

                                    .SBTTL  SCOPE HANDLER ROUTINE

                                    ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                    ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                    ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                    ;*SW14=1        LOOP ON TEST
                                    ;*SW11=1        INHIBIT ITERATIONS
                                    ;*SW09=1        LOOP ON ERROR
                                    ;*SW08=1        LOOP ON TEST IN SWR<7:0>
                                    ;*CALL
                                    ;*      SCOPE           ;;SCOPE=IOT

020604                              $SCOPE:
020604  004037  013474                      JSR     R0,MONIT
020610  032777  040000  160320      1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
020616  001111                              BNE     $OVER           ;;YES IF SW14=1
                                    ;#####START OF CODE FOR THE XOR TESTER#####
020620  000416                      $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                    ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
020622  013746  000004                      MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
020626  012737  020646  000004              MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
020634  005737  177060                      TST     @#177060        ;;TIME OUT ON XOR?
020640  012637  000004                      MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
020644  000463                              BR      $SVLAD          ;;GO TO THE NEXT TEST
020646  022626                      5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
020650  012637  000004                      MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
020654  000423                              BR      7$              ;;LOOP ON THE PRESENT TEST
020656                              6$:;#####END OF CODE FOR THE XOR TESTER#####
020656  032777  000400  160252              BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
020664  001404                              BEQ     2$              ;;BR IF NO
020666  127737  160244  001102              CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
020674  001462                              BEQ     $OVER           ;;BR IF YES
020676  105737  001103              2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
020702  001421                              BEQ     3$              ;;BR IF NO
020704  123737  001115  001103              CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
020712  101015                              BHI     3$              ;;BR IF NO
020714  032777  001000  160214              BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
020722  001404                              BEQ     4$              ;;BR IF NO
020724  013737  001110  001106      7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
020732  000443                              BR      $OVER
020734  105037  001103              4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
020740  005037  001156                      CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
```

```
020744  000415                              BR      1$              ;;ESCAPE TO THE NEXT TEST
020746  032777  004000  160162      3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
020754  001011                              BNE     1$              ;;BR IF YES
020756  005737  001100                      TST     $PASS           ;;IF FIRST PASS OF PROGRAM
```

```
020762  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
020764  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
020770  023737  001156  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
020776  002021                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
021000  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
021006  013737  021056  001156          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
021014  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
021020  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
021024  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
021030  005037  001160                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
021034  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
021042  013777  001102  160070  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
021050  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
021054  000002                          RTI                     ;;FIXES PS
021056  000005                  $MXCNT: 5                       ;;MAX. NUMBER OF ITERATIONS
                                ;*************************************************************

                                .SBTTL  ERROR HANDLER ROUTINE

                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO $ERRTYP ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW15=1         HALT ON ERROR
                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                ;*SW10=1         BELL ON ERROR
                                ;*SW09=1         LOOP ON ERROR
                                ;*CALL
                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

021060                          $ERROR:
021060  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
021064  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
021066  013777  001102  160044          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
021074  032777  002000  160034          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
021102  001402                          BEQ     1$              ;;NO - SKIP
021104  104400  001162                  TYPE    ,$BELL          ;;RING BELL
021110  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
021114  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
021120  162737  000002  001116          SUB     #2,$ERRPC
021126  117737  157764  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
021134  032777  020000  157774          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
021142  001004                          BNE     20$             ;;SKIP TYPEOUTS
021144  004737  021450                  JSR     PC,$ERRTYP      ;;GO TO USER ERROR ROUTINE
021150  104400  001167                  TYPE    ,$CRLF
021154                          20$:
021154  005777  157756          2$:     TST     @SWR            ;;HALT ON ERROR
021160  100006                          BPL     3$              ;;SKIP IF CONTINUE
021162  000000                          HALT                    ;;HALT ON ERROR!
021164  022737  010570  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
021172  001001                          BNE     3$              ;;BRANCH IF NO
021174  000000                          HALT                    ;;YES
```

```
021176  032777  001000  157732  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
021204  001402                          BEQ     4$              ;;BR IF NO
021206  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
021212  005737  001160          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
021216  001402                          BEQ     5$              ;;BR IF NONE
021220  013716  001160                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
021224                          5$:
021224  000002                          RTI                     ;;RETURN
                                ;*************************************************************
```

K06

```
                                        .SBTTL  TYPE ROUTINE

                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                        ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                        ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                        ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                        ;*
                                        ;*CALL:
                                        ;*1) USING A TRAP INSTRUCTION
                                        ;*      TYPE    ,MESADR                 ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*      TYPE
                                        ;*      MESADR
                                        ;*
                                        ;*2) USING A JSR INSTRUCTION
                                        ;*      MOV     PS,-(SP)                ;;PUSH PROCESSOR STATUS WORD ON THE STACK
                                        ;*      JSR     PC,$TYPE                ;;CALL TYPE ROUTINE
                                        ;*      MESADDR                         ;;FIRST ADRESS OF MESSAGE

021226  105737  001155                  $TYPE:  TSTB    $TPFLG                  ;;IS THERE A TERMINAL?
021232  100002                                  BPL     1$                      ;;BR IF YES
021234  000000                                  HALT                            ;;HALT HERE IF NO TERMINAL
021236  000407                                  BR      3$                      ;;LEAVE
021240  010046                          1$:     MOV     R0,-(SP)                ;;SAVE R0
021242  017600  000002                          MOV     @2(SP),R0               ;;GET ADDRESS OF ASCIZ STRING
021246  112046                          2$:     MOVB    (R0)+,-(SP)             ;;PUSH CHARACTER TO BE TYPED ONTO STACK
021250  001005                                  BNE     4$                      ;;BR IF IT ISN'T THE TERMINATOR
021252  005726                                  TST     (SP)+                   ;;IF TERMINATOR POP IT OFF THE STACK
021254  012600                          60$:    MOV     (SP)+,R0                ;;RESTORE R0
021256  062716  000002                  3$:     ADD     #2,(SP)                 ;;ADJUST RETURN PC
021262  000002                                  RTI                             ;;RETURN
021264  122716  000011                  4$:     CMPB    #THT,(SP)               ;;BRANCH IF <HT>
021270  001431                                  BEQ     8$
021272  122716  000200                          CMPB    #TCRLF,(SP)             ;;BRANCH IF NOT <CRLF>
021276  001007                                  BNE     5$
021300  005726                                  TST     (SP)+                   ;;POP  <CR><LF> EQUIV
021302  013746  177776                          MOV     PS,-(SP)                ;;TYPE CR AND LF
021306  004737  021226                          JSR     PC,$TYPE
021312  001167                                  $CRLF
021314  000754                                  BR      2$                      ;;GET NEXT CHARACTER
021316  004737  021400                  5$:     JSR     PC,$TYPEC               ;;GO TYPE THIS CHARACTER
021322  123726  001154                  6$:     CMPB    $FILLC,(SP)+            ;;IS IT TIME FOR FILLER CHARS.?
021326  001347                                  BNE     2$                      ;;IF NO GO GET NEXT CHAR.
021330  013746  001152                          MOV     $NULL,-(SP)             ;;GET # OF FILLER CHARS. NEEDED
                                                                                ;;AND THE NULL CHAR.
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 67
DZVTH.P11       TYPE ROUTINE                                                                                    SEQ 0078

021334  105366  000001                  7$:     DECB    1(SP)                   ;;DOES A NULL NEED TO BE TYPED?
021340  002770                                  BLT     6$                      ;;BR IF NO--GO POP THE NULL OFF OF STACK
021342  004737  021400                          JSR     PC,$TYPEC               ;;GO TYPE A NULL
021346  105337  021444                          DECB    $CHARCNT                ;;DO NOT COUNT AS A COUNT
021352  000770                                  BR      7$                      ;;LOOP

                                        ;HORIZONTAL TAB PROCESSOR

021354  112716  000040                  8$:     MOVB    #40,(SP)                ;;REPLACE TAB WITH SPACE
021360  004737  021400                  9$:     JSR     PC,$TYPEC               ;;TYPE A SPACE
021364  132737  000007  021444                  BITB    #7,$CHARCNT             ;;BRANCH IF NOT AT
021372  001372                                  BNE     9$                      ;;TAB STOP
021374  005726                                  TST     (SP)+                   ;;POP SPACE OFF STACK
021376  000723                                  BR      2$                      ;;GET NEXT CHARACTER
```

```
021400  105777  157542          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
021404  100375                          BPL     $TYPEC
021406  116677  000002  157534          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
021414  122766  000015  000002          CMPB    #15,2(SP)       ;;BRANCH IF
021422  001003                          BNE     1$              ;;NOT <CR>
021424  105037  021444                  CLRB    $CHARCNT        ;;
021430  000406                          BR      $TYPEX          ;;EXIT
021432  122766  000012  000002  1$:     CMPB    #12,2(SP)       ;;BRANCH IF
021440  002002                          BGE     $TYPEX          ;;<LF>
021442  105227                          INCB    (PC)+           ;;INC SPACE
021444  000000                  $CHARCNT:.WORD  0               ;;COUNT
021446  000207                  $TYPEX: RTS     PC
                                ;;      EQUATES
        000011                  THT=11
        000200                  TCRLF=200

                                ;*****************************************************************

                                .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
                                ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.

021450                          $ERRTYP:
021450  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021454  010046                          MOV     R0,-(SP)        ;;SAVE R0
021456  005000                          CLR     R0              ;;PICKUP THE ITEM INDEX
021460  153700  001114                  BISB    @#$ITEMB,R0
021464  001004                          BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                                ;;TYPE THE PC OF THE ERROR
021466  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                                ;;ERROR ADDRESS
021472  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
021474  000445                          BR      10$             ;;GET OUT
021476  005300                  1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
021500  006300                          ASL     R0              ;;      WORK FOR THE ERROR TABLE
021502  006300                          ASL     R0
021504  006300                          ASL     R0
021506  062700  001172                  ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
021512  012037  021522                  MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
021516  001404                          BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
```

```
021520  104400                          TYPE                    ;;TYPE THE "ERROR MESSAGE"
021522  000000                  2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
021524  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021530  012037  021540          3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
021534  001404                          BEQ     5$              ;;SKIP TYPEOUT IF 0
021536  104400                          TYPE                    ;;TYPE THE "DATA HEADER"
021540  000000                  4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
021542  104400  001167                  TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021546  010146                  5$:     MOV     R1,-(SP)        ;;SAVE R1
021550  012001                          MOV     (R0)+,R1        ;;PICKUP "DATA TABLE" POINTER
021552  001415                          BEQ     9$              ;;BR IF NO DATA TO BE TYPED
021554  012000                          MOV     (R0)+,R0        ;;PICKUP "DATA FORMAT" POINTER
021556  105720                  6$:     TSTB    (R0)+           ;;"OCTAL" OR "DECIMAL"
021560  001003                          BNE     7$              ;;BR IF DECIMAL
021562  013146                          MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
021564  104401                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
021566  000402                          BR      8$
021570                          7$:
021570  013146                          MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
```

M06

```
021572  104404                           TYPDS                    ;;GO TYPE--DECIMAL ASCII WITH SIGN
021574  005711                   8$:     TST     (R1)             ;;IS THERE ANOTHER NUMBER?
021576  001403                           BEQ     9$               ;;BR IF NO
021600  104400  021620                   TYPE    ,11$             ;;TYPE TWO(2) SPACES
021604  000764                           BR      6$               ;;LOOP

021606  012601                   9$:     MOV     (SP)+,R1         ;;RESTORE R1
021610  012600                   10$:    MOV     (SP)+,R0         ;;RESTORE R0
021612  104400  001167                   TYPE    ,$CRLF           ;;"CARRIAGE RETURN" & "LINE FEED"
021616  000207                           RTS     PC               ;;RETURN
021620  020040     000           11$:    .ASCIZ  /  /             ;;TWO(2) SPACES
        021624                           .EVEN
                                 ;**************************************************************

                                 .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                 ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                 ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                 ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                 ;*CALL:
                                 ;*       MOV     NUM,-(SP)        ;;NUMBER TO BE TYPED
                                 ;*       TYPOS                    ;;CALL FOR TYPEOUT
                                 ;*       .BYTE   N                ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                 ;*       .BYTE   M                ;;M=1 OR 0
                                 ;*                                        ;;1=TYPE LEADING ZEROS
                                 ;*                                        ;;0=SUPPRESS LEADING ZEROS
                                 ;*
                                 ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                 ;*$TYPOS OR $TYPOC
                                 ;*CALL:
                                 ;*       MOV     NUM,-(SP)        ;;NUMBER TO BE TYPED
                                 ;*       TYPON                    ;;CALL FOR TYPEOUT
                                 ;*
                                 ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                 ;*CALL:
                                 ;*       MOV     NUM,-(SP)        ;;NUMBER TO BE TYPED
                                 ;*       TYPOC                    ;;CALL FOR TYPEOUT
```

```

021624  017646  000000          $TYPOS: MOV     @(SP),-(SP)      ;;PICKUP THE MODE
021630  116637  000001  022047          MOVB    1(SP),$0FILL     ;;LOAD ZERO FILL SWITCH
021636  116637  022051                  MOVB    (SP)+,$0MODE+1   ;;NUMBER OF DIGITS TO TYPE
021642  062716  000002                  ADD     #2,(SP)          ;;ADJUST RETURN ADDRESS
021646  000406                          BR      $TYPON
021650  112737  000001  022047  $TYPOC: MOVB    #1,$0FILL        ;;SET THE ZERO FILL SWITCH
021656  112737  000006  022051          MOVB    #6,$0MODE+1      ;;SET FOR SIX(6) DIGITS
021664  112737  000005  022046  $TYPON: MOVB    #5,$0CNT         ;;SET THE ITERATION COUNT
021672  010346                          MOV     R3,-(SP)         ;;SAVE R3
021674  010446                          MOV     R4,-(SP)         ;;SAVE R4
021676  010546                          MOV     R5,-(SP)         ;;SAVE R5
021700  113704  022051                  MOVB    $0MODE+1,R4      ;;GET THE NUMBER OF DIGITS TO TYPE
021704  005404                          NEG     R4
021706  062704  000006                  ADD     #6,R4            ;;SUBTRACT IT FOR MAX. ALLOWED
021712  110437  022050                  MOVB    R4,$0MODE        ;;SAVE IT FOR USE
021716  113704  022047                  MOVB    $0FILL,R4        ;;GET THE ZERO FILL SWITCH
021722  016605  000012                  MOV     12(SP),R5        ;;PICKUP THE INPUT NUMBER
021726  005003                          CLR     R3               ;;CLEAR THE OUTPUT WORD
021730  006105                  1$:     ROL     R5               ;;ROTATE MSB INTO "C"
021732  000404                          BR      3$               ;;GO DO MSB
021734  006105                  2$:     ROL     R5               ;;FORM THIS DIGIT
021736  006105                          ROL     R5
021740  006105                          ROL     R5
```

```
021742  010503                          MOV     R5,R3
021744  006103                  3$:     ROL     R3                      ;;GET LSB OF THIS DIGIT
021746  105337  022050                  DECB    $OMODE                  ;;TYPE THIS DIGIT?
021752  100016                          BPL     7$                      ;;BR IF NO
021754  042703  177770                  BIC     #177770,R3              ;;GET RID OF JUNK
021760  001002                          BNE     4$                      ;;TEST FOR 0
021762  005704                          TST     R4                      ;;SUPPRESS THIS 0?
021764  001403                          BEQ     5$                      ;;BR IF YES
021766  005204                  4$:     INC     R4                      ;;DON'T SUPPRESS ANYMORE 0'S
021770  052703  000060                  BIS     #'0,R3                  ;;MAKE THIS DIGIT ASCII
021774  052703  000040          5$:     BIS     #' ,R3                  ;;MAKE ASCII IF NOT ALREADY
022000  110337  022044                  MOVB    R3,8$                   ;;SAVE FOR TYPING
022004  104400  022044                  TYPE    ,8$                     ;;GO TYPE THIS DIGIT
022010  105337  022046          7$:     DECB    $OCNT                   ;;COUNT BY 1
022014  003347                          BGT     2$                      ;;BR IF MORE TO DO
022016  002402                          BLT     6$                      ;;BR IF DONE
022020  005204                          INC     R4                      ;;INSURE LAST DIGIT ISN'T A BLANK
022022  000744                          BR      2$                      ;;GO DO THE LAST DIGIT
022024  012605                  6$:     MOV     (SP)+,R5                ;;RESTORE R5
022026  012604                          MOV     (SP)+,R4                ;;RESTORE R4
022030  012603                          MOV     (SP)+,R3                ;;RESTORE R3
022032  016666  000002  000004          MOV     2(SP),4(SP)             ;;SET THE STACK FOR RETURNING
022040  012616                          MOV     (SP)+,(SP)
022042  000002                          RTI                             ;;RETURN
022044     000                  8$:     .BYTE   0                       ;;STORAGE FOR ASCII DIGIT
022045     000                          .BYTE   0                       ;;TERMINATOR FOR TYPE ROUTINE
022046     000                  $OCNT:  .BYTE   0                       ;;OCTAL DIGIT COUNTER
022047     000                  $OFILL: .BYTE   0                       ;;ZERO FILL SWITCH
022050  000000                  $OMODE: .WORD   0                       ;;NUMBER OF DIGITS TO TYPE
                                ;*****************************************************************


                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
```

```

                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES.
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)               ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                           ;;GO TO THE ROUTINE

022052                          $TYPDS:
022052  010046                          MOV     R0,-(SP)                ;;PUSH R0 ON STACK
022054  010146                          MOV     R1,-(SP)                ;;PUSH R1 ON STACK
022056  010246                          MOV     R2,-(SP)                ;;PUSH R2 ON STACK
022060  010346                          MOV     R3,-(SP)                ;;PUSH R3 ON STACK
022062  010546                          MOV     R5,-(SP)                ;;PUSH R5 ON STACK
022064  012746  020200                  MOV     #20200,-(SP)            ;;SET BLANK SWITCH AND SIGN
022070  016605  000020                  MOV     20(SP),R5               ;;GET THE INPUT NUMBER
022074  100004                          BPL     1$                      ;;BR IF INPUT IS POS.
022076  005405                          NEG     R5                      ;;MAKE THE BINARY NUMBER POS.
022100  112766  000055  000001          MOVB    #'-,1(SP)               ;;MAKE THE ASCII NUMBER NEG.
022106  005000                  1$:     CLR     R0                      ;;ZERO THE CONSTANTS INDEX
022110  012703  022266                  MOV     #$DBLK,R3               ;;SETUP THE OUTPUT POINTER
022114  112723  000040                  MOVB    #' ,(R3)+               ;;SET THE FIRST CHARACTER TO A BLANK
022120  005002                  2$:     CLR     R2                      ;;CLEAR THE BCD NUMBER
022122  016001  022256                  MOV     $DTBL(R0),R1            ;;GET THE CONSTANT
022126  160105                  3$:     SUB     R1,R5                   ;;FORM THIS BCD DIGIT
022130  002402                          BLT     4$                      ;;BR IF DONE
022132  005202                          INC     R2                      ;;INCREASE THE BCD DIGIT BY 1
```

```
022134  000774                          BR      3$
022136  060105                  4$:     ADD     R1,R5                   ;;ADD BACK THE CONSTANT
022140  005702                          TST     R2                      ;;CHECK IF BCD DIGIT=0
022142  001002                          BNE     5$                      ;;FALL THROUGH IF 0
022144  105716                          TSTB    (SP)                    ;;STILL DOING LEADING 0'S?
022146  100407                          BMI     7$                      ;;BR IF YES
022150  106316                  5$:     ASLB    (SP)                    ;;MSD?
022152  103003                          BCC     6$                      ;;BR IF NO
022154  116663  000001  177777          MOVB    1(SP),-1(R3)            ;;YES--SET THE SIGN
022162  052702  000060          6$:     BIS     #'0,R2                  ;;MAKE THE BCD DIGIT ASCII
022166  052702  000040          7$:     BIS     #' ,R2                  ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
022172  110223                          MOVB    R2,(R3)+                ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
022174  005720                          TST     (R0)+                   ;;JUST INCREMENTING
022176  020027  000010                  CMP     R0,#10                  ;;CHECK THE TABLE INDEX
022202  002746                          BLT     2$                      ;;GO DO THE NEXT DIGIT
022204  003002                          BGT     8$                      ;;GO TO EXIT
022206  010502                          MOV     R5,R2                   ;;GET THE LSD
022210  000764                          BR      6$                      ;;GO CHANGE TO ASCII
022212  105726                  8$:     TSTB    (SP)+                   ;;WAS THE LSD THE FIRST NON-ZERO?
022214  100003                          BPL     9$                      ;;BR IF NO
022216  116663  177777  177776          MOVB    -1(SP),-2(R3)           ;;YES--SET THE SIGN FOR TYPING
022224  105013                  9$:     CLRB    (R3)                    ;;SET THE TERMINATOR
022226  012605                          MOV     (SP)+,R5                ;;POP STACK INTO R5
022230  012603                          MOV     (SP)+,R3                ;;POP STACK INTO R3
022232  012602                          MOV     (SP)+,R2                ;;POP STACK INTO R2
022234  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
022236  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
```

```
022240  104400  022266                  TYPE    ,$DBLK                  ;;NOW TYPE THE NUMBER
022244  016666  000002  000004          MOV     2(SP),4(SP)             ;;ADJUST THE STACK
022252  012616                          MOV     (SP)+,(SP)
022254  000002                          RTI                             ;;RETURN TO USER
022256  023420                  $DTBL:  10000.
022260  001750                          1000.
022262  000144                          100.
022264  000012                          10.
022266  000004                  $DBLK:  .BLKW   4
                                ;*************************************************************************

                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;POWER DOWN ROUTINE
022276  012737  022420  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC        ;;SET FOR FAST UP
022304  012737  000340  000026          MOV     #340,@#PWRVEC+2         ;;PRIO:7
022312  010046                          MOV     R0,-(SP)                ;;PUSH R0 ON STACK
022314  010146                          MOV     R1,-(SP)                ;;PUSH R1 ON STACK
022316  010246                          MOV     R2,-(SP)                ;;PUSH R2 ON STACK
022320  010346                          MOV     R3,-(SP)                ;;PUSH R3 ON STACK
022322  010446                          MOV     R4,-(SP)                ;;PUSH R4 ON STACK
022324  010546                          MOV     R5,-(SP)                ;;PUSH R5 ON STACK
022326  010637  022424                  MOV     SP,$SAVR6               ;;SAVE SP
022332  012737  022344  000024          MOV     #$PWRUP,@#PWRVEC        ;;SET UP VECTOR
022340  000000                          HALT
022342  000776                          BR      .-2                     ;;HANG UP

                                ;POWER UP ROUTINE
022344  013706  022424          $PWRUP: MOV     $SAVR6,SP               ;;GET SP
022350  005037  022424                  CLR     $SAVR6                  ;;WAIT LOOP FOR THE TTY
022354  005237  022424          1$:     INC     $SAVR6                  ;;WAIT FOR THE INC
022360  001375                          BNE     1$                      ;;OF WORD
022362  012605                          MOV     (SP)+,R5                ;;POP STACK INTO R5
022364  012604                          MOV     (SP)+,R4                ;;POP STACK INTO R4
```

```
022366  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
022370  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
022372  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
022374  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
022376  012737  022276  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
022404  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
022412  104400                          TYPE                    ;REPORT THE POWER FAILURE
022414  022426                  $PWRMG: .WORD   $POWER          ;;POWER FAIL MESSAGE POINTER
022416  000002                          RTI
022420  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
022422  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
022424  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
022426  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
022434  000122
                                        .EVEN
                                ;*************************************************************

                                .SBTTL  TRAP DECODER

                                ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
```

```
                                ;*GO TO THAT ROUTINE.

022436  010046                  $TRAP:  MOV     R0,-(SP)                ;;SAVE R0
022440  016600  000002                  MOV     2(SP),R0                ;;GET TRAP ADDRESS
022444  005740                          TST     -(R0)                   ;;BACKUP BY 2
022446  111000                          MOVB    (R0),R0                 ;;GET RIGHT BYTE OF TRAP
022450  006300                          ASL     R0                      ;;POSITION FOR INDEXING
022452  016000  022460                  MOV     $TRPAD(R0),R0           ;;INDEX TO TABLE
022456  000200                          RTS     R0                      ;;GO TO ROUTINE


                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;       ROUTINE
                                ;       -------
022460                          $TRPAD:
022460  021226                          $TYPE   ;;CALL=TYPE     TRAP+0(104400)  TTY TYPEOUT ROUTINE
022462  021650                          $TYPOC  ;;CALL=TYPOC    TRAP+1(104401)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
022464  021624                          $TYPOS  ;;CALL=TYPOS    TRAP+2(104402)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
022466  021664                          $TYPON  ;;CALL=TYPON    TRAP+3(104403)  TYPE OCTAL NUMBER (AS PER LAST CALL)
022470  022052                          $TYPDS  ;;CALL=TYPDS    TRAP+4(104404)  TYPE DECIMAL NUMBER (WITH SIGN)

022472  003062  003450  003656  TSTADD: TST1,TST2,TST3

022500  004052  004204  004420          TST4,TST5,TST6

022506  004650  005424  006104          TST7,TST10,TST11

022514  006316  006472  006720          TST12,TST13,TST14

022522  007142  007642  010060          TST15,TST16,TST17

022530  010226  010624  011130          TST20,TST21,TST22

022536  011326  011400                  TST23,TST24
```

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 022542  042523  020124  052126   STUPM:  .ASCII  /SET VT61S TO  FULL DUPLEX, /<15><12>
 022550  030466  020123  047524
 022556  020040  052506  046114
 022564  042040  050125  042514
 022572  026130  006440     012
 022577     071  030066  041060           .ASCIZ  /9600BAUD, REMOTE,PARITY MATCHED TO INTERFACE/<15><12>
 022604  052501  026104  051040
 022612  046505  052117  026105
 022620  040520  044522  054524
 022626  046440  052101  044103
 022634  042105  052040  020117
 022642  047111  042524  043122
 022650  041501  006505  000012


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DZVTH.P11        TRAP TABLE                                                                    SEQ 0084

 022656  005015  042101  051104   DUNTST: .ASCIZ  <15><12>/ADDRESSES WITH RESPONSIVE VT61S ARE:/<15><12>
 022664  051505  042523  020123
 022672  044527  044124  051040
 022700  051505  047520  051516
 022706  053111  020105  052126
 022714  030466  020123  051101
 022722  035105  005015     000
 022727     015  047012  020117   NOVT:   .ASCIZ  <15><12>/NO VT61 RESPONDED TO ESCZ SEQ. AUTO RETRY IN 30 SEC./<15><12>
 022734  052126  030466  051040
 022742  051505  047520  042116
 022750  042105  052040  020117
 022756  051505  055103  051440
 022764  050505  020056  052501
 022772  047524  051040  052105
 023000  054522  044440  020116
 023006  030063  051440  041505
 023014  006456  000012


 023020  005015  046104  030461   DLERR:  .ASCIZ  <15><12>/DL11 FAILED AT ADDRESS/
 023026  043040  044501  042514
 023034  020104  052101  040440
 023042  042104  042522  051523
 023050     000

 023051     115  047101  040525   DMANA:  .ASCII  /MANUAL TEST SELECTED -/<15><12>
 023056  020114  042524  052123
 023064  051440  046105  041505
 023072  042524  020104  006455
 023100     012
 023101     105  052116  051105           .ASCIZ  /ENTER ADDRESSES OF VT61S TO BE TESTED/<15><12>
 023106  040440  042104  042522
 023114  051523  051505  047440
 023122  020106  052126  030466
 023130  020123  047524  041040
 023136  020105  042524  052123
 023144  042105  005015     000

 023151     105  052116  051105   DMANB:  .ASCIZ  /ENTER TESTS TO BE RUN/<15><12>
 023156  052040  051505  051524
 023164  052040  020117  042502
 023172  051040  047125  005015
 023200     000
 4037
 4038  023201     101  020116  051505  EM1:     .ASCIZ  /AN ESC SEQ. TO THE VT61  FAILED - OCTAL EQUIV. IS:/<15><12>
 4039  023206  020103  042523  027121
 4040  023214  052040  020117  044124
 4041  023222  020105  052126  030466
 4042  023230  020040  040506  046111
 4043  023236  042105  026440  047440
 4044  023244  052103  046101  042440
 4045  023252  052521  053111  020056
 4046  023260  051511  006472  000012
 4047  023266  042524  052123  020043  DH1:     .ASCIZ  /TEST#  ERR PC  BYTE 1+2 BYTE 3+4/<15><12>
 4048  023274  042440  051122  050040
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DZVTH.P11          TRAP TABLE                                                                              SEQ 0085

 4049  023302  020103  041040  052131
 4050  023310  020105  025461  020062
 4051  023316  054502  042524  031440
 4052  023324  032053  005015     000
 4053
 4054  023331     122  041505  044505  EM2:     .ASCIZ  /RECEIVE STATUS ERROR./<15><12>
 4055  023336  042526  051440  040524
 4056  023344  052524  020123  051105
 4057  023352  047522  027122  005015
 4058  023360     000
 4059  023361     101  042104  020056  DH2:     .ASCIZ  /ADD.  STAT.  ERR.BITS  CHAR./<15><12>
 4060  023366  051440  040524  027124
 4061  023374  020040  051105  027122
 4062  023402  044502  051524  020040
 4063  023410  044103  051101  006456
 4064  023416  000012
 4065
 4066  023420  047523  052106  040527  EM3:     .ASCIZ  /SOFTWARE (VSTAT) STATUS ERROR./<15><12>
 4067  023426  042522  024040  051526
 4068  023434  040524  024524  051440
 4069  023442  040524  052524  020123
 4070  023450  051105  047522  027122
 4071  023456  005015     000
 4072  023461     040  040520  051523  DH3:     .ASCIZ  / PASS#,  TEST#,  EXP.STAT,  ACT.STAT/<15><12>
 4073  023466  026043  020040  042524
 4074  023474  052123  026043  020040
 4075  023502  054105  027120  052123
 4076  023510  052101  020054  040440
 4077  023516  052103  051456  040524
 4078  023524  006524  000012
 4079
 4080  023530  042107  020056  040504  EM4:     .ASCIZ  /GD. DATA DOES NOT MATCH REC. DATA/<15><12>
 4081  023536  040524  042040  042517
 4082  023544  020123  047516  020124
 4083  023552  040515  041524  020110
 4084  023560  042522  027103  042040
 4085  023566  052101  006501  000012
 4086  023574  042524  052123  020043  DH4:     .ASCIZ  /TEST# ,REC.CNT.,GD. DATA, REC. DATA/<15><12>
 4087  023602  051054  041505  041456
 4088  023610  052116  026056  042107
 4089  023616  020056  040504  040524
 4090  023624  020054  042522  027103
 4091  023632  042040  052101  006501
 4092  023640  000012
 4093                                           .EVEN
 4094
 4095  023642  054502  042524  020123  EM5:     .ASCIZ  /BYTES EXPECTED DOES NOT EQUAL BYTES RECEIVED/<15><12>
 4096  023650  054105  042520  052103
 4097  023656  042105  042040  042517
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  4098  023664  020123  047516  020124
  4099  023672  050505  040525  020114
  4100  023700  054502  042524  020123
  4101  023706  042522  042503  053111
  4102  023714  042105  005015     000
  4103  023721     102  052131  051505  DH5:    .ASCIZ  /BYTES EXP., BYTES REC./<15><12>
  4104  023726  042440  050130  026056
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 75
DZVTH.P11         TRAP TABLE                                                                       SEQ 0086

  4105  023734  041040  052131  051505
  4106  023742  051040  041505  006456
  4107  023750  000012
  4108
  4109  023752  052503  051522  051117  EM6:    .ASCIZ  /CURSOR POSITIONING ERROR/<15><12>
  4110  023760  050040  051517  052111
  4111  023766  047511  044516  043516
  4112  023774  042440  051122  051117
  4113  024002  005015     000
  4114  024005     107  020104  044514  DH6:    .ASCIZ  /GD LINE  GD COL.   BD LINE  BD COL/<15><12>
  4115  024012  042516  020040  042107
  4116  024020  041440  046117  020056
  4117  024026  020040  042102  046040
  4118  024034  047111  020105  041040
  4119  024042  020104  047503  006514
  4120  024050  000012
  4121
  4122  024052  044504  042522  052103  EM7:    .ASCIZ  /DIRECT CURSOR ADDRESSING FAILURE/<15><12>
  4123  024060  041440  051125  047523
  4124  024066  020122  042101  051104
  4125  024074  051505  044523  043516
  4126  024102  043040  044501  052514
  4127  024110  042522  005015     000
  4128  024115     120  051501  021523  DH7:    .ASCIZ  /PASS#  TEST #  ERROR PC   /<15><12>
  4129  024122  020040  042524  052123
  4130  024130  021440  020040  051105
  4131  024136  047522  020122  041520
  4132  024144  020040  006440  000012
  4133  024152  040520  051523  020043  DH10:   .ASCIZ  /PASS#  TEST#  BD.ROW  BD.COL/<15><12>
  4134  024160  052040  051505  021524
  4135  024166  020040  042102  051056
  4136  024174  053517  020040  042102
  4137  024202  041456  046117  005015
  4138  024210     000
  4139
  4140  024211     114  051501  020124  EM11:   .ASCIZ  /LAST TRANSMISSION TO VT61 CAUSED UNIT TO FAIL-HANG./<15><12>
  4141  024216  051124  047101  046523
  4142  024224  051511  044523  047117
  4143  024232  052040  020117  052126
  4144  024240  030466  041440  052501
  4145  024246  042523  020104  047125
  4146  024254  052111  052040  020117
  4147  024262  040506  046111  044055
  4148  024270  047101  027107  005015
  4149  024276     000
  4150
  4151  024277     126  033124  020061  EM12:   .ASCIZ  /VT61 UNDER TEST FAILED- ERROR DATA FOLLOWS/<15><12>
  4152  024304  047125  042504  020122
  4153  024312  042524  052123  043040
  4154  024320  044501  042514  026504
  4155  024326  042440  051122  051117
  4156  024334  042040  052101  020101
  4157  024342  047506  046114  053517
  4158  024350  006523  000012
  4159
  4160  024354  052126  030466  043040  EM10:   .ASCIZ  /VT61 FAILED SELF TEST FUNCTION/<15><12>
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  4161  024362  044501  042514  020104
  4162  024370  042523  043114  052040
  4163  024376  051505  020124  052506
  4164  024404  041516  044524  047117
  4165  024412  005015     000
  4166
  4167
  4168  024415     120  051501  021523  DH12:   .ASCIZ  /PASS#,  TEST#, GD.CKSUM, BD.CKSUM/<15><12>
  4169  024422  020054  052040  051505
  4170  024430  021524  020054  042107
  4171  024436  041456  051513  046525
  4172  024444  020054  042102  041456
  4173  024452  051513  046525  005015
  4174  024460     000
  4175
  4176  024461     124  051505  044524  DABRT:  .ASCIZ  /TESTING ABORTED-TOO MANY FATAL XMITS/<15><12>
  4177  024466  043516  040440  047502
  4178  024474  052122  042105  052055
  4179  024502  047517  046440  047101
  4180  024510  020131  040506  040524
  4181  024516  020114  046530  052111
  4182  024524  006523  000012
  4183
  4184  024530  052126  030466  051040  EM13:   .ASCIZ  /VT61 RECEIVER CHECKSUM COMPARE ERROR/<15><12>
  4185  024536  041505  044505  042526
  4186  024544  020122  044103  041505
  4187  024552  051513  046525  041440
  4188  024560  046517  040520  042522
  4189  024566  042440  051122  051117
  4190  024574  005015     000
  4191
  4192  024577     126  033124  020061  EM14:   .ASCIZ  /VT61 TRANSMITTER CHECKSUM COMPARE ERROR/<15><12>
  4193  024604  051124  047101  046523
  4194  024612  052111  042524  020122
  4195  024620  044103  041505  051513
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 4196   024626  046525  041440  046517
 4197   024634  040520  042522  042440
 4198   024642  051122  051117  005015
 4199   024650     000
 4200
 4201           024652                          .EVEN
 4202   024652  047125  052111  052440  DVUNIT: .ASCII  /UNIT UNDER TEST /<15><12>
 4203   024660  042116  051105  052040
 4204   024666  051505  020124  005015
 4205   024674  041522  051123  020040          .ASCIZ  /RCSR   VECT.   IDENT/<15><12>
 4206   024702  053040  041505  027124
 4207   024710  020040  044440  042504
 4208   024716  052116  005015     000
 4209   024723     040  041522  051123  DH11:   .ASCIZ  / RCSR   VECT./<15><12>
 4210   024730  020040  053040  041505
 4211   024736  027124  005015     000
 4212   024743     120  044522  052116  DPRTR:  .ASCIZ  /PRINTER IS ATTACHED/<15><12>
 4213   024750  051105  044440  020123
 4214   024756  052101  040524  044103
 4215   024764  042105  005015     000.
 4216   024771     103  050117  042511  DCOPYR: .ASCIZ  /COPIER IS ATTACHED/<15><12>
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DZVTH.P11               TRAP TABLE                                                                              SEQ 0088

 4217   024776  020122  051511  040440
 4218   025004  052124  041501  042510
 4219   025012  006504  000012
 4220   025016  047530  043106  052040  EM15:   .ASCIZ  /XOFF TO VT61 FAILED TO HALT BLOCK XMIT/<15><12>
 4221   025024  020117  052126  030466
 4222   025032  043040  044501  042514
 4223   025040  020104  047524  044040
 4224   025046  046101  020124  046102
 4225   025054  041517  020113  046530
 4226   025062  052111  005015     000
 4227   025067     130  047117  052040  EM16:   .ASCIZ  /XON TO VT61 FAILED TO RESTART BLOCK XMIT/<15><12>
 4228   025074  020117  052126  030466
 4229   025102  043040  044501  042514
 4230   025110  020104  047524  051040
 4231   025116  051505  040524  052122
 4232   025124  041040  047514  045503
 4233   025132  054040  044515  006524
 4234   025140  000012
 4235   025142  047516  054040  047117  EM17:   .ASCIZ  /NO XON RECEIVED WITHIN 3 SEC. AFTER A RESET/<15><12>
 4236   025150  051040  041505  044505
 4237   025156  042526  020104  044527
 4238   025164  044124  047111  031440
 4239   025172  051440  041505  020056
 4240   025200  043101  042524  020122
 4241   025206  020101  042522  042523
 4242   025214  006524  000012
 4243   025220  040514  052123  050040  EM20:   .ASCIZ  /LAST PERIPHERAL OPERATION ABORTED/<15><12>
 4244   025226  051105  050111  042510
 4245   025234  040522  020114  050117
 4246   025242  051105  052101  047511
 4247   025250  020116  041101  051117
 4248   025256  042524  006504  000012
 4249   025264  047503  046125  020104  EM21:   .ASCIZ  /COULD NOT CLEAR LAST ABORT FLAG./<15><12>
 4250   025272  047516  020124  046103
 4251   025300  040505  020122  040514
 4252   025306  052123  040440  047502
 4253   025314  052122  043040  040514
 4254   025322  027107  005015     000
 4255   025327     123  046517  047440  EM22:   .ASCIZ  /SOM OR EOM NOT RECEIVED DURING MAINT. MODE TRANSMIT/<15><12>
 4256  025334  020122  047505  020115
 4257  025342  047516  020124  042522
 4258  025350  042503  053111  042105
 4259  025356  042040  051125  047111
 4260  025364  020107  040515  047111
 4261  025372  027124  046440  042117
 4262  025400  020105  051124  047101
 4263  025406  046523  052111  005015
 4264  025414     000
 4265  025415     114  047111  020105  EM23:   .ASCIZ  /LINE FEED OR CURSOR RIGHT ISSUED FROM ROW 23 DID NOT CAUSE SCREEN TO SC
 4266  025422  042506  042105  047440
 4267  025430  020122  052503  051522
 4268  025436  051117  051040  043511
 4269  025444  052110  044440  051523
 4270  025452  042525  020104  051106
 4271  025460  046517  051040  053517
 4272  025466  031040  020063  044504
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 4273  025474  020104  047516  020124
 4274  025502  040503  051525  020105
 4275  025510  041523  042522  047105
 4276  025516  052040  020117  041523
 4277  025524  047522  046114  005015
 4278  025532     000
 4279  025533     120  051501  020123  DH13:   .ASCIZ  /PASS ,   TEST ,   VSTAT/<15><12>
 4280  025540  020054  020040  042524
 4281  025546  052123  026040  020040
 4282  025554  053040  052123  052101
 4283  025562  005015     000
 4284  025565     120  051501  026123  DH14:   .ASCIZ  /PASS,   TEST,   ERR PC,   VSTAT/<15><12>
 4285  025572  020040  052040  051505
 4286  025600  026124  020040  042440
 4287  025606  051122  050040  026103
 4288  025614  020040  053040  052123
 4289  025622  052101  005015     000
 4290
 4291  025627     105  041523  000040  DESC:   .ASCIZ  /ESC /
 4292
 4293
 4294
 4295  025634  042513  041131  040517  DKYBD:  .ASCII  /KEYBOARD TEST/<15><12>
 4296  025642  042122  052040  051505
 4297  025650  006524     012
 4298  025653     113  054505  052123          .ASCII  /KEYSTROKES ECHO:/<15><12>
 4299  025660  047522  042513  020123
 4300  025666  041505  047510  006472
 4301  025674     012
 4302  025675     101  042040  051511          .ASCII  /A DISPLAY CHAR. = A DISPLAY CHAR./<15><12>
 4303  025702  046120  054501  041440
 4304  025710  040510  027122  036440
 4305  025716  040440  042040  051511
 4306  025724  046120  054501  041440
 4307  025732  040510  027122  005015
 4308  025740  031463  036440  042440          .ASCII  /33 = ESC/<15><12>
 4309  025746  041523  005015
 4310  025752  032461  036440  041440          .ASCII  /15 = C-R/<15><12>
 4311  025760  051055  005015
 4312  025764  031061  036440  046040          .ASCII  /12 = L-F/<15><12>
 4313  025772  043055  005015
 4314  025776  033460  036440  041040          .ASCII  /07 = BELL/<15><12>
 4315  026004  046105  006514     012
 4316  026011     061  020060  020075          .ASCII  /10 = TAB/<15><12>
 4317  026016  040524  006502     012
 4318  026023     116  047117  042055                  .ASCIZ  /NON-DISPLAY CHAR.= OCTAL EQUIV/<15><12>
 4319  026030  051511  046120  054501
 4320  026036  041440  040510  027122
 4321  026044  020075  041517  040524
 4322  026052  020114  050505  044525
 4323  026060  006526  000012
 4324
 4325  026064  040524  020102     000  DTAB:   .ASCIZ  /TAB /
 4326  026071     103  051055  000040  DCR:    .ASCIZ  /C-R /
 4327  026076  026514  020106     000  DLF:    .ASCIZ  /L-F /
 4328  026103     102  046105  020114  DBELL:  .ASCIZ  /BELL /
```

```
 4329  026110     000
 4330
 4331  026111     114  047517  020120  DLOOP:  .ASCII  /LOOP TEST - LOOP COMMANDS AND DATA THRU/<15><12>
 4332  026116  042524  052123  026440
 4333  026124  046040  047517  020120
 4334  026132  047503  046515  047101
 4335  026140  051504  040440  042116
 4336  026146  042040  052101  020101
 4337  026154  044124  052522  005015
 4338  026162  047510  052123  041040          .ASCII  /HOST BACK TO VT61 UNDER TEST. /<15><12>
 4339  026170  041501  020113  047524
 4340  026176  053040  033124  020061
 4341  026204  047125  042504  020122
 4342  026212  042524  052123  020056
 4343  026220  005015
 4344  026222  047503  052116  047522  DCNTZ:  .ASCIZ  /CONTROL C  EXITS TEST./<15><12>
 4345  026230  020114  020103  042440
 4346  026236  044530  051524  052040
 4347  026244  051505  027124  005015
 4348  026252     000
 4349
 4350  026253     105  044530  020124  DEXT:   .ASCIZ  /EXIT TEST./
 4351  026260  042524  052123  000056
 4352
 4353  026266  051120  047111  042524  DPRNT:  .ASCII  /PRINTER TEST -/<15><12>
 4354  026274  020122  042524  052123
 4355  026302  026440  005015
 4356  026306  031461  020062  047503          .ASCII  /132 COLUMNS OF A SLIDING PATTERN WILL BE/
 4357  026314  052514  047115  020123
 4358  026322  043117  040440  051440
 4359  026330  044514  044504  043516
 4360  026336  050040  052101  042524
 4361  026344  047122  053440  046111
 4362  026352  020114  042502
 4363  026356  047503  052116  047111          .ASCII  /CONTINOUSLY OUTPUTTED TO PRINTER/<15><12>
 4364  026364  052517  046123  020131
 4365  026372  052517  050124  052125
 4366  026400  042524  020104  047524
 4367  026406  050040  044522  052116
 4368  026414  051105  005015
 4369  026420  040503  027122  051040  DCRST:  .ASCIZ  /CAR. RET. TO START/<15><12>
 4370  026426  052105  020056  047524
 4371  026434  051440  040524  052122
 4372  026442  005015     000
 4373
 4374  026445     114  051501  020124  DEVERR: .ASCIZ  /LAST XMIT CAUSED VT61 HANG/<15><12>
 4375  026452  046530  052111  041440
 4376  026460  052501  042523  020104
 4377  026466  052126  030466  044040
```

```
  4378  026474  047101  006507  000012
  4379  026502  051120  042117  041525  DKBD:   .ASCII  /PRODUCTION KEYBOARD TEST. 10 ERRORS CAUSES TEST EXIT./<15><12>
  4380  026510  044524  047117  045440
  4381  026516  054505  047502  051101
  4382  026524  020104  042524  052123
  4383  026532  020056  030061  042440
  4384  026540  051122  051117  020123
```

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  4385  026546  040503  051525  051505
  4386  026554  052040  051505  020124
  4387  026562  054105  052111  006456
  4388  026570     012
  4389  026571     104  050105  042522          .ASCIZ  /DEPRESS KEYS FROM LEFT TO RIGHT/<15><12>
  4390  026576  051523  045440  054505
  4391  026604  020123  051106  046517
  4392  026612  046040  043105  020124
  4393  026620  047524  051040  043511
  4394  026626  052110  005015     000
  4395  026633     104  050105  042522  DLSHFT: .ASCIZ  /DEPRESS LEFT SHIFT KEY AND THE "A" KEY /<15><12>
  4396  026640  051523  046040  043105
  4397  026646  020124  044123  043111
  4398  026654  020124  042513  020131
  4399  026662  047101  020104  044124
  4400  026670  020105  040442  C20042
  4401  026676  042513  020131  005015
  4402  026704     000
  4403  026705     104  050105  042522  DTOP:   .ASCIZ  /DEPRESS KEYS IN TOP ROW/<15><12>
  4404  026712  051523  045440  054505
  4405  026720  020123  047111  052040
  4406  026726  050117  051040  053517
  4407  026734  005015     000
  4408
  4409  026737     104  050105  042522  DRSHFT: .ASCIZ  /DEPRESS RIGHT SHIFT KEY AND THE "A" KEY /<15><12>
  4410  026744  051523  051040  043511
  4411  026752  052110  051440  044510
  4412  026760  052106  045440  054505
  4413  026766  040440  042116  052040
  4414  026774  042510  021040  021101
  4415  027002  045440  054505  006440
  4416  027010  000012
  4417  027012  042504  051120  051505  DSEC:   .ASCIZ  /DEPRESS KEYS IN SECOND ROW/<15><12>
  4418  027020  020123  042513  051531
  4419  027026  044440  020116  042523
  4420  027034  047503  042116  051040
  4421  027042  053517  005015     000
  4422
  4423  027047     104  050105  042522  DTHRD:  .ASCIZ  /DEPRESS KEYS IN THIRD ROW BEGINNING WITH 'A'/<15><12>
  4424  027054  051523  045440  054505
  4425  027062  020123  047111  052040
  4426  027070  044510  042122  051040
  4427  027076  053517  041040  043505
  4428  027104  047111  044516  043516
  4429  027112  053440  052111  020110
  4430  027120  040447  006447  000012
  4431  027126  042504  051120  051505  DCONT:  .ASCIZ  /DEPRESS CONTROL KEY ,AND THE "A" KEY /<15><12>
  4432  027134  020123  047503  052116
  4433  027142  047522  020114  042513
  4434  027150  020131  040454  042116
  4435  027156  052040  042510  021040
  4436  027164  021101  045440  054505
  4437  027172  006440  000012
  4438  027176  042504  051120  051505  DBOT:   .ASCIZ  /DEPRESS KEYS IN FORTH ROW EXCEPT SHIFT KEYS/<15><12>
  4439  027204  020123  042513  051531
  4440  027212  044440  020116  047506
```

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  4441  027220  052122  020110  047522
  4442  027226  020127  054105  042503
  4443  027234  052120  051440  044510
  4444  027242  052106  045440  054505
  4445  027250  006523  000012
  4446  027254  042504  051120  051505   DSPCE: .ASCIZ  /DEPRESS SPACE BAR/<15><12>
  4447  027262  020123  050123  041501
  4448  027270  020105  040502  006522
  4449  027276  000012
  4450
  4451  027300  042504  051120  051505  DKPD:   .ASCIZ  /DEPRESS KEYPAD KEYS,LEFT TO RIGHT, TOP TO BOTTOM/<15><12>
  4452  027306  020123  042513  050131
  4453  027314  042101  045440  054505
  4454  027322  026123  042514  052106
  4455  027330  052040  020117  044522
  4456  027336  044107  026124  052040
  4457  027344  050117  052040  020117
  4458  027352  047502  052124  046517
  4459  027360  005015     000
  4460
  4461  027363     113  054505  047502  DKBERR: .ASCII  /KEYBOARD ERROR,KEY POSITION IN ROW SHOULD BE /
  4462  027370  051101  020104  051105
  4463  027376  047522  026122  042513
  4464  027404  020131  047520  044523
  4465  027412  044524  047117  044440
  4466  027420  020116  047522  020127
  4467  027426  044123  052517  042114
  4468  027434  041040  020105
  4469  027440  020040  005015          KYSTRK: .ASCII  /  /<15><12>
  4470  027444  041517  040524  020114          .ASCIZ  /OCTAL GD, OCTAL BAD/<15><12>
  4471  027452  042107  020054  041517
  4472  027460  040524  020114  040502
  4473  027466  006504  000012
  4474  027472  020040  020040  020040  DSPC6:  .ASCIZ /      /
  4475  027500     000
  4476
  4477  027501     036     076     020  ROW1:   .BYTE   36,76,20,13,32,12,54,44,14,41,71,57,63,64,3,114,0
  4478  027504     013     032     012
  4479  027507     054     044     014
  4480  027512     041     071     057
  4481  027515     063     064     003
  4482  027520     114     000
  4483
  4484  027522     026     056     030  ROW2:   .BYTE   26,56,30,73,52,22,55,34,24,31,51,77,62,61,2,0
  4485  027525     073     052     022
  4486  027530     055     034     024
  4487  027533     031     051     077
  4488  027536     062     061     002
  4489  027541     000
  4490
  4491  027542     046     040     053  ROW3:   .BYTE   46,40,53,23,72,42,45,74,11,21,47,27,66,0
  4492  027545     023     072     042
  4493  027550     045     074     011
  4494  027553     021     047     027
  4495  027556     066     000
  4496
```

M07

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  4497  027560      016       070       060   ROW4:    .BYTE    16,70,60,50,33,43,25,35,75,65,37,115,67,0
  4498  027563      050       033       043
  4499  027566      025       035       075
  4500  027571      065       037       115
  4501  027574      067       000
  4502
  4503  027576      001       000             CNTRA:   .BYTE    01,0
  4504
  4505  027600      101       000             SHFTA:   .BYTE    101,0
  4506
  4507  027602      015       000             SPCB:    .BYTE    15,0
  4508
  4509  027604      113       004       103   KYPD:    .BYTE    113,04,103,104,1,112,101,102,6,7,106,100,5
  4510  027607      104       001       112
  4511  027612      101       102       006
  4512  027615      007       106       100
  4513  027620      005
  4514  027621      010       105       107            .BYTE    10,105,107,110,17,111,0
  4515  027624      110       017       111
  4516  027627      000
  4517
  4518                                                 .EVEN
  4519  027630  000500                          RCRLB:   .BLKB    500      ;RECEIVE CIRCULAR BUFFER
  4520
  4521  030330  000500                          TCRLB:   .BLKB    500               ;TRANSMIT CIRCULAR BUFFER
  4522  031030  000000                          ABUFP:   .WORD    0
  4523  031032  000062                          ABBUF:   .BLKB    50.
  4524  031114  000000                                   0
  4525          000001                                   .END
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 84
DZVTH.P11         CROSS REFERENCE TABLE -- USER SYMBOLS                                                                     SEQ 0094

ABBUF     031032              811     2516     2518     4523#
ABSXT     020424             3453#
ABUFP     031030              811*    1087     1119     1122     1134     1137     1348     1349     1356     1904     1907     1911*    2515*
                             2516     2518*    2519*    2757*    2758     2870     2874     3350*    3352     3355     3356*    3422     3427
                             3450     4522#
AESCO     014542             2587     2619#
AESCP     014534             2585     2616#
ALWCNT    002200              651#     913     1175     1616     2441
AOUT      012536             2177     2227#
ASESC     014356             2522     2584#
ASTRT     003062              814      827#    1839     1910     1991     2016     2053
AUTO      002230              141      670#
AUTOA     002240              672#     676      755     2127
BASC3     004222             1059     1060#
BBLUP     013250             2274     2277     2370#
BEL       001746              442#     833     1926
BINOCT    017266             1942     3207#    3365     3379     3385
BIT0   =  000001              115#
BIT00  =  000001              105#     115      803     1830     2205     2521
BIT01  =  000002              104#     114      806      877     2521     2590
BIT02  =  000004              103#     113     2156
BIT03  =  000010              102#     112     2521     2586     2596
BIT04  =  000020              101#     111
BIT05  =  000040              100#     110
BIT06  =  000100               99#     109
BIT07  =  000200               98#     108     1214     2485
BIT08  =  000400               97#     107     3531
BIT09  =  001000               96#     106     3539     3601
BIT1   =  000002              114#
BIT10  =  002000               95#    3583
BIT11  =  004000               94#    3546
BIT12  =  010000               93#
```

N07

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BIT13 = 020000           92#     3590
BIT14 = 040000           91#     3517
BIT15 = 100000           90#
BIT2  = 000004          113#
BIT3  = 000010          112#
BIT4  = 000020          111#
BIT5  = 000040          110#
BIT6  = 000100          109#
BIT7  = 000200          108#
BIT8  = 000400          107#
BIT9  = 001000          106#
BLDADA  002312          694#      714
BLDADD  002310          692#      698
BLDINA  017102         1981      3151#    3158
BLDINC  017076         1028      1069     1306     1492     1817     3150#    3157     3169
BLDTST  002410          708       711      716#
BLKM    002224          661#      775*    1061*    1299*    1333*    1642*    1814*    2675     2678*    2683*    2710     2852*    3021*
BOROW   020042         3370      3373#
BPTVEC= 000014          122#
BUBCT   002206          654#     1812*    1824     1828*    2037*    2046     2326*    2340*    2342     2346*    2350*    2372*    2379*
                       2394*     2414     2756*    2762*    3359*    3360
BUMPCT  020344         3421      3432#
BYSTOR  016024         1498*     2854     2902#    2947*
CALCK   017516         1314      2514     2699     3289#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 85
DZVTH.P11         CROSS REFERENCE TABLE -- USER SYMBOLS                                                                    SEQ 0095

CARRT   001750          444#     1724     1735     1934     1982     2552     3243     3258     3268
CDEV    012242          673       705      709     2165#
CDEVA   012312         2175#     2181     2187     2223     2226
CDWN    001764          460#
CESAM   014526         2601      2605     2609     2611     2613#    2617     2622     2627     2633     2635
CHKITT  015766         2883      2887     2889     2891#
CHOM    001760          454#     1184     1308     1647
CHRD    002160          643#      783*     866*     867      870*     917*    2117*    2257*    2259     2261     2264*    2268*    2328*
                       2334*     2336*    2337*    2338     2344     2348     2352     2356     2376*    2476*    2477*    2478     2959*
                       2960*     2962     2963     2964*    2965*    2966     2967     3351*    3355*    3357     3384
CKABRT  017572         1836      1988     3319#
CKDAT   005220         1204      1226#
CKEOM   003564          944       948#
CKEXT   006100         1321      1346     1355     1362     1369     1375#
CKGP  = 000106          592#     2606
CKKBD   017716         2045      3350#
CKLIN   004070         1023      1025#
CKMEM   005260         1227      1237#
CKMNT   003466          931       933#
CKOFF   020560         2893      3082     3493#
CKSCRA  006736         1545      1547#
CKSCRB  007026         1563      1565#
CKSFT   015366         1081      1092     1245     1329     1368     2791#    2896     3084
CKSRC   005746         1347#     1357
CKSTR   015734         2863      2873     2882#
CKSUM = 002000          378#     1315     2696     2713
CKSUMA  005442         1296      1298#
CKSUMB  005646         1323      1331#
CKVST   016000         2881      2894#
CLFT    001766          463#     1452
CLMAIN  011512         2043      2054#
CLRCK   002014          496#
CLREG   015530          904      1229     1324     1363     1467     1776     2817     2835#    2961     3075
CLTCK   002016          499#
CMPOS   016314         1637      2979#
CNTF    020162         3361      3395#
CNTRA   027576         2072      4503#
```

B08

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CONMGP = 000020      384#    2562     2608     2612
CONRD    013442     2423#    3254
CPABRT=  000171      594#    2628
CPPOS    016356     1669     2994#
CRBUF    001744      434#
CRCSR    001742      433#
CRRUL    016750     3097#
CRT      001762      457#    1413
CUHME    002152      618#     990      993     1635     1641
CUP      001770      466#    1425
CURER    016216      994     1012     1043     1423     1584     1684     1722     1738     2957#
CURPOS=  000004      385#    2600     2884
CURS1    003674      977      979#
CURS1A   006122     1390     1392#
CURS1B   006334     1446     1448#
CURS2    007160     1604     1606#
CUR1XT   006314     1410     1427     1434#
C2CK     007576     1661     1665     1676#
C2XT     007640     1618     1634     1655     1677     1680     1687#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 86
DZVTH.P11         CROSS REFERENCE TABLE -- USER SYMBOLS                                                SEQ 0096

DABRT    024461     2443     4176#
DAPNT    002032      517#
DATSC    017124     1758     3166#
DBELL    026103     1928     4328#
DBOT     027176     2064     4438#
DCNTZ    026222     1899     4344#
DCONT    027126     2066     4431#
DCOPYR   024771      805     4216#
DCOUNT   017074      860*     951*    1073*    1114*    1120*    1135*    2283*    2760*    3133*    3140#
DCR      026071     1936     4326#
DCRAD    002042      530#     590      997     1064     1624
DCRST    026420     4369#
DDISP  = 177570       37#     170
DELAY    017032      861      952     1074     1115     1121     1136     2284     2761     3124#
DELIM    003256      845      874#
DEMP     002022      505#    2624
DESC     025627     1915     4291#
DEVERR   026445     4374#
DEXT     026253     2051     3456     4350#
DF0      001442      207      214      229      341#
DF1      001446      258      343#
DF2      001450      236      345#
DF3      001474      243      351#
DF4      001534      264      271      294      301      308      336      359#
DF5      001537      360#
DF6      001543      222      250      278      285      315      322      329      362#
DH1      023266      205     4047#
DH10     024152      248     4133#
DH11     024723      256     4209#
DH12     024415      276      283     4168#
DH13     025533      292      299     4279#
DH14     025565      313      320     4284#
DH2      023361      212     4059#
DH3      023461      220      327     4072#
DH4      023574      227     4086#
DH5      023721      234     4103#
DH6      024005      241     4114#
DH7      024115      262      269      306      334     4128#
DISPLA   001140      170#    2105*    3560*    3582*
DISPRE   000174      138#    2105
DKBD     026502     2035     4379#
DKBERR   027363     3376     4461#
```

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DKPD    027300           2066     4451#
DKYBD   025634           1897     4295#
DLAY    002216            658#     942*     945*    1199*    1205*    1347*    1351*    1657*    1662*    2329*    2332*    2858*    2866*
                         2871*    2876*    3026*    3033*    3037*    3042*    3473*    3476*    3493*    3496*
DLERR   023020           2216     4013#
DLF     026076           1940     4327#
DLOOP   026111           2011     4331#
DLSHFT  026633           2066     4395#
DLTBL   001610            411#     706      746     2174     2248     2280     2287
DLTPT   001712            417#     746*     749      769*
DMAIN   002004            485#
DMANA   023051            689     4019#
DMANB   023151            716     4032#
DMPOCT  020064           3376#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 87
DZVTH.P11        CROSS REFERENCE TABLE -- USER SYMBOLS                                                                    SEQ 0097

DOAROW  011434           2040#    2050     2057
DPNT    001776            475#
DPRNT   026266           1966     4353#
DPRTR   024743            808     4212#
DRECT   002012            493#    1040     2745     3189
DRSHFT  026737           2066     4409#
DSCHNG= 100000            394#
DSEC    027012           2064     4417#
DSMES   017172           1898     1967     2012     2036     2052     3183#    3457
DSPCE   027254           2066     4446#
DSPC6   027472           3382     4474#
DSWR  = 177570             36#     169
DTAB    026064           1932     4325#
DTHRD   027047           2064     4423#
DTOP    026705           2064     4403#
DTTBL   011560           2040     2070#    3363
DT0     001422            206      338#
DT1     001434            235      257      340#
DT2     001452            213      242      347#
DT3     001464            263      270      349#
DT4     001500            221      249      277      284      314      321      328      353#
DT5     001512            228      355#
DT6     001524            293      300      307      335      357#
DUNTST  022656           2288     3994#
DVUNIT  024652            786     4202#
EAPNT   002030            515#
EEMP    002020            503#    2619
EINST   002034            520#
EMAIN   002002            483#    2743
EMTVEC= 000030            125#    2087*    2088*
EM1     023201            204     4038#
EM10    024354            255     4160#
EM11    024211            261     4140#
EM12    024277            268     4151#
EM13    024530            275     4184#
EM14    024577            282     4192#
EM15    025016            291     4220#
EM16    025067            298     4227#
EM17    025142            305     4235#
EM2     023331            211     4054#
EM20    025220            312     4243#
EM21    025264            319     4249#
EM22    025327            326     4255#
EM23    025415            333     4265#
EM3     023420            219     4066#
EM4     023530            226     4080#
EM5     023642            233     4095#
```

D08

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EM6      023752          240    4109#
EM7      024052          247    4122#
ENDPS    010474         1838    1840#
ENDSEL   010462         1823    1831     1837#
ENDTAB   001722          422#   2147
ENSRT    006712         1519    1526#
EOM    = 000004          640#    940     1178     1313     1356     1619     2348     2411     2546     2682     2931     3193
EOS      001772          469#   1765
EPL    = 001000          379#   2556     3417     3425
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 88
DZVTH.P11        CROSS REFERENCE TABLE -- USER SYMBOLS                                                      SEQ 0098

EPNT     001774          473#   1973
ERPL     002036          522#
ERRVEC=  000004          118#   3522     3523*    3525*    3528*
ERSE     010076         1753    1756#
ERSXT    010224         1772    1774     1779#
ESAMB    014636         1914*   2521     2526*    2584     2586     2590*    2596*    2613*    2640#    2944*    3424*
ESC    = 000400          380#   1912     2527     3417     3425
ESCN     002130          606#    885     1183     1307     1417     1451     1646     1764     1834     1974     2523     3427
ESCO     002056          542#    598      888     1038     1066     1112     1186     1309     1310     1648     1804     2734     2744
                        2746    3188
ESCOI  = 002056          598#    981      999     1453     1462     1725
ESCP     002116          587#    599      891     1514
ESCPI  = 002116          599#
ESCYI  = 002042          590#
ESCZ     002124          600     602#     936      938     2777
ESCZI  = 002124          600#   1185
ESSEQ    002214          657#    849*     851      907      908
ESTEX    003436          843     916#
ESTST    003100          831     833#
EXINT    013010         2281    2287#
EXIT3    004414         1086    1088     1093#
EXMAIN   011124         1901    1949#    1968     2013
EXMNT    003654          958     963#
EXTST    020414         1908    1989     3440     3450#
FADD     012176         2146#   2157
FADD1    012214         2151#   2154
FEXIT    011476         2042    2048     2051#
FNDBT    020544         3475    3483#
FRCECT   020362         3431    3433     3436#
FTEX1    003442          914     918#
FTLCNT   002176          650#    810*     912*     913     1175     1207*    1353*    1616     2441     2449*    2738*    2879*    3058*
                        3481*
FTLEXT   016070         2915    2917#
GCMD     003136          841#    882      886      889      892      895      902
GDAD     012524         2210    2224#
GDCURP   006304         1411    1430#
GDSCRL   007140         1561    1578     1580     1585#
GDSTRK   020154         3358    3392#
GETON    015256         1806    2736     2756#
GNS    = ****** U        137    3956     3957     3958     3959     3960
GOTON    015324         2759    2765#
GTCR     017364         1970    3241#    3244
GTEXT    017476         3267    3269     3272#
GTNUM    017406          694     720     3254#    3275
HDFLG    016746         2749*   3024*    3071     3074*    3088#
IABT     002024          508#
IDENT    002122          597#    779*     781*     797      803      806      867     1830
INAG     006546         1497#   1521
INITA    012620          674     710     2248#
INRPL    006510         1486    1488#
INRXT    006716         1510    1518     1528#
INTAB    001650          412#    691      717      815     2145     2173
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                                                                      E08
INTRC   013746          762    2507#
INTXM   014670          764    2670#
INTXT   012756         2252    2280#
INXMT   003164          850#    898
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 89
DZVTH.P11       CROSS REFERENCE TABLE -- USER SYMBOLS                                                          SEQ 0099

IOTVEC= 000020          123#   2085*   2086*   2169*   2170*   2230*   2231*
ITSUMA  006070         1301    1371#
JMPADD  013644         2462*   2463*   2467    2469#
KBDLP   017726         3352#   3390    3394
KIENA   015126         2673    2715#
KYBD    010642         1894    1896#
KYBXMT  011110         1916    1929    1933    1937    1941    1944#
KYPD    027604         2072    4509#
KYSTRK  027440         3374*   3375*   4469#
KYSTRT  010676         1903#   1925    1946
LDADD   013040          760    2182    2253    2305#
LDBUF   017564         1336    1394    1500    1549    1568    1706    1760    3312#   3327
LDOUT   016122         2928    2931#
LDPOS   020050         3368    3372    3374#
LDXMIT  016076         1253    1302    1495    1520    1827    1900    1902    1945    1969    2014    2044    2055    2925#
                       3377    3381    3383    3387    3389
LINXT   004202         1035    1037    1044#
LKKB    002006          488#
LNFED   001752          446#    699     728    1188    1719    1938    1983    2554    3266    3270    3429
LNRW    016420         1622*   1638    1641*   1673    2979    2981*   2983    2985*   2986*   2994    2996*   2998    3000*
                       3001*   3004#
LOOP    020164         2015    3406#
LOOPR   020250         3413    3417#
LOOPT   020216         3411#   3416    3428    3435    3441
LOOPTA  020222         3412#   3420
LPSTR   020270         3418    3422#
LPTST   011344         2008    2010#
LSTST   010244         1799    1801#
MAINT = 000004          402#
MANS    002262          142     687#
MANSA   002274          689#    707     712     759    2126
MEMA    004674         1163#   1254
MEMB    004730         1169#   1176
MEMC    005102         1199#   1216    1218    1221    1225
MEMD    005150         1202    1210#
MEMXT   005422         1177    1193    1209    1248    1277#
MEM1    004666         1159    1161#
MODCA   002516          748#   1877    2459
MODCK   002502          675     726     733     746#    758
MODE    002174          649#    670*    687*    732*    753     813    1837    2124    2439
MONIT   013474         2439#   3516
MPATT = 005402         1163    1196    1247    1264    1267#
MSTBL   011532         2041    2064#
MSTRT   000204          142#
NABRT = 000170          596#   3335
NCKGP = 000107          593#   2610
NOCALC  017562         3291    3293    3306#
NOER    015504         2801    2816    2824#
NOKIL   014706         2671    2675#   2692    2694
NOROUT  020464         3451    3460#
NORXT   016074         2916    2918#
NOSHFT  017360         3230    3234#
NOSOM   014730         2676    2680#
NOVT    022727         2282    4001#
NWLN    007660         1702    1704#
OCTBIN  017342          713     735    3228#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 90
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OFFLP   004520             1119#   1125
ONE     002202              652#
ONLP    004576             1132#   1140
ONOFA   004560             1123    1129#
ONOFLP  004470             1114#   1138
ONOFXT  004646             1133    1143#
ONOF61  004436             1106    1108#
PABRT = 010000              376#   2632    3319
PATGN   005350             1172    1211    1256#
PC     =%000007              49#   1857*   1860*   1872*   3592*   3649*   3652*   3659*   3666*   3680*   3682*   3741*
PDKBD   011416             2032    2035#
PIRQ  = 177772               35#
PIRQVE= 000240              129#
PMULT   017072             2112*   2118*   2122*   3127    3139#
POPIT   003246              869#    915
POP2SP= 022626              366#   2115    2121    2153    2192    2448
PRABRT= 000172              595#   2630
PRESC   002212              656#    836*    840     854     885*    888*    891*    905
PR0   = 000000               52#
PR1   = 000040               53#
PR2   = 000100               54#
PR3   = 000140               55#
PR4   = 000200               56#
PR5   = 000240               57#
PR6   = 000300               58#
PR7   = 000340               59#
PS    = 177776               32#     33    3648
PSW   = 177776               33#   2465*
PUSH2S= 024646              367#
PWRVEC= 000024              124#   2091*   2092*   3895*   3896*   3904*   3919*   3920*
QUST    017500             3261    3263    3273#
RABT    002110              564#
RBBUF   014630              772*   1036    1198    1200    1322    1326    1361    1365    1460    1469    1562    1579    1582*
                           1666    1667    1683*   1716    1732    1757*   1767*   1773    1777    2549    2561    2637#   2886
                           2890    2940    2964    3029    3415
RBUFP   014634             1200*   1201    1656    1658    1666*   2549*   2559    2561*   2569*   2570*   2639#   2940*   3029
                           3038    3411    3415*   3419    3422*   3423*   3429*   3430*   3434*
RCRLB   027630              770     772     989    1006    1421*   3408    3453    4519#
RCUR    002050              535#   1029
RDCUR   002052              538#    982    1000    1030    1726    2598
RDENA = 000100              395#    812     834     918    1840    2207    2215    2458    2481
REBUF   014632              770*   2559    2638#   3407*   3453*
RECAD   013650             2201    2476#
RECDN = 000200              393#   2330    2425    2450    3241
RECEX   013236             2335    2351    2355#
RECEXA  013242             2349    2357#
RECITT  016020             1405*   1497*   1565*   2891*   2900#   2945*
RECTM   013060             2324#   2780
RECXT   014352             2573    2577    2581#
REEX    013706             2482#   2486
REOM  = 020000              375#    949     957    1132    1203    1318    1358    1359    1660    2548    2861    2872    3040
                           3062
RERR  = 100000              396#
RESET   002126              604#   2733
RESETV  015146              933     980    1025    1063    1108    1161    1298    1393    1449    1488    1547    1607    1704
                           1756    1811    2731#   3183
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 91
DZVTH.P11       CROSS REFERENCE TABLE -- USER SYMBOLS                                                        SEQ 0101

RESPTR  016136              774    1093    1164    1180    1300    1375    1621    1640    1896    2010    2880    2897    2939#
                           3059    3409    3455
RESVEC= 000010              119#
```

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REVID = 000040             383#   2566    2621    2626
RFMER = 020000             398#
RORUN = 040000             397#
ROW1    027501            2070    4477#
ROW2    027522            2070    4484#
ROW3    027542            2070    4491#
ROW4    027560            2070    4497#
RPAR  = 010000             399#
RSMAIN  011526            2054    2058#
RSOM  = 040000             374#    943     955    2543
RSTER   014316            2528    2532    2537    2540    2544    2551    2557    2572#   2591    2597    2614
RSTT  = 004000             377#   2575
RTRP    012076            2113    2119    2123#
RXOFF = 100000             373#   1075    2531    2535    2864    3031    3494
R0    =%000000              40#    672*    673*    674*    690*    694*    705*    709*    710*    713*    720*    735*    760*
                           774*    778*    856*    861*    864*    904*    933*    935*    937*    939*    941*    952*    980*
                           985*    994*   1002*   1012*   1025*   1028*   1032*   1043*   1063*   1069*   1074*   1081*   1085*
                          1092*   1093*   1108*   1113*   1115*   1117*   1121*   1130*   1136*   1161*   1164*   1168*   1172*
                          1174*   1179*   1180*   1190*   1211*   1229*   1245*   1253*   1260*   1265*   1298*   1300*   1302*
                          1306*   1314*   1320*   1324*   1329*   1336*   1345*   1363*   1368*   1375*   1393*   1394*   1407*
                          1423*   1449*   1456*   1467*   1488*   1492*   1495*   1500*   1507*   1520*   1547*   1549*   1558*
                          1568*   1575*   1584*   1607*   1610*   1615*   1620*   1621*   1633*   1637*   1640*   1654*   1669*
                          1684*   1704*   1706*   1712*   1722*   1728*   1738*   1756*   1758*   1760*   1769*   1776*   1805*
                          1806*   1811*   1817*   1822*   1827*   1835*   1836*   1869*   1872    1896*   1898*   1900*   1902*
                          1908*   1922*   1924*   1942*   1945*   1967*   1969*   1970*   1975*   1981*   1988*   1989*   2010*
                          2012*   2014*   2015*   2036*   2044*   2045*   2052*   2055*   2159*   2182*   2240*   2253*   2255*
                          2274*   2277*   2284*   2285*   2286*   2298*   2310*   2359*   2384*   2416*   2430*   2446*   2514*
                          2699*   2735*   2736*   2739    2747*   2750*   2761*   2764*   2765*   2778*   2780*   2782*   2817*
                          2828*   2839*   2878*   2880*   2893*   2896*   2897*   2899*   2914*   2918*   2929*   2932*   2933*
                          2948*   2961*   2970*   2982*   2987*   2997*   3002*   3057*   3059*   3064*   3075*   3082*   3084*
                          3086*   3102*   3137*   3154*   3169*   3183*   3197*   3221*   3235*   3245*   3254*   3272*   3306*
                          3312    3314*   3321    3327*   3333*   3337    3341*   3365*   3377*   3379*   3381*   3383*   3385*
                          3387*   3389*   3395*   3409*   3440*   3442*   3455*   3457*   3459*   3460*   3483    3486*   3498*
                          3516*   3635    3636*   3637    3640*   3697    3698*   3699*   3706*   3707*   3708*   3709*   3710*
                          3711    3716    3722    3724*   3725    3739*   3836    3846*   3850    3866    3867    3880*   3897
                          3918*   3939    3940*   3941    3942*   3943*   3944*   3945*
R0SVE   002220             659#   2325*   2358    2371*   2383    2393*   2415    2424*   2429    2792*   2827    2958*   2969
                          3470*   3485

R0SV1   015364            2775*   2781    2783#
R00C08  002150             617#
R00C11  002144             614#
R00C20  002146             616#
R00C80  002154             619#
R01C00  002132             607#   1036    1042    1732    1737
R01C20  002134             608#   1716    1721
R1    =%000001              41#    695     699     721     728     748*    833*    841     948*    953*    979*    981*    982*
                           989*    990     996*    997*    998*    999*   1000*   1006*   1008    1026*   1029*   1030*   1060*
                          1064*   1065*   1066*   1067*   1182*   1183*   1184*   1185*   1186*   1187*   1188*   1198*   1201
                          1215    1223    1228*   1230    1231    1232    1234    1304*   1307*   1308*   1309*   1310*   1311*
                          1335*   1392*   1411*   1415    1422    1424    1448*   1450*   1451*   1452*   1453*   1454*   1489*
                          1490*   1493*   1499*   1548*   1567*   1623*   1624*   1625    1626*   1627*   1643*   1644    1646*
                          1647*   1648*   1649*   1656*   1658    1678*   1679    1683    1685    1705*   1723*   1724*   1725*
                          1726*   1759*   1815*   1907*   1917    1919    1921    1926    1930    1934    1938    1976*   1979*
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 92
DZVTH.P11       CROSS REFERENCE TABLE -- USER SYMBOLS                                                                SEQ 0102

                          1982*   1983*   2134*   2137*   2138*   2140    2144*   2146    2147    2155    2156    2175*   2183*
                          2185*   2200*   2201*   2202*   2203*   2204*   2206*   2211*   2232*   2234*   2235*   2237    2250*
                          2306*   2308    2452*   2453*   2454    2456*   2460*   2461*   2462    2508    2509*   2510*   2513
                          2519    2523    2529    2533    2541    2546    2552    2554    2564*   2568*   2569    2572    2578
                          2582*   2588    2592    2594    2598    2602    2606    2610    2616    2619    2624    2628    2630
                          2634    2793    2796*   2800    2803    2813*   2815    2820    2821    2824*   2854*   2882    2888
                          2890*   3046    3050    3053    3067*   3069    3080*   3097*   3099*   3100    3111*   3125    3128*
                          3129*   3136*   3151*   3167*   3186*   3187*   3188*   3189*   3191*   3193*   3211*   3212*   3213*
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                                                    H08
                          3214    3228*   3234    3255*   3256    3258*   3260    3262    3264    3266    3268    3270*   3312*
                          3326*   3362*   3363*   3364*   3378*   3384*   3721    3722*   3727    3731    3733    3738*   3837
                          3850*   3851    3855    3879*   3898    3917*
R12C00  002140             610#
R2      =%000002            42#    692*    697     701     703     719*    723     730     749*    751     769     840*    899*
                           901*   1166*   1169*   1195*   1210*   1217    1224    1237    1240    1348*   1349    1412*   1415
                          1421    1424    1608*   1611*   1625*   1635    1638*   1644*   1671    1673*   1676    1685    1897*
                          1966*   2011*   2035*   2051*   2135*   2137    2139*   2146*   2147    2149    2150    2151*   2173*
                          2176    2180*   2233*   2234    2236*   2248*   2251    2270*   2272    2287*   2290    2296    2305
                          2794    2797*   2799*   2800    2814*   2815    2825*   2855*   2882    2696*   3038    3046    3051
                          3053    3098*   3099    3103*   3104    3106*   3108    3110*   3111    3112*   3113*   3126    3127*
                          3131*   3135*   3191    3229    3231*   3232*   3233*   3234*   3456*   3838    3849*   3853*   3856
                          3863*   3864*   3865    3870*   3878*   3899    3916*
R22C00  002136             609#
R23C00  002142             612#   1065    1583
R23C78  002156             620#   1622    1626
R23C79  002044             532#    998    1008    1011    1679
R3      =%000003            43#    691*    697*    703*    704*    717*    723*    730*    731*    750*    761     762*    763*
                           764*    765*    841*    844     849     874     877     880     897     899     900*    901    1027*
                          1068*   1072*   1077*   1197*   1220    1222*   1223*   1224*   1226    1234    1252*   1301*   1305*
                          1413*   1418    1425    1491*   1494*   1519*   1816*   1826*   1899*   1901*   1915*   1928*   1932*
                          1936*   1940*   1943*   1968*   1980*   2013*   2041*   2054*   2136*   2138    2172*   2190*   2200
                          2213*   2249*   2254*   2271*   2275    2927    3054*   3152*   3168*   3301*   3302*   3304    3376*
                          3380*   3382*   3386*   3388*   3778    3787*   3793*   3794*   3797*   3802*   3803*   3804    3813*
                          3839    3847*   3848*   3862*   3865*   3874*   3875*   3877*   3900    3915*
R4      =%000004            44#    718*    724*    725     837*    847     852     858     884*    894*   1118*   1124*   1131*
                          1139*   1163*   1173    1196*   1214*   1215    1222    1256*   1257    1259*   1261*   1262    1264*
                          1312*   1322    1325    1332*   1361    1364    2040*   2205*   2209    2305*   2306    2307*   2374
                          2375*   2376    2377*   2382*   2394    2397*   2399    2400    2404    2405*   2406    2414*   2478
                          2484*   2485    2487*   2489    3019    3020*   3045*   3052    3085*   3296    3300*   3301    3303
                          3305*   3357    3362    3378    3392*   3393    3411*   3419    3779    3781*   3782*   3783*   3784
                          3785*   3799    3801*   3809*   3812*   3901    3914*
R5      =%000005            45#   1119*   1122    1134*   1137    1162*   1163    1196    1212    1246*   1247    1250    1264
                          1313*   1496*   1511    1513    1516    1517    1977*   1992    2038*   2040    2041    2049    2056
                          2145*   2150*   2158*   2174*   2224*   2227*   2396*   2399*   2406    2513*   2698*   2851    2870*
                          2874    2898*   3025*   3048    3050*   3051*   3052*   3066*   3067    3068*   3076    3077    3078
                          3150*   3151    3155*   3156    3208    3209*   3214*   3215*   3216*   3217*   3220*   3289*   3290
                          3292    3302    3303*   3304*   3305    3363    3780    3786*   3788*   3790*   3791*   3792*   3793
                          3811*   3840    3842*   3844*   3851*   3855*   3870    3876*   3902    3913*
R6      =%000006            46#     48    2080*   2081*   2082    2189*   2190    2191    2397    2427*   2428*   2447
R7      =%000007            47#     49
SEQ4     003344            848     897#
SETA     011604            671     688    2079#   2445
SETREV   005416           1252    1275#   1826
SHFTA    027600           2072    4505#
SLSH   = 000057            591#   2338    2602
SOM    = 000002            639#    934    1167    1609    2344    2395    2541    2677    2925    3187
SP      =%000006            48#    766*    767*    779     783     787*    792*    797*    839*    851*    854*    866     870
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 93
DZVTH.P11        CROSS REFERENCE TABLE -- USER SYMBOLS                                                                  SEQ 0103

                           917     993*   1011*   1042*   1080*   1083*   1084*   1091*   1110*   1111*   1112*   1244*   1318*
                          1319*   1328*   1343*   1344*   1367*   1422*   1583*   1631*   1632*   1652*   1653*   1682*   1721*
                          1737*   1802*   1803*   1804*   1820*   1821*   1832*   1833*   1834*   1864*   1972*   1973*   1974*
                          2084*   2099*   2100*   2106    2107    2108    2165*   2166*   2197*   2198*   2217*   2257    2264
                          2268    2272*   2273*   2275*   2276*   2290*   2325    2326    2327*   2352*   2356*   2358*   2371
                          2372    2373    2374*   2382    2383*   2393    2415*   2424    2429*   2466*   2467*   2508*   2582
                          2732*   2733*   2734*   2742*   2743*   2744*   2745*   2746*   2775    2776*   2777*   2779*   2781*
                          2792    2796    2827*   2851*   2895*   2898    2912*   2913*   2958    2959    2969*   3019*   3062*
                          3063*   3083*   3085    3125*   3126*   3135    3136    3208*   3220    3255    3470    3471    3472
                          3485*   3522*   3525    3527    3528    3556    3557    3561*   3587    3603*   3606*   3635*   3636
                          3637*   3639    3640    3641*   3643    3645    3647    3648*   3653    3655*   3657*   3665*   3669
                          3673    3674    3678    3697*   3702*   3721*   3727*   3731*   3738    3739    3770*   3771    3772
                          3773*   3778*   3779*   3780*   3786    3811    3812    3813    3814*   3815*   3836*   3837*   3838*
```

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                         3839*    3840*    3841*    3842     3845*    [illegible] 3860*  3862     3872     3874     3876     3877     3878
                         3879     3880     3882*    3883*    3897*    3898*    3899*    3900*    3901*    3902*    3903     3909*    3913
                         3914     3915     3916     3917     3918     3939*    3940
SPCB     027602          2070     4507#
SPTN     003336           846      894#
STACK  = 001100            29#    2084
START    000200           141#
STKLMT=  177774            34#
STRBYT   015756          2885     2888#
STRO     014664          2634*    2653#    3335
STRP     014666          2616*    2654#
STRTAB   001714           419#    2146
STTEP    014662          2576     2578*    2579*    2652#    2814     2826*    2942*
STTER    014640          2642#    2813     2826     2942
STUPM    022542          2109     3978#
SVER1    002162           644#    1943     2793*    2824     3214*    3215*    3216*    3366*    3367     3369     3371*    3373*    3374
                         3375     3380     3386
SVER2    002164           645#    2794*    2825     3219*    3366
SWR      001136           169#    2102     2104*    3517     3531     3533     3539     3546     3583     3590     3595     3601
SWREG    000176           139#    2104
SW0    = 000001            87#
SW00   = 000001            77#      87
SW01   = 000002            76#      86
SW02   = 000004            75#      85
SW03   = 000010            74#      84
SW04   = 000020            73#      83
SW05   = 000040            72#      82
SW06   = 000100            71#      81
SW07   = 000200            70#      80
SW08   = 000400            69#      79
SW09   = 001000            68#      78
SW1    = 000002            86#
SW10   = 002000            67#
SW11   = 004000            66#
SW12   = 010000            65#
SW13   = 020000            64#
SW14   = 040000            63#
SW15   = 100000            62#
SW2    = 000004            85#
SW3    = 000010            84#
SW4    = 000020            83#
SW5    = 000040            82#
SW6    = 000100            81#
```

```
SW7    = 000200            80#
SW8    = 000400            79#
SW9    = 001000            78#
TAB      001754           448#    1930
TBBUF    015136           773*     979      996     1026     1060     1182     1304     1335     1392     1448     1489     1494     1499
                         1548     1567     1623     1643     1676     1678     1705     1723     1759     1815     1976     1979     2691
                         2703     2714     2719#    2941     3167     3186     3326     3408*    3454*
TBITVE=  000014           120#
TBLCK    012226          2148     2155#
TBUFP    015142           934*     936*     938*     940*    1116*    1129*    1167*    1173*    1178*    1609*    1614*    1619*    1921*
                         1923*    2685     2689     2691*    2693*    2698     2700     2701     2703*    2705*    2714*    2721#    2925*
                         2927*    2931*    2941*
TCOMB  = 000104           403#    2208     2214     2480
TCRLB    030330           771      773     1197     1220     1226     1228     1406     1412     1498     1511     1566     1582     1671
                         3025     3048     3066     3068     3097     3100     3407     3454     4521#
TCRLF  = 000200          3645     3685#
TCUCH    002066           549#    1454     1465
TDATA    006706          1511     1524#
```

```
TDEV     012356           2169     2188#
TEBUF    015140            771*    2689     2701     2720#
TENA   = 000100            401#    1071     1317     1342     1630     1651     1819     1985     2184     2188     2483     2490     2538
                          2715     2856     2910     2939     3023     3171     3194     3439
TESC     013322            856     1113     1805     1835     1975     2392#    2735     2747     2778
TFUNCT   006700           1513     1523#
THT    = 000011           3643     3684#
TIMEXT   020546           3482     3484#
TKVEC  = 000060            127#
TOADD    002204            653#    2373*    2375
TOFF     013672           2480#    2488
TOTCH  = 003600            405#    1166     1217     1237     1239     1608     3170
TOTC1  = 003601            406#
TPENT    012222           2143     2153#
TPREG    002210            655#
TPRNT    011146           1964     1966#
TPVEC  = 000064            128#
TRAPVE=  000034            126#    2089*    2090*
TRDY   = 000200            400#    2402     2409     2412
TRMID  = 000002            386#    2604
TRPA     012042           2110     2115#
TRPB     012066           2116     2121#
TRPE     012202           2147#    2152
TRPVEC   012122            672      690     2134#
TRTVEC=  000014            121#
TSMAD    013732           2203     2489#
TSTADD   022472           2462     3962#
TSTER    002120            589#    1803
TSTNM    002226            338      349      353      355      357      662#     835*    2731*
TSTPTR   002172            648#     756      815*    2456     2464*
TST1     003062            829#    3962
TST10    005424           1294#    3966
TST11    006104           1388#    3966
TST12    006316           1444#    3968
TST13    006472           1484#    3968
TST14    006720           1543#    3968
TST15    007142           1602#    3970
TST16    007642           1700#    3970
```

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TST17   010060       1751#     3970
TST2    003450        929#     3962
TST20   010226       1797#     3972
TST21   010624       1892#     3972
TST22   011130       1962#     3972
TST23   011326       2006#     3974
TST24   011400       2030#     3974
TST3    003656        975#     3962
TST4    004052       1021#     3964
TST5    004204       1057#     3964
TST6    004420       1104#     3964
TST7    004650       1157#     3966
TXEX    015134       2711      2716#
TXRCK   002074        554#     1311
TXSUM = 000100        382#     1334      2511      2550
TXTCK   002102        559#
TYPDS = 104404       1865      3732      3960#
TYPE  = 104400        689       716       785       786       802       805       808      1863      1866      2109      2216      2222      2282
                     2288      2295      2443      3265      3274      3585      3593      3696      3713      3715      3718      3720      3735
                     3740      3805      3881      3921      3956#
TYPNUM  017514       3264*     3265      3273*     3274      3276#
TYPOC = 104401       3704      3728      3957#
TYPON = 104403       3959#
TYPOS = 104402        789       794       799      2219      2292      3958#
TYP6    002170        647#
T1ERR   003360        868       904#
UNLKKB  002010        490#
UPD4    013710       2479      2483#
VBIT    020554       3472*     3474      3487#
VDLAY   020556       3471*     3478*     3488#
VECPT   001710        416#      747*      750       792       809*
VECT    001740        432#      761*     1809
VRBUF   001732        429#      862      2225*     2336      2476      2509      3243
VRCSR   001730        428#      748       787       812*      834*      918*     1808      1840*     2175      2207*     2215*     2217      2224
                     2250      2330      2458*     2481*     2818      2819      3241
VSTAT   002222        660#      777*      943       949       955       957       960      1062*     1075      1109*     1126      1132      1141
                     1165*     1194*     1203      1303*     1315*     1331*     1334*     1358*     1359      1606*     1629*     1645*     1660
                     1813*     1903*     1912      1944*     1978*     1986      2511      2527*     2531*     2535*     2536      2539*     2543*
                     2548*     2550*     2556*     2562      2566      2575*     2600*     2604*     2608*     2612*     2621*     2626*     2632*
                     2670      2672*     2696      2712*     2713*     2748*     2797      2804      2853*     2857*     2859      2861      2864
                     2872      2884      2908*     2917*     3022*     3027      3031      3040      3166*     3173      3184*     3195      3319
                     3323      3339      3410*     3412      3414*     3417      3425*     3474      3494
VVECT   001550        410#      747      2172      2249
VXBUF   001736        431#     2308      2395*     2404*     2411*     2489*     2677*     2682*     2700*
VXCSR   001734        430#     1071*     1317*     1342*     1630*     1651*     1819*     1985*     2184*     2188*     2208*     2214*     2402
                     2409      2412      2480*     2483*     2490*     2538*     2715*     2856*     2910*     2939*     3023*     3171*     3194*
                     3439*
WDSTOR  016022       1406*     1566*     2855      2901#     2946*
WTBGND  020470       1085      1320      1345      1633      1654      1822      2914      3064      3469#
XMAD2   015716       2868      2878#
XMCNT   015144        983*     1001*     1031*     1070*     1189*     1316*     1341*     1404*     1455*     1506*     1557*     1574*     1628*
                     1650*     1711*     1727*     1768*     1818*     1984*     2680      2707*     2723#     2909*     2943*     3170*     3185*
                     3190*     3332*     3426*     3432      3436*     3437
XMDNE = 000001        387#     1083      1343      1631      1652      1820      1986      2712      2859      2912      3027      3173      3195
                     3412      3414
XMITT   015606       2857#     2892
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XMIT1   016026        935       937       939       941      1117      1130      1168      1174      1179      1610      1615      1620      1922
                     1924      2908#     2929      2932
XMKIL = 000200        381#     2536      2539      2672
```

L08

```
XMREC     015552       985     1002     1032     1190     1407  [illegible]  1507     1558     1575     1712     1728     1769     2850#
                      3333
XMTAL     002060       544#    1067     1111     1187     1649
XMWT      020404      3438     3440#
XMXT      016016      2899#
XMZER     020466       776*    2687     3406*    3458*    3462#
XOFF    = 000023       641#    1116     2529     3292
XON     = 000021       642#    1087     1129     2533     2758     3290
XRCMP     016422      3018#
XREC      016524      3028     3030     3037#    3056
XRERR     016610      3035     3043     3057#
XREXT     016626      3041     3055     3061#
XROUT     016726      3060     3065     3070     3082#
ZERO      002166       646#     704      839     1110     1579     1773     1802     1832     1972     2327     2732     2742     2776
ZERST     003126       838#     872
ZFLAG     015326       778      864     2255     2774#
$BDADR    001122       163#     347     2821*    2836*    2967*
$BDDAT    001126       165#     338      340      347      353      355      907*     910*     960*    1040*    1231*    1240*    1326*
                      1365*    1419*    1464*    1465*    1469*    1513*    1719*    1735*    1766*    1777*    1809*    2082     2804*
                      2820*    2838*    2966*    3077*    3323*    3339*
$BELL     001162       181#    3585     3609
$CHARC    021444      3660*    3667     3676*    3681#
$CMTAG    001100       151#    2080     2087     2093     2094     2095
$CM3    = 000000       179#
$CRLF     001167       183#     785      802     2222     2295     3388     3593     3609     3650     3687     3696     3715     3720
                      3740
$DBLK     022266      3847     3881     3889#
$DOAGN    010600      1859     1870     1876#
$DTBL     022256      3850     3885#
$ENDAD    010570      1872#    3598
$ENDCT    010536      1661#    2093
$ENDMG    010604      1863     1878#
$ENULL    010621      1866     1881#
$EOP      010502      1851#
$EOPCT    010530      1858#    1862     2093*
$ERFLG    001103       154#    3506     3535     3537     3543*    3564     3580*    3609
$ERMAX    001115       160#    2096*    3537     3559*    3564
$ERROR    021060      2087     3579#
$ERRPC    001116       161#     338      349     3587*    3588*    3589     3609     3702
$ERRTB    001172       201#    3710
$ERRTY    021450      3592     3695#
$ERTTL    001112       158#    3586*    3609
$ESCAP    001160       180#    2095*    3558*    3604     3606     3609
$FILLC    001154       177#    3653     3687
$FILLS    001153       176#    3687
$GDADR    001120       162#     347      355      357     1126*    1141*    1232*    2739*    2818*    2835*    2963*    3078*
$GDDAT    001124       164#     338      340      347      353      355      905*     906*     959*    1038*    1039*    1230*    1239*
                      1325*    1364*    1417*    1418*    1462*    1463*    1468*    1514*    1718*    1734*    1764*    1765*    1808*
                      2803*    2819*    2837*    2962*    3076*    3321*    3322*    3337*    3338*
$GET42    010560      1867#
$HD     = 000000        13
$ICNT     001104       155#    3550*    3551     3553*    3563
$ILLUP    022420      3895     3924#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 97
DZVTH.P11         CROSS REFERENCE TABLE -- USER SYMBOLS                                                                    SEQ 0107

$ITEMB    001114       159#    3589*    3609     3699
$LF       001170       184#    3609     3687
$LPADR    001106       156#     831*     931*     977*    1023*    1059*    1106*    1159*    1296*    1390*    1446*    1486*    1545*
                      1604*    1702*    1753*    1799*    1894*    1964*    2008*    2032*    2097*    3541*    3556*    3561     3563
$LPERR    001110       157#    2098*    3541     3557*    3563     3603
$MAIL   = ****** U     832      932      978     1024     1060     1107     1160     1297     1391     1447     1487     1546     1605
                      1703     1754     1800     1895     1965     2009     2033     2109     3556     3595     3637
$MXCNT    021056      3554     3563#
```

```
                                                         M08
$NULL   001152            175#    3655     3687
$NWTST= 000000            828#     928#     974#    1020#    1056#    1103#    1156#    1293#    1387#    1443#    1483#    1542#    1601#
                         1699#    1750#    1796#    1891#    1961#    2005#    2029#
$OCNT   022046           3777*    3806*    3819#
$OMODE  022050           3772*    3776*    3781     3784*    3795*    3821#
$OVER   021042           3518     3534     3542     3552     3560#
$PASS   001100            152#     349      353      357     1855*    1856*    1864     1878     3548     3564
$POWER  022426           3922     3927#
$PWRDN  022276           2091     3895#    3919
$PWRMG  022414           3922#
$PWRUP  022344           3904     3909#
$QUES   001166            182#    3609     3687
$RDCHR= ****** U         3961
$RDDEC= ****** U         3961
$RDLIN= ****** U         3961
$RDOCT= ****** U         3961
$R2A  = ****** U         3961
$SAVRE= ****** U         3961
$SAVR6  022424           3903*    3909     3910*    3911*    3926#
$SCOPE  020604           2085     2230     3515#
$SETUP= 000037            665#    1853     2085     2087     2089     2091     2093     2094     2095     2097     3598
$STUP = 177777            665#
$SVLAD  021014           3526     3555#
$SWR  = 167400              3#      13       18       19       20       21       22       23       24      179      180      181      830
                          930      976     1022     1058     1105     1158     1295     1389     1445     1485     1544     1603     1701
                         1752     1798     1848     1854     1868     1877     1878     1893     1963     2007     2031     2094     2095
                         2097     2098     3507     3508     3509     3510     3511     3517     3529     3531     3532     3535     3536
                         3537     3544     3545     3546     3557     3560     3563     3571     3572     3573     3574     3575     3583
                         3590     3595     3601     3609     3923
$SWRMK= 000000             24       25     3511     3512     3533
$TIMES  001156            179#     830*     930*     976*    1022*    1058*    1105*    1158*    1295*    1389*    1445*    1485*    1544*
                         1603*    1701*    1752*    1798*    1854*    1893*    1963*    2007*    2031*    2094*    3544*    3551     3554*
                         3563
$TKB    001144            172#    2427     2452
$TKS    001142            171#    2425     2450
$TN   = 000025              3#      13      828      830#     928      930#     974      976#    1020     1022#    1056     1058#    1103
                         1105#    1156     1158#    1293     1295#    1387     1389#    1443     1445#    1483     1485#    1542     1544#
                         1601     1603#    1699     1701#    1750     1752#    1796     1798#    1891     1893#    1961     1963#    2005
                         2007#    2029     2031#
$TPB    001150            174#    3673*    3687
$TPFLG  001155            178#    3631     3687
$TPS    001146            173#    3671     3687
$TRAP   022436           2089     3939#
$TRP  = 000005           3947#    3957#    3958#    3959#    3960#    3961#
$TRPAD  022460           3944     3955#
$TSTNM  001102            153#     835     1853*    2731     3506     3533     3555*    3560     3564     3582     3609
$TYPBN= ****** U         3961
$TYPDS  022052           3835#    3960
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DZVTH.P11        CROSS REFERENCE TABLE -- USER SYMBOLS                                                                      SEQ 0108

$TYPE   021226           3631#    3649     3947     3956
$TYPEC  021400           3652     3659     3666     3671#    3672
$TYPEX  021446           3677     3679     3682#
$TYPOC  021650           3775#    3957
$TYPON  021664           3774     3777#    3959
$TYPOS  021624           3770#    3958
$XTSTR  020620           3520#
$OFILL  022047           3771*    3775*    3785     3820#
$4OCAT= ****** U         3517     3592
.     = 031116            133#     137#     140#     150#     185      364#     410#     411#     412#     871     1267     1360     1878
                         1882     1987     2083     2097     2098     2186     2403     2410     2413     2426     3130     3174     3242
                         3313     3353     3563     3564     3609     3687     3743#    3889#    3906     3925     4201#    4519#    4521#
                         4523#
```

```
.BEL  = 000007           441#   1401    1554    1709
.CARRT= 000015           443#
.CDWN = 000102           459#   1395    1504    1550
.CHOM = 000110           453#   1501    1554    1572    1761
.CLFT = 000104           462#   1398    1550
.CLRCK= 000133           495#   1371
.CLTCK= 000134           498#   1337
.CPYSC= 000135           575#   1833
.CRT  = 000103           456#   1395
.CUP  = 000101           465#   1401
.C00  = 000040           626#   1550
.C03  = 000043           627#
.C08  = 000050           628#
.C11  = 000053           629#
.C20  = 000064           630#   1707
.C21  = 000065           631#
.C40  = 000110           632#
.C79  = 000157           633#   1569
.DAPNT= 000171           516#
.DCRAD= 054433           529#
.DEMP = 000152           504#
.DISAC= 000137           577#
.DMAIN= 000141           484#   1949    2058
.DPNT = 000130           474#
.DRECT= 000103           492#   1371
.EAPNT= 000131           514#
.EEMP = 000112           502#   1275
.EINST= 000111           519#   1523    1526
.EMAIN= 000101           482#
.ENAC = 000136           576#
.EOS  = 000112           468#   1761
.EPNT = 000127           472#
.ERPL = 000151           521#   1523
.ESC  = 000033           585#   1275    1337    1371    1395    1398    1401    1501    1504    1526    1550    1554    1569
                        1572    1707    1709    1761    1949    2058    3328    3330
.ESCZ = 055033           601#
.IABT = 000137           507#   3328
.LKKB = 000105           487#
.LNFED= 000012           445#   1554    1709
.O    = 000117           541#   1275    1337    1371    1395    1398    1401    1501    1504    1554    1569    1572    1709
                        1761    1949    2058    3328    3330
.P    = 000120           586#   1526
.PSCRN= 000150           578#
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 99
DZVTH.P11        CROSS REFERENCE TABLE -- USER SYMBOLS                                                       SEQ 0109

.RABT = 000140           563#   3328
.RDCUR= 000131           537#   1395    1398    1401    1569    1709
.RESET= 000122           603#
.R00  = 000040           621#   1707
.R00C1= 025440           613#
.R00C2= 032040           615#
.R01  = 000041           622#
.R12  = 000054           623#
.R22  = 000066           624#
.R23  = 000067           625#   1550    1569
.R23C0= 020067           611#
.R23C7= 067467           531#
.TAB  = 000011           447#
.TCUCH= 000127           548#   1501    1504    1554    1572
.TSTER= 000124           588#
.TXRCK= 000135           553#
.TXTCK= 000136           558#   1337
.UNLKK= 000145           489#   3330
```

```
.XMTAL= 000126             543#    1337    1761
.Y    = 000131             536#    1550    1569    1707
```

```
COMMEN    130#
ENDCOM    130#
ERROR      30#     911     961     987     992    1004    1010    1034    1041    1079    1090    1127    1142    1192    1208
         1223    1241    1327    1354    1366    1409    1420    1458    1466    1470    1509    1515    1560    1564    1577
         1581    1664    1681    1714    1720    1730    1736    1771    1775    1778    1810    2740    2805    2822    2968
         3073    3079    3324    3340    3480
ESCAPE    130#
MULT      130#
NEWTST    130#     827     928     974    1020    1056    1103    1156    1293    1387    1443    1483    1542    1601    1699
         1750    1796    1891    1961    2005    2029
POP       130#     779     782     865     869     916    2256    2263    2267    2324    2326    2370    2372    2373    2381
         2392    2423    2581    2774    2791    2796    2898    2957    2959    3085    3135    3220    3255    3469    3471
         3472    3876    3913
PUSH      130#     838     850     854     993    1011    1042    1080    1082    1084    1091    1110    1111    1112    1243
         1318    1319    1328    1343    1344    1367    1422    1583    1631    1632    1652    1653    1682    1721    1737
         1801    1803    1804    1820    1821    1832    1833    1834    1971    1973    1974    2272    2273    2275    2276
         2327    2352    2355    2357    2374    2383    2415    2429    2507    2732    2733    2734    2741    2743    2744
         2745    2746    2776    2779    2781    2827    2850    2894    2911    2913    2969    3018    3061    3063    3083
         3124    3207    3484    3835    3897
SCOPE      31#     829     929     975    1021    1057    1104    1157    1294    1388    1444    1484    1543    1602    1700
         1751    1797    1852    1892    1962    2006    2030
SETTRA   3947#    3957    3958    3959    3960
SETUP     130#    2079
SKIP      130#
SLASH     130#
SPACE     130#
STARS     130#     143     185     369     371     389     391     407     409     425     427     437     439     449     451
          477     479     510     512     525     527     567     569     571     573     581     583     635     638     665
          668     678     685     738     744     817     818     825     828     920     926     928     964     971     974
         1014    1018    1020    1047    1054    1056    1095    1101    1103    1145    1154    1156    1279    1291    1293
         1377    1385    1387    1436    1441    1443    1473    1481    1483    1530    1540    1542    1588    1599    1601
         1689    1697    1699    1742    1748    1750    1783    1794    1796    1841    1882    1889    1891    1952    1959
         1961    1996    2003    2005    2018    2027    2029    2075    2077    2128    2132    2160    2163    2193    2196
         2242    2246    2299    2303    2312    2322    2362    2368    2386    2390    2418    2421    2432    2437    2470
         2474    2493    2505    2656    2669    2724    2729    2752    2754    2767    2772    2785    2789    2808    2811
         2830    2833    2840    2848    2904    2906    2920    2923    2935    2937    2951    2955    2972    2974    2977
         2989    2992    3005    3016    3090    3095    3116    3122    3142    3148    3161    3164    3176    3181    3199
         3206    3223    3226    3237    3239    3248    3252    3280    3287    3307    3310    3315    3317    3343    3347
         3397    3404    3444    3448    3463    3467    3489    3491    3500    3564    3609    3687    3744    3822    3890
         3930
TRMTRP   3947#
TYPBIN    130#
TYPDEC    130#    1864    3730
TYPNUM    130#
TYPOCS    130#     787     792     797    2217    2289
TYPOCT    130#    3702    3727
TYPTXT    130#
$$CMRE    143#
$$CMTM    143#
$$ESCA    130#
$$NEWT    130#     828     928     974    1020    1056    1103    1156    1293    1387    1443    1483    1542    1601    1699
         1750    1796    1891    1961    2005    2029
$$SET    3947#    3957    3958    3959    3960
$$SKIP    130#
.EQUAT      3#      25
.HEADE      3#
```

```
.SETUP   3#    665
.SWRHI   3#     13
.SWRLO   3#     25#
.$CATC   3#    130
.$CNTA   3#    143
.$EOP    3#   1841
.$ERRO   3#   3564
.$ERRT   3#   3687
.$POWE   3#   3890
.$SAVE   3#
.$SCOP   3#   3500
.$TRAP   3#   3930
.$TYPD   3#   3822
.$TYPE   3#   3609
.$TYPO   3#   2744
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 104
DZVTH.P11       CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                  SEQ 0112

ADD          809    1246    2139    2151    2180    2236    2254    2285    2307    2463    2579    2764    2879    3057    3234
            3459    3641    3710    3773    3783    3855
ASL         2461    3231    3232    3233    3707    3708    3709    3943
ASLB        2484    3860
ASRB        3211    3212    3213
BCC         3861
BEQ          702     707     726     804     807     814     842     845     853     875     878     881     898     909     956
             991    1009    1037    1088    1123    1170    1216    1218    1227    1238    1248    1323    1360    1362    1416
            1461    1512    1518    1563    1580    1612    1636    1677    1680    1717    1733    1774    1831    1838    1870
            1913    1987    2042    2125    2157    2177    2210    2252    2341    2349    2351    2398    2401    2403    2407
            2410    2413    2426    2451    2455    2479    2486    2512    2520    2537    2553    2563    2567    2577    2593
            2629    2676    2697    2708    2759    2801    2816    2862    2865    2883    2885    2889    2928    2980    2984
            2995    2999    3032    3043    3047    3055    3070    3157    3174    3196    3230    3242    3257    3259    3267
            3291    3293    3320    3336    3353    3358    3368    3413    3420    3428    3495    3532    3534    3536    3540
            3549    3581    3584    3602    3605    3644    3712    3717    3723    3734    3800
BGE         3552    3679
BGT         1859    2457    3807    3869
BHI         1920    2262    2524    3263    3438    3538
BHIS         914    1221    3049    3101    3361
BIC          834    1109    1165    1194    1256    1303    1331    1358    1606    1629    1645    1813    1840    1856    1903
            1944    1978    2188    2214    2215    2337    2428    2453    2458    2477    2480    2481    2490    2510    2535
            2539    2550    2612    2626    2713    2715    2799    2853    2857    2908    2939    3022    3166    3184    3228
            3289    3302    3303    3410    3414    3425    3797
BICB        3215
BIS          812     918    1071    1214    1315    1317    1334    1342    1630    1651    1819    1985    2184    2207    2208
            2483    2527    2531    2538    2543    2548    2556    2568    2575    2590    2596    2600    2604    2608    2621
            2632    2672    2712    2856    2910    3023    3171    3194    3304    3439    3802    3803    3863    3864
BISB        3216    3699
BIT          803     806     943     949     955     957    1075    1132    1203    1359    1660    1830    1912    1986    2156
            2330    2402    2409    2412    2425    2450    2485    2511    2521    2536    2562    2566    2584    2586    2696
            2859    2861    2864    2872    2884    3027    3031    3040    3173    3195    3241    3319    3412    3417    3474
            3494    3517    3531    3539    3546    3583    3590    3601
BITB        3053    3667
BLO          845    1176    1235    1263    1617    1659    1686    1918    2047    2148    2238    2260    2343    2442    3030
            3039    3261    3370    3433
BLOS        1672
BLT         2141    2309    3658    3808    3852    3868
BMI          843     848    1258    2043    2178    2258    3859
BNE          696     700     722     729     752     754     784     868     871     944     946     950     954     958    1076
            1078    1125    1133    1138    1140    1202    1204    1206    1213    1251    1350    1352    1357    1426    1661
            1663    1668    1825    1905    1927    1931    1935    1939    1993    2083    2186    2212    2265    2269    2281
            2297    2331    2333    2339    2345    2378    2380    2440    2517    2522    2525    2530    2534    2542    2547
            2555    2560    2585    2587    2589    2595    2599    2603    2607    2611    2620    2625    2631    2681    2686
            2688    2690    2702    2711    2763    2860    2867    2873    2875    2877    2892    3028    3034    3041    3072
            3081    3105    3109    3130    3132    3134    3153    3192    3244    3269    3313    3394    3418    3451    3475
            3477    3479    3497    3518    3547    3591    3599    3638    3646    3654    3668    3675    3700    3726    3798
            3857    3912
BPL          757     780     859    1249    2573    2671    3218    3297    3596    3632    3672    3796    3843    3873
BR           676     698     708     712     714     727     733     736     750     872     882     886     889     892     895
             902     915     936     988    1003    1005    1033    1035    1086    1191    1193    1209    1225    1321    1346
            1355    1369    1408    1410    1427    1457    1459    1508    1510    1521    1559    1561    1576    1578    1634
            1639    1655    1665    1670    1674    1713    1715    1729    1731    1770    1772    1807    1823    1829    1909
            1916    1925    1929    1933    1937    1941    1946    1990    1994    2048    2050    2057    2103    2113    2119
            2152    2154    2181    2187    2223    2226    2266    2278    2335    2347    2353    2408    2488    2528    2532
            2540    2544    2551    2557    2591    2597    2601    2605    2609    2614    2617    2622    2627    2633    2635
            2673    2684    2692    2694    2704    2737    2823    2863    2868    2581    2887    2515    2916    2926    2930
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 105
DZVTH.P11       CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                                      SEQ 0113

            3035    3044    3056    3060    3065    3107    3114    3158    3210    3271    3275    3372    3390    3416    3421
            3431    3435    3441    3482    3520    3526    3529    3542    3545    3634    3651    3661    3670    3677    3705
            3729    3736    3774    3789    3810    3854    3871    3906    3925
CLC         3295
CLR          670     692     718     719     766     775     776     777     781     810     836     837     942    1062    1162
            1195    1199    1312    1332    1347    1419    1464    1496    1657    1718    1734    1757    1766    1767    1812
            1853    1854    1914    2037    2038    2081    2094    2095    2144    2158    2165    2197    2206    2225    2227
            2229    2235    2328    2329    2449    2465    2466    2487    2613    2748    2749    2835    2836    2837    2838
            2858    2871    2917    2943    2944    2946    2947    3020    3024    3026    3037    3351    3424    3458    3473
            3493    3544    3558    3698    3787    3846    3849    3910
CLRB         731    1493    1911    2678    2683    2757    3350    3356    3543    3676    3875
CMP          725     913     990    1008    1036    1122    1137    1175    1201    1217    1220    1226    1234    1237    1349
            1415    1424    1425    1511    1517    1616    1635    1658    1671    1676    1679    1685    1716    1732    2082
            2106    2140    2147    2237    2308    2441    2516    2559    2576    2689    2701    2800    2815    2874    2882
            3029    3038    3048    3100    3360    3419    3432    3437    3527    3551    3598    3867
CMPB         695     699     721     728     844     867     874     877     880    1087    1212    1215    1250    1262    1322
            1356    1361    1460    1562    1579    1667    1773    1917    1919    1926    1930    1934    1938    1992    2046
            2259    2261    2338    2342    2344    2348    2406    2454    2478    2523    2529    2533    2541    2546    2552
            2554    2588    2592    2594    2598    2602    2606    2610    2619    2624    2628    2630    2758    2979    2983
            2994    2998    3046    3104    3108    3156    3243    3256    3258    3260    3262    3266    3268    3290    3292
            3335    3357    3367    3369    3427    3450    3533    3537    3643    3645    3653    3674    3678
DEC          945     953    1077    1124    1139    1169    1205    1351    1611    1662    1857    2185    2211    2332    2379
            2460    2707    2762    2866    2876    2891    3033    3042    3054    3129    3131    3133    3152    3217    3434
            3476    3478    3496    3706
DECB        2340    2350    2981    2985    3657    3660    3795    3806
EMT           30
HALT         137    3597    3600    3633    3905    3924
INC          724     912    1207    1210    1353    1490    1828    1855    2464    2515    2570    2693    2705    2738    2879
            3045    3058    3074    3190    3359    3364    3392    3406    3423    3426    3430    3436    3481    3550    3586
            3801    3809    3853    3911
INCB        1261    2346    2996    3000    3103    3112    3155    3555    3580    3680
IOT           31
JMP          141     142     671     675     688     711     755     759    1177    1254    1618    1839    1877    1910    1991
            2016    2053    2126    2127    2445    2459    2469
JSR          672     673     674     690     694     705     709     710     713     720     735     760     774     778     856
             861     864     904     933     935     937     939     941     952     980     985     994    1002    1012    1025
            1028    1032    1043    1063    1069    1074    1081    1085    1092    1093    1108    1113    1115    1117    1121
            1130    1136    1161    1164    1168    1172    1174    1179    1180    1190    1211    1229    1245    1253    1298
            1300    1302    1306    1314    1320    1324    1329    1336    1345    1363    1368    1375    1393    1394    1407
            1423    1449    1456    1467    1488    1492    1495    1500    1507    1520    1547    1549    1558    1568    1575
            1584    1607    1610    1615    1620    1621    1633    1637    1640    1654    1669    1684    1704    1706    1712
            1722    1728    1738    1756    1758    1760    1769    1776    1805    1806    1811    1817    1822    1827    1835
            1836    1872    1896    1898    1900    1902    1908    1922    1924    1942    1945    1967    1969    1970    1975
            1981    1988    1989    2010    2012    2014    2015    2036    2044    2045    2052    2055    2182    2253    2255
            2274    2277    2284    2514    2699    2735    2736    2747    2761    2778    2780    2817    2880    2893    2896
            2897    2914    2929    2932    2961    3059    3064    3075    3082    3084    3169    3183    3254    3327    3333
            3365    3377    3379    3381    3383    3385    3387    3389    3409    3440    3455    3457    3516    3592    3649
            3652    3659    3666
MOV          687     691     697     703     704     717     746     747     748     749     750     761     762     763     764
             765     767     769     770     771     772     773     779     783     787     792     797     811     815     830
             831     833     839     840     841     849     851     854     860     866     870     884     885     888     891
             894     905     907     917     930     931     948 [illegible]  959     960     976     977     979     981     983
             989     993     996     997     998     999    1000    1001    1006    1011    1022    1023    1026    1027    1029
            1030    1031    1038    1040    1042    1058    1059    1060    1061    1064    1065    1066    1067    1068    1070
            1072    1073    1080    1083    1084    1091    1105    1106    1110    1111    1112    1114    1118    1119    1120
            1126    1131    1134    1135    1141    1158    1159    1163    1166    1182    1183    1184    1185    1186    1187
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 106
DZVTH.P11       CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                                                 SEQ 0114

            1128    1189    1196    1197    1198    1200    1224    1228    1232    1239    1240    1244    1252    1264    1295
            1296    1299    1301    1304    1305    1313    1316    1318    1319    1328    1333    1335    1341    1343    1344
            1348    1367    1389    1390    1392    1404    1405    1406    1411    1412    1413    1421    1422    1445    1446
            1448    1450    1453    1454    1455    1462    1485    1486    1489    1491    1494    1497    1498    1499    1506
            1513    1514    1519    1544    1545    1548    1557    1565    1566    1567    1574    1582    1583    1603    1604
            1608    1622    1623    1624    1625    1626    1628    1631    1632    1638    1641    1642    1643    1644    1646
            1647    1648    1649    1650    1652    1653    1656    1666    1673    1678    1682    1683    1701    1702    1705
            1711    1719    1721    1723    1724    1725    1726    1727    1735    1737    1752    1753    1759    1768    1798
            1799    1802    1803    1804    1808    1809    1814    1815    1816    1818    1820    1821    1826    1832    1833
            1834    1860    1864    1869    1893    1894    1897    1899    1901    1915    1928    1932    1936    1940    1943
            1963    1964    1966    1968    1972    1973    1974    1976    1977    1979    1980    1982    1983    1984    2007
            2008    2011    2013    2031    2032    2035    2040    2041    2051    2054    2080    2084    2085    2086    2087
            2088    2089    2090    2091    2092    2093    2097    2098    2099    2100    2101    2104    2105    2107    2108
            2110    2112    2116    2118    2122    2123    2134    2135    2136    2137    2138    2142    2143    2145    2146
            2150    2166    2168    2169    2170    2172    2173    2174    2175    2183    2190    2198    2200    2201    2202
            2203    2204    2205    2217    2224    2228    2230    2231    2232    2233    2234    2248    2249    2250    2257
            2264    2268    2272    2273    2275    2276    2283    2287    2290    2305    2306    2325    2326    2327    2334
            2352    2356    2358    2371    2372    2373    2374    2375    2376    2377    2382    2383    2393    2394    2396
            2397    2411    2414    2415    2424    2429    2462    2467    2508    2509    2513    2518    2526    2549    2561
            2578    2582    2691    2703    2714    2732    2733    2734    2739    2742    2743    2744    2745    2746    2756
            2760    2775    2776    2777    2779    2781    2792    2793    2794    2796    2797    2803    2804    2813    2814
            2818    2819    2824    2825    2826    2827    2851    2852    2854    2855    2870    2886    2895    2898    2909
            2912    2913    2940    2941    2942    2945    2958    2959    2964    2969    3019    3021    3025    3052    3062
            3063    3067    3068    3078    3083    3085    3097    3098    3106    3110    3125    3126    3127    3128    3135
            3136    3150    3167    3168    3170    3185    3186    3187    3188    3189    3208    3209    3220    3255    3301
            3305    3321    3323    3326    3332    3337    3339    3362    3376    3380    3382    3386    3388    3407    3408
            3411    3415    3453    3454    3456    3470    3471    3472    3485    3522    3523    3525    3528    3541    3553
            3554    3556    3557    3560    3561    3582    3587    3603    3606    3635    3636    3640    3648    3655    3697
            3702    3711    3716    3721    3722    3724    3727    3731    3738    3739    3770    3778    3779    3780    3786
            3793    3811    3812    3813    3814    3815    3836    3837    3838    3839    3840    3841    3842    3847    3850
            3870    3876    3877    3878    3879    3880    3882    3883    3895    3896    3897    3898    3899    3900    3901
            3902    3903    3904    3909    3913    3914    3915    3916    3917    3918    3919    3920    3939    3940    3944
MOVB         723     730     732     835     899     901     934     936     938     940     982    1116    1129    1167    1173
            1178    1222    1223    1230    1231    1307    1308    1309    1310    1311    1325    1326    1364    1365    1417
            1418    1451    1452    1465    1469    1469    1609    1614    1619    1627    1764    1765    1777    1907    1921
            1923    2096    2336    2395    2399    2404    2427    2452    2456    2476    2489    2519    2569    2616    2634
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            3771    3772    3775    3776    3777    3781    3784    3785    3804    3845    3848    3862    3865    3874    3942
NEG         3782    3844
NOP          963    1013    1044    1143    1277    1434    1472    1528    1585    1687    1739    1779    1873    1874    1875
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RESET       1871    2171    2239    2444
ROL         3788    3790    3791    3792    3794
ROLB        3300
RTI          768    2167    2199    2468    2482    2491    2583    2679    2709    2716    3562    3608    3642    3816    3884
            3923
RTS         1260    1265    2159    2240    2286    2298    2310    2359    2384    2416    2430    2446    2750    2765    2782
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SEC         3299
SPL         2111
SUB         2189    2213    2270    2271    2564    2960    2965    3066    3080    3322    3338    3363    3371    3373    3588
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SXT       2117
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TSTB       756     813     908    1837    1904    2124    2209    2400    2439    2675    2685    2710    3296    3352    3393
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WAIT      1906
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.BLKW      410     411     412    3889
.BYTE      153     154     159     160     175     176     177     178     341     343     345     351     359     360     362
           790     791     795     796     800     801    1275    1337    1371    1395    1398    1401    1501    1504    1524
          1526    1550    1554    1569    1572    1707    1709    1761    1881    1949    2058    2220    2221    2293    2294
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          4509    4514
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           666     669     679     686     739     745     791     792     796     797     801     802     818     819     826
           829     830     831     832     921     927     929     930     931     932     965     972     975     976     977
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          1104    1105    1106    1107    1146    1155    1157    1158    1159    1160    1280    1292    1294    1295    1296
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          3958    3959    3960    3961
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           106     107     108     109     110     111     112     113     114     115
.EVEN      364    1266    3743    3929    4093    4201    4518
.IF          4      21      22      23      24      25      28      36      88     116     140     143     150     152     179
           180     181     185     186     369     371     389     391     407     409     425     427     437     439     449
           451     477     479     510     512     525     527     567     569     571     573     581     583     635     638
           665     668     678     685     738     744     790     791     795     796     800     801     817     818     825
MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 108
DZVTH.P11       CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                        SEQ 0116

           828     830     831     832     920     926     928     930     931     932     964     971     974     976     977
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G09

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          1867    1868    1877    1878    1882    1889    1891    1893    1894    1895    1952    1959    1961    1963    1964
          1965    1996    2003    2005    2007    2008    2009    2018    2027    2029    2031    2032    2033    2075    2077
          2080    2084    2085    2087    2089    2091    2093    2094    2095    2097    2109    2128    2132    2160    2163
          2193    2196    2220    2221    2242    2246    2293    2294    2299    2303    2312    2322    2362    2368    2386
          2390    2418    2421    2432    2437    2470    2474    2493    2505    2656    2669    2724    2729    2752    2754
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          3148    3161    3164    3176    3181    3199    3206    3223    3226    3237    3239    3248    3252    3280    3287
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           569     571     573     581     583     635     638     665     668     678     685     738     744     791     792
           796     600     801     818     825     829     830     831     920     926     929     930     964     971     975
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          1961    1972    1973    1974    2005    2029    2257    2264    2268    2272    2273    2275    2276    2325    2326
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           477     478     479     480     510     511     512     513     525     526     527     528     567     568     569
MAINDEC-11-DZVTH-A      MACY11 27(732)   20-SEP-76   10:22   PAGE 109
DZVTH.P11         CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                                     SEQ 0117

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H09

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             570     571     572     573     574     581     582     583     584     635     636     638     639     665     666
             668     669     678     679     685     686     738     739     744     745     818     819     825     826     828
             830     920     921     926     927     928     930     964     965     971     972     974     976    1014    1015
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.PAGE        143     185
.REPT        137     369     371     389     391     407     409     425     427     437     439     449     451     477     479
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             685     738     744     818     825     920     926     964     971    1014    1018    1047    1054    1095    1101
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MAINDEC-11-DZVTH-A      MACY11 27(732)  20-SEP-76  10:22  PAGE 110
DZVTH.P11         CROSS REFERENCE TABLE -- PERMANENT SYMBOLS                                                        SEQ 0118

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             422     423     424     428     429     430     431     432     433     434     442     444     446     448     450
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      499      503      505      508      511      515      517      520      522      526      530      532      533      535      538
      539      542      544      545      547      549      550      552      554      555      557      559      560      562      564
      565      568      587      589      597      602      604      606      607      608      609      610      612      614      616
      617      618      619      620      643      644      645      646      647      648      649      650      651      652      653
      654      656      657      658      659      660      661      662     1268     1269     1270     1271     1272     1273     1430
     1431     1432     1433     1523     1858     1861     2064     2066     2070     2072     2637     2638     2639     2640     2651
     2652     2653     2654     2719     2720     2721     2723     2783     2900     2901     2902     3004     3462     3681     3714
     3719     3821     3922     4522


ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*,DZVTH/SOL/CRF=DZVTH
RUN-TIME: 47 41 10 SECONDS
RUN-TIME RATIO: 257/100=2.5
CORE USED:  20K  (39 PAGES)
```

```
                                                J09
Spooler runtime 19 Seconds, 81 KCS, 566 disk reads, 3 disk writes, 119 pages
[redacted]
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000001111111111111111111111111111111110
00000000111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111111112222222222333 12
[redacted]4567890123456789012 **
000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000001111111111111111111111111111111110
90000000111111111122222222223333333333444444444455555555556666666666777777777788888888889999999999000000000011111111112222222222333 12
```