DZV-11

DZV11 CABLE + ECHO TESTS

MD-11-DVDZC-A

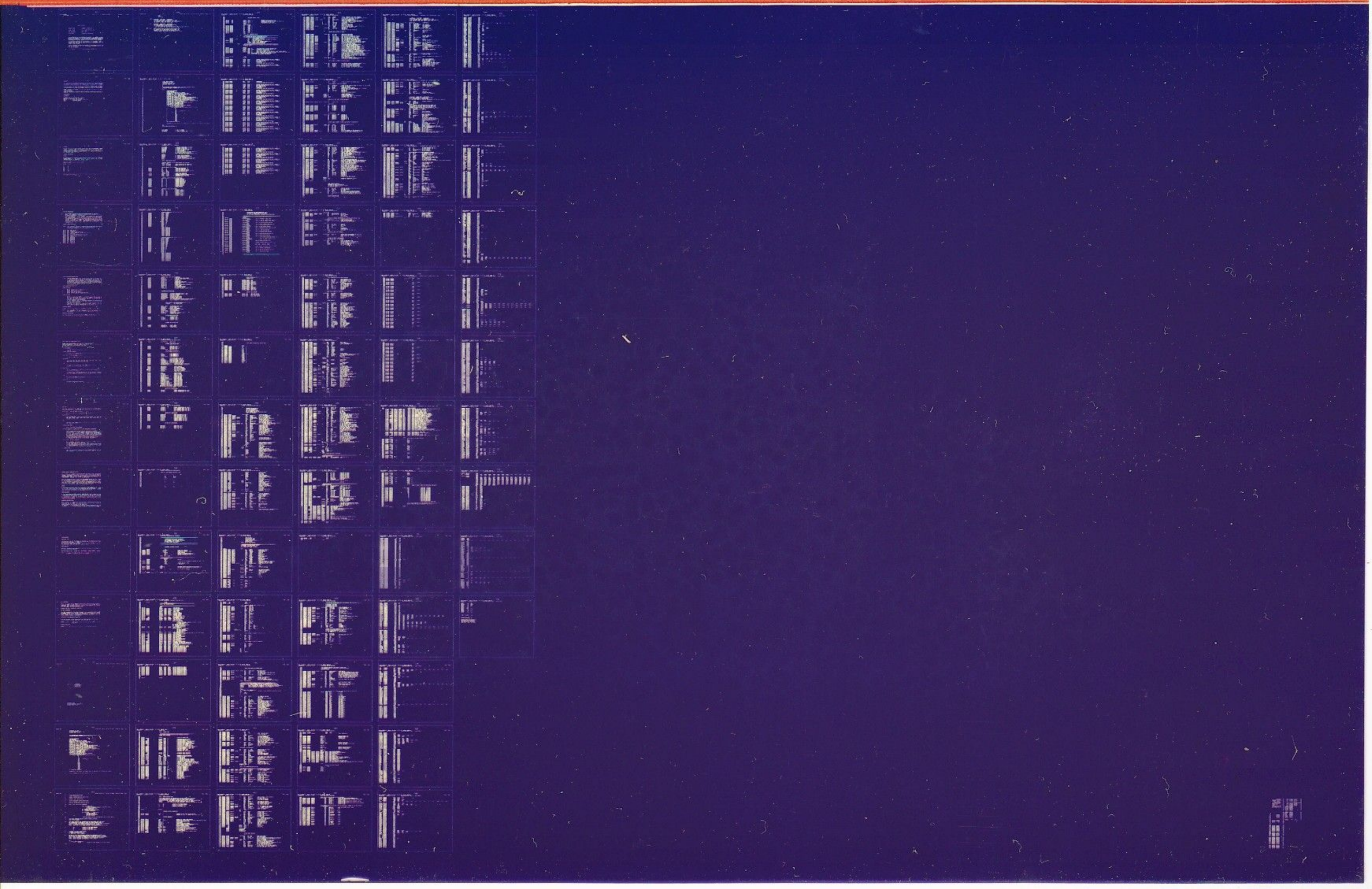
EP-DZVDZC-A-DL-A

FICHE 1 OF 1

OCT 1977

digital

MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DVDZC-A-D

PRODUCT NAME: DZV11 CABLE AND ECHO TESTS

DATE RELEASED: APRIL 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

1. ABSTRACT

The function of the DZV11 diagnostics is to verify the option operates according to specifications. The diagnostics also verify that the DZV11 operates in its environment such as the system in which it is installed.

Currently there are three standalone diagnostics (DVDZA,DVDZB,and DVDZC) one system module for DEC X/11 (DZBA), and an overlay for ITEP (DVDZD).

DVDZA together with DVDZB will test all logical functions of the DZV11 interface module.
DVDZC is designed as a non-chainable standalone diagnostic providing the operator with direct control over the testing of all DZV11 EIA cables.

2. REQUIREMENTS

2.1 EQUIPMENT

An LSI11 CPU with minimum 4K of memory.
ASR 33 (or equivalent for console)
ASR 33 (or equivalent) to run DZV11 ECHO TEST
DZV11 INTERFACE MODULE
H325 Cable turnaround connector.

2.2 STORAGE

Program will use all 4K of memory except where ABL and BOOTSTRAP LOADER reside. Location 1500 thru 1740 are especially to be noted and to be untouched by the operator if the parameters have been already built by running either the DVDZA or DVDZB diagnostics. Loading this diagnostic will preserve these locations.

3. LOADING PROCEEDURE

3.1 METHOD

All programs are in absolute format and are loaded using the ABSOLUTE LOADER. NOTE: if the diagnostics are on a media such as DISK ,MAGTAPE,DECTAPE, or CASSETTE; follow instructions for the monitor which has been provided on that specific media.

ABSOLUTE LOADER starting address *500

MEMORY * SIZE

4k	17
8k	37
12k	57
16k	77
20k	117
24k	137
28k	157

3.1.1 Starting the processor at the Absolute Loader starting address will load the diagnostic into memory.

4. STARTING PROCEEDURE

A. Set the SWR to allow the desired program options to function.
NOTE: Loc. 000176 is used as a software Switch Register in all of the DZV11 diagnostics. (see Sec. 4.1)
B. Start the diagnostic at Loc. 200(8). The program will type Maindec and program names (if this was the first start up of the program).
C. The program will then ask for the Device Address, the Vector and the Line no. of the DZV11 to be tested. Type these values on the console terminal followed by a <CR>. The program will then ask for which test is desired, Echo or Cable. Type either E or C and a <CR>. The diagnostic will type out the name of the test that is now running (see Sec. 5.1).

4.1 CONTROL SWITCH SETTINGS

NOTE: This program utilizes a Software Switch Register which may be modified by changing Loc. 176 or by typing Control "G" (↑G) on the console terminal while the program is running.

SW 15	Set:	Halt on error
SW 14	Set:	Reserved
SW 13	Set:	Inhibit error print out
SW 12	Set:	Inhibit **ALL** type out/bell on error.
SW 11	Set:	Reserved
SW 10	Set:	Go to End of Pass after an error
SW 09	Set:	Loop with current data (see Sec. 4.1.1)
SW 08	Set:	Restart test after an error
SW 07	Set:	Reserved
SW 06	Set:	Reserved
SW 05	Set:	Reserved
SW 04	Set:	Reserved
SW 03	Set:	Reserved
SW 02	Set:	Reserved
SW 01	Set:	Reserved
SW 00	Set:	Reserved

4.1.1 SWITCH REGISTER RESTRICTIONS

SW 09 LOOP ON CURRENT DATA: this switch is only used in the Cable test to lock on testing if setting the DTR bit for the desired line in the Transmit Control Register of the DZV11 will cause the CO and RING bits to set for that line in the Modem Status Register. This switch is designed to provide an aid for a trained trouble-shooter to sample various signals on the module and is not meant to be used as a general user control switch.

4.1.2 SWITCH REGISTER PRIORITIES

ERROR SWITCHES

1. SW 12 Delete print out/bell on error.
2. SW 13 Delete error printout.
3. SW 15 Halt on the error.
4. SW 08 Restart the test after an error
5. SW 10 Go to the End of Pass after an error

SCOPE SWITCHES

1. SW 09 (if enabled by 'SCOP1'). If an '*' is printed in front of the test no. on an error report then SW09 is incorporated in that test. This switch provides the operator with the ability to lock on a specific test operation.
If the program user is technically trained to electronically isolate signal problems on the DZV11 module, this switch might prove to be a useful aid.
Presently this switch is only used in this diagnostic for the Cable test to lock on checking that if DTR is set for an active line the CO and RING will become set for that line.

4.2 STARTING ADDRESS

SA 200 - The starting address for any DZV11 diagnostic is Loc. 200

NOTE: This diagnostic is not designed to run in an automatic chain mode because of the operator intervention required to run it.

5. OPERATING PROCEEDURE

When the program is initially started, messages as described in section four will be printed and the diagnostic will begin running.

5.1 HOW TO RUN THE "CABLE/ECHO" TESTS.

Normal starting proceedure for the first time would be:
Load the diagnostic, set the SWR at loc. 176 to whatever settings are desired, then start the program at loc. 200.
The program will print out on the console terminal:

"VECTOR ADDRESS-"

You type a vector followed by a <CR>.

"CONTROL REGISTER ADDRESS-"

You type in the DZVCSR address under test followed by a <CR>.

"WHICH TEST ? ECHO OR CABLE (E OR C)"

Lets do the CABLE TEST first. Type "C" and a <CR>.

"BAUD RATE- "

type either 50, 110, 135, 150, 300, 600, 1200 1800, 2000, 2400, 3600, 4800, 7200, 9600 followed by <CR>

"LINE: "

You type the line which has the H325 test connector. (Type either 0, 1, 2, 3) Program will then print:

"CABLE TEST"

and if everything is working, the End of Pass message will be printed after each pass.

To change lines, HIT ANY PRINTING KEY ON YOUR CONSOLE TERMINAL WHILE THE PROGRAM IS RUNNING and the following will be printed:

"LINE: "

Now change the H325 test connector to another line and type the new line. Program will then print:

"CABLE TEST"

and begin running the diagnostic.
Continue this operation until all lines are tested.

5.2 ECHO TEST

Start the program at loc. 200 and enter the values for the CSR address and the device vector. The program will then print out on the console:

"WHICH TEST ? ECHO OR CABLE (E OR C)"

Now type an "E" to do the ECHO TEST. program will print:

"BAUD RATE-"

Type the BAUD RATE. Baud rate choices are: 50,75, 110, 135, 150 300, 600 , 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600. The program will then print:

LINE: "

Type the line number which the terminal is connected to. Then the program will print:

"TERMINAL ECHO TEST"

*** AT THIS POINT THE MESSAGE:

"THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789"

Should be printed on the terminal connected to the DZV11. If this message is desired to be printed continuously, type a Control G <↑G> on the CONSOLE terminal while the message is printing. The program will print a prompt on the console asking for a new SWR setting. By setting the SWR to 377 the QUICK BROWN FOX message will be continuously printed on the DZV terminal. A Control G can then be typed on the console terminal at any time to reset the SWR and return to the flow of the diagnostic.
The program will then print on the console terminal:

"TYPE A CHAR. ON DZV11 TERMINAL"

Any printable character which is typed on the DZV11 terminal will be echoed back on the terminal.
If you type Control C <↑C> on the DZV11 terminal the program will print the End of Pass message on the console terminal and the "QUICK BROWN FOX" message will begin printing on the DZV11 terminal again, the echo test will be resumed.

TO CHANGE LINES:

Type any printable character on the CONSOLE TERMINAL (not the DZV11 terminal). The program will again type "LINE: " and wait for a response.

5.3 PROGRAM AND/OR OPERATOR ACTION

The variety of program Control Switches provided in this Diagnostic Package is designed to provide the user with a wide range of trouble-shooting techniques. Before the user attempts to run this diagnostic he should become familiar with the use of these Control Switches and their restrictions. (See Sec. 4.1, 4.1.1, 4.1.2, 4.1.3)

When the program detects an error the TEST NUMBER and PC will be typed out and possibly an error message (depending on the particular error). If it is necessary to know more information concerning the error report then look in the program listing for that TEST NUMBER and then note the PC of the error report. The reason for the error report will become clearer when reading the comments in the program listing.

6. ERRORS

As described previously there will always be a TEST NUMBER and PC typed out at the time of an error (providing SW 13=0 and SW 12=0). In most cases additional information will be supplied to the the error message which is to give the operator an indication of the error.

6.1 ERROR RECOVERY

If for some reason the DZV11 should 'HANG THE BUS' (gain control of bus so that console manual functions are inhibited) an init or power down/up is necessary for the operator to regain control of the CPU. It will then be necessary to check the PC processor register and refer to this location in the program listing to find out what the program was doing at the time of the error.

7. OPERATING RESTRICTIONS

When running the Cable test, the line that is declared active must be terminated by an H325 test connector which will turn the transmitted signal around to the receiver on the same line.
The diagnostic is not designed to determine a logic problem with the DZV interface. It is designed only to verify that the interface cable is providing a true link to the terminals which are connected to the DZV11.

8. MISCELLANEOUS

8.1 EXECUTION TIME

The execution time for the Cable test depends upon the desired baud rate given at start up time. At 9600. baud the End Pass message will print out before 10 seconds have elapsed.
The execution time for the Echo test is entirely dependent upon the number of characters the operator wishes to send.

8.2 PASS COMPLETE

When the diagnostic has completed a pass the following is an example of the print out to be expected.

END PASS DVDZC-A CSR: 160100 VEC: 300 PASSES: 000001 ERRORS: 000000

NOTE: The numbers for CSR and VEC are not necessarily the values for the device. They are only for this example.

8.3 KEY LOCATIONS

After the base device address and the base vector have been typed in, locations 2010 through 2046 will contain the various device register addresses and the device vectors. Location 1374 (SAVLIN) will contain the line number that was declared active.

9.0 RUNNING THE DZV11 DIAGNOSTIC UNDER APT

9.1.1 THE APT INTERFACE

The DZV diagnostics have been designed to be compatible with the APT (Automated Product Test) system. The DZV logic test diagnostics (DVDZA, and DVDZB) can be run as standalone diagnostics or in either of the APT modes. DVDZC, however is designed as a standalone diagnostic only and requires direct operator participation.

9.1.2 SETTING UP THE DIAGNOSTIC USING APT

Only one variable in the region subtitled "APT Mailbox-Etable" needs to be set up before running under APT. This variable is:

$SWREG -(1142) used as the software switch register while running under APT.

9.1.3 RUNNING UNDER APT

$SWREG (loc. 1142) should be set up prior to running the diagnostic.

DOCUMENT
****
DVDZCA SEQ
****

THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.

11 STARTING PROCEDURE
LOAD PROGRAM
START THE PROGRAM AT LOC. 000200
PROGRAM WILL TYPE DZV11 ECHO/CABLE TEST
PROGRAM WILL TYPE WHICH TEST- ECHO OR CABLE
TYPE IN E OR C RESPECTIVELY
PROGRAM WILL TYPE "VECTOR ADDRESS-"
TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
FOR THE DZV11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
FOR THE DZV11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
PROGRAM WILL TYPE "LINE NUMBER-"
TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)
FOLLOWED BY <CARRIAGE RETURN>
PROGRAM WILL TYPE "BAUD RATE-"
TYPE IN THE BAUD RATE OF THE DZV11 TERMINAL
FOLLOWED BY <CARRIAGE RETURN>
THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL

50
75
110
135 (ROUNDED OFF 134.5)
150
300
600
1200
1800
2000
2400
3600
4800
7200
9600

ALL OTHERS ARE REJECTED

47 PROGRAM WILL TYPE "ECHO" OR "CABLE TEST" TO INDICATE THAT TESTING HAS STARTED

74 INITIAL ADDRESS OF THE STACK POINTER *** 1120 ***

```
                79      MISCELLANEOUS DEFINITIONS
                91      GENERAL PURPOSE REGISTER DEFINITIONS
                103     PRIORITY LEVEL DEFINITIONS
                113     "SWITCH REGISTER" SWITCH DEFINITIONS
                141     DATA BIT DEFINITIONS (BIT00 TO BIT15)
                169     BASIC "CPU" TRAP VECTOR ADDRESSES
                384                             BITS 15-11=CPU TYPE
                                                        11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                                        11/70=06,PDQ=07,Q=10
                                                BIT 10=REAL TIME CLOCK
                                                BIT  9=FLOATING POINT PROCESSOR
                                                BIT  8=MEMORY MANAGEMENT
                392                             MEM.TYPE BYTE   --  (HIGH BYTE)
                                                        900 NSEC CORE=001
                                                        300 NSEC BIPOLAR=002
                                                        500 NSEC MOS=003
                397                               MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
                436     THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                        USED IN THE PROGRAM.
                488     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:
                494             EM              ;;POINTS TO THE ERROR MESSAGE
                                DH              ;;POINTS TO THE DATA HEADER
                                DT              ;;POINTS TO THE DATA
                                DF              ;;POINTS TO THE DATA FORMAT
                873     INCREMENT THE PASS NUMBER ($PASS)
                        IF THERES A MONITOR GO TO IT
                        IF THERE ISN'T JUMP TO XBEGIN
                995     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


1728        *********   ECHO TEST   **********
            THIS TEST WILL ACCEPT 1 CHARACTER AT A TIME
            (IN INTERRUPT MODE) AND TRANSMIT THAT SAME CHARACTER,
            ONE LINE AT A TIME, ANY LINE 0 THRU 7 (OCTAL)

1799        *********   CABLE TEST   **********
            THIS TEST TRANSMITS A BINARY COUNT PATTERN
            VIA INTERRUPT MODE TO THE RECEIVER
            ...THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR

1808        TEST TO VERIFY THAT SETTING DTR FOR A GIVEN LINE
            WILL BRING UP "CO" AND "RING" FOR THE SAME LINE
            JUMPERS W1,W2,W3 AND W4 MUST BE INSTALLED ON THE
            INTERFACE MODULE OTHERWISE AN ERROR REPORT WILL RESULT.
```

```
                                .TITLE  MD-11-DVDZC-A
                                ;*COPYRIGHT (C) 1977
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
000001                          $TN=1
                                        ;*STARTING PROCEDURE
                                        ;*LOAD PROGRAM
                                        ;*START THE PROGRAM AT LOC. 000200
                                        ;*PROGRAM WILL TYPE DZV11 ECHO/CABLE TEST
                                        ;*PROGRAM WILL TYPE  WHICH TEST- ECHO OR CABLE
                                        ;*TYPE IN  E  OR  C  RESPECTIVELY
                                        ;*PROGRAM WILL TYPE "VECTOR ADDRESS-"
                                        ;*TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
                                        ;*FOR THE DZV11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                        ;*PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
                                        ;*TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
                                        ;*FOR THE DZV11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
                                        ;*PROGRAM WILL TYPE "LINE NUMBER-"
                                        ;*TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)
                                        ;*,FOLLOWED BY <CARRIAGE RETURN>
                                        ;*PROGRAM WILL TYPE "BAUD RATE-"
                                        ;*TYPE IN THE BAUD RATE OF THE DZV11 TERMINAL
                                        ;*,FOLLOWED BY <CARRIAGE RETURN>
                                                ;*THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL
                                        ;*               50
                                        ;*               75
                                        ;*               110
                                        ;*               135     (ROUNDED OFF   134.5)
                                        ;*               150
                                        ;*               300
                                        ;*               600
                                        ;*               1200
                                        ;*               1800
                                        ;*               2000
                                        ;*               2400
                                        ;*               3600
                                        ;*               4800
                                        ;*               7200
                                        ;*               9600
                                        ;*ALL OTHERS ARE REJECTED

                                        ;*PROGRAM WILL TYPE "ECHO"  OR "CABLE TEST" TO INDICATE THAT TESTING HAS STARTED

                                .REM    !
                                ;SWITCH REGISTER OPTIONS
                                ;----------------------

                                SW15=100000             ;=1,HALT ON ERROR
                                SW14=40000              ;=1,LOOP ON CURRENT TEST
                                SW13=20000              ;=1,INHIBIT ERROR TYPEOUT
```

```
                        SW12=10000              ;=1,DELETE TYPEOUT/BELL ON ERROR.
                        SW11=4000               ;=1,INHIBIT ITERATIONS
                        SW10=2000               ;=1,ESCAPE TO NEXT TEST ON ERROR
                        SW09=1000               ;=1,LOOP WITH CURRENT DATA
                        SW08=400                ;=1,LOOP ON ERROR
                        SW07=200                ;=1, DO "AUTO SIZING" ON INITAL START UP.
                        SW06=100                ;=1, DESELECT SPECIFIC DEVICES
                                                ;NOTE: THIS MUST NOT EXCEED ORIGINAL COUNT
                        SW05=40
                        SW04=20                 ;=1, SELECT DELAY PARAMETER
                        SW03=10                 ;=1, SELECT SPECIFIC PARAMETERS
                        SW02=4                  ;=1, LOCK ON TEST SELECT
                        SW01=2                  ;=1, RESTART PROGRAM AT SELECTED TEST
                        SW00=1                  ;=1, SELECT DEVICE ADDRESS, VECTOR, ETC.
                        !
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1120 ***
001120                  STACK=  1120
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

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

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


                        ;INSTRUCTION DEFINITIONS
                        ;----------------------

005746                  PUSH1SP=5746    ;DECREMENT PROCESSOR STACK 1 WORD
005726                  POP1SP=5726     ;INCREMENT PROCESSOR STACK 1 WORD
010046                  PUSHR0=10046    ;SAVE R0 ON STACK
012600                  POPR0=12600     ;RESTORE R0 FROM STACK
024646                  PUSH2SP=24646   ;DECREMENT STACK TWICE
022626                  POP2SP=22626    ;INCREMENT STACK TWICE
000200                  MASK=BIT7       ;SET INTERRUPT MASK (INHIBIT FURTHER INTERRUPTS)
000000                  CLEAR=0         ;ALLOW INTERRUPTS (CLEAR PROCESSOR STATUS)


                                ;DZV11 CONTROL AND STATUS REGISTER DEFINITIONS
                                ;(DZVCSR)       BIT DEFINITIONS
                                ;------------------------------

000010                  MAINT = BIT3    ;MAINTENANCE MODE ENABLE
000020                  DCLR=BIT4       ;DEVICE CLEAR
000040                  MSENAB=BIT5     ;MASTER SCAN ENABLE
000100                  RIE=BIT6        ;RECEIVER INTERRUPT ENABLE
000200                  RDONE=BIT7      ;RECEIVER DONE
010000                  SILOEN= BIT12   ;SILO ALARM ENABLE
020000                  SILOAL = BIT13  ;SILO ALARM
040000                  TIE=BIT14       ;TRANSMITTER INTERRUPT ENABLE
100000                  TRDY=BIT15      ;TRANSMITTER READY

                                ;DZVCSR WORD DEFINITIONS
                                ;----------------------
000000                  TL0=0           ;TRANSMIT LINE 0
000400                  TL1=BIT8        ;TRANSMIT LINE 1
001000                  TL2=BIT9        ;TRANSMIT LINE 2
001400                  TL3=BIT9!BIT8   ;TRANSMIT LINE 3


                                ;DZVRBUF BIT DEFINITIONS
                                ;----------------------

010000                  PARER=BIT12     ;PARITY ERROR
020000                  FRMERR=BIT13    ;FRAME ERROR
040000                  OVRRUN=BIT14    ;OVERRUN ERROR
```

```
                100000          DVALID=BIT15    ;DATA VALID
                                ;DZVRBUF WORD DEFINITIONS
                                ;-----------------------
                000000          RL0=0           ;RECEIVER LINE 0
                000400          RL1=BIT8        ;RECEIVER LINE 1
                001000          RL2=BIT9        ;RECEIVER LINE 2
                001400          RL3=BIT9!BIT8   ;RECEIVER LINE 3
                                ;DZVLPR WORD DEFINITIONS
                                ;-----------------------
                000000          LP0=0           ;LINE PARAMETER 0
                000001          LP1=BIT0        ;LINE PARAMETER 1
                000002          LP2=BIT1        ;LINE PARAMETER 2
                000003          LP3=BIT1!BIT0   ;LINE PARAMETER 3
                000000          FIVE=0          ;FIVE BITS/CHAR,1 STOP BIT
                000010          SIX=BIT3        ;SIX BITS/CHAR,1 STOP BIT
                000020          SEVEN=BIT4      ;SEVEN BITS/CHAR,1 STOP BIT
                000030          EIGHT=BIT4!BIT3 ;EIGHT BITS/CHAR,1 STOP BIT
                000040          FIVES=BIT5      ;FIVE BITS/CHAR,2 STOP BITS
                000050          SIXS=BIT5!BIT3  ;SIX BITS/CHAR,2 STOP BITS
                000060          SEVENS=BIT5!BIT4        ;SEVEN BITS/CHAR, 2 STOP BITS
                000070          EIGHTS=BIT5!BIT4!BIT3   ;EIGHT BITS/CHAR, 2 STOP BITS
                000100          PARITY=BIT6             ;PARITY ENABLED
                000200          ODDPAR=BIT7             ;ODD PARITY ENABLED
                000000          ONESTOP=0               ;ONE STOP BIT ENABLED
                000040          TWOSTOP=BIT5            ;TWO STOP BITS ENABLED
                000000          EVEPAR=0                ;EVEN PARITY ENABLED
                010000          RCVON=BIT12             ;ENABLE RECEIVER (RECEIVER ON)
                000000          S50=0                   ;SPEED 50 BAUD
                000400          S75=BIT8                ;SPEED 75 BAUD
                001000          S110=BIT9               ;SPEED 110 BAUD
                001400          S134=BIT9!BIT8          ;SPEED 134.5 BAUD
                002000          S150=BIT10              ;SPEED 150 BAUD
                002400          S300=BIT10!BIT8         ;SPEED 300 BAUD
                003000          S600=BIT10!BIT9         ;SPEED 600 BAUD
                003400          S1200=BIT10!BIT9!BIT8   ;SPEED 1200 BAUD
                004000          S1800=BIT11             ;SPEED 1800 BAUD
                004400          S2000=BIT11!BIT8        ;SPEED 2000 BAUD
                005000          S2400=BIT11!BIT9        ;SPEED 2400 BAUD
                005400          S3600=BIT11!BIT9!BIT8   ;SPEED 3600 BAUD
                006000          S4800=BIT11!BIT10       ;SPEED 4800 BAUD
                006400          S7200=BIT11!BIT10!BIT8  ;SPEED 7200 BAUD
                007000          S9600=BIT11!BIT10!BIT9  ;SPEED 9600 BAUD
                007400          S19200=BIT11!BIT10!BIT9!BIT8    ;SPEED 19200 BAUD
                                ;DZVTCR BIT DEFINITIONS
                                ;---------------------
                000001          TCR0=BIT0               ;ENABLE TRANSMISSION ON LINE 0
                000002          TCR1=BIT1               ;ENABLE TRANSMISSION ON LINE 1
                000004          TCR2=BIT2               ;ENABLE TRANSMISSION ON LINE 2
```

```
281          000010                  TCR3=BIT3               ;ENABLE TRANSMISSION ON LINE 3
282          000400                  D1R0=BIT8               ;DATA TERMINAL READY FOR LINE 0
283          001000                  D1R1=BIT9               ;DATA TERMINAL READY FOR LINE 1
284          002000                  D1R2=BIT10              ;DATA TERMINAL READY FOR LINE 2
285          004000                  D1R3=BIT11              ;DATA TERMINAL READY FOR LINE 3
286
287                                          ;DZVMSR BIT DEFINITIONS
288                                          ;----------------------
289          000001                  RING0=BIT0              ;RING INDICATED ON LINE 0
290          000002                  RING1=BIT1              ;RING INDICATED ON LINE 1
291          000004                  RING2=BIT2              ;RING INDICATED ON LINE 2
292          000010                  RING3=BIT3              ;RING INDICATED ON LINE 3
293          000400                  CO0=BIT8                ;CARRIER PRESENT ON LINE 0
294          001000                  CO1=BIT9                ;CARRIER PRESENT ON LINE 1
295          002000                  CO2=BIT10               ;CARRIER PRESENT ON LINE 2
296          004000                  CO3=BIT11               ;CARRIER PRESENT ON LINE 3
297
298                                          ;DZVTDR BIT DEFINITIONS
299                                          ;----------------------
300
301          000400                  BRK0=BIT8               ;BREAK FOR LINE 0
302          001000                  BRK1=BIT9               ;BREAK FOR LINE 1
303          002000                  BRK2=BIT10              ;BREAK FOR LINE 2
304          004000                  BRK3=BIT11              ;BREAK FOR LINE 3
305
```

```
306                             ;TABLE OF LOOP AROUND FUNCTIONS (H325)
307                             ;
308                             ;       -----------------
309                             ;       I               ↑
310                             ;       V               ↑
311                             ;       REC             TRANS
312                             ;       DATA            DATA
313                             ;
314                             ;       -----------------
315                             ;       I               ↑
316                             ;       V               ↑
317                             ;       CO              RTS
318                             ;
319                             ;       -----------------
320                             ;       I               ↑
321                             ;       V               ↑
322                             ;       RING            DTR
```

```
                                ;:*****************************************************************
                                ;-----------------------------------------------------------------
                                        ;TRAPCATCHER FOR ILLEGAL INTERRUPTS
                                        ;THE STANDARD "TRAP CATCHER" IS PLACED
                                        ;BETWEEN ADDRESS 0 TO ADDRESS 776.
                                        ;IT LOOKS LIKE "PC+2 HALT".
                                ;-----------------------------------------------------------------
                                ;:*****************************************************************

                        000000  .=0
                                        ;STANDARD INTERRUPT VECTORS
                                        ;-------------------------

                        000024          .=24
000024  005576                  $PWRDN                  ;POWER FAIL HANDLER
000026  000340                  340                     ;SERVICE AT PRIORITY LEVEL 7
000030  004704                  $ERROR                  ;ERROR HANDLER
000032  000340                  340                     ;SERVICE AT PRIORITY LEVEL 7
000034  004476                  .TRPSRV                 ;GENERAL HANDLER DISPATCH SERVICE
000036  000340                  340                     ;SERVICE AT PRIORITY LEVEL 7
                        .SBTTL  ACT11 HOOKS

                                ;;**********************`*****************************************
                                ;HOOKS REQUIRED BY ACT11
                        000040          $SVPC=.                 ;SAVE PC
                        000046          .=46
000046  002644                  $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                        000052          .=52
000052  000000                  .WORD   0               ;;2)SET LOC.52 TO ZERO
                        000040          .=$SVPC                 ;; RESTORE PC

                        000174          .=174
000174  000000          DISPREG:0                       ;SOFTWARE DISPLAY REGISTER FOR SWITCHLESS 11S
000176  000000          SWREG:  0                       ;SOFTARE SWITCH REGISTER FOR SWITCHLESS 11S
                        000200          .=200
000200  000137  002116          JMP     .START          ;GO TO START OF PROGRAM


                        001000          .=1000
001000  005200  040515  047111  MTITLE: .ASCIZ  <200><12>/MAINDEC-11-DVDZCA/<200>/DZV11 ECHO AND CABLE TESTS  /<200>
(2)
```

```
                001120                          .=1120
                                        ;;*****************************************************************
                                        .SBTTL  APT MAILBOX-ETABLE

                                        ;;*****************************************************************
                                        .EVEN
001120                                  $MAIL:                          ;;APT MAILBOX
001120  000000                          $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001122  000000                          $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001124  000000                          $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001126  000000                          $PASS:  .WORD   APASS           ;;PASS COUNT
001130  000000                          $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001132  000000                          $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001134  000000                          $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001136  000000                          $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001140                                  $ETABLE:                        ;;APT ENVIRONMENT TABLE
001140     000                          $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
001141     000                          $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001142  000000                          $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
001144  000000                          $USWR:  .WORD   AUSWR           ;;USER SWITCHES
001146  000000                          $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                        ;*                              BITS 15-11=CPU TYPE
                                        ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                        ;*                                      11/70=06,PDQ=07,Q=10
                                        ;*                              BIT 10=REAL TIME CLOCK
                                        ;*                              BIT  9=FLOATING POINT PROCESSOR
                                        ;*                              BIT  8=MEMORY MANAGEMENT
001150     000                          $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
001151     000                          $MTYP1: .BYTE   AMTYP1          ;;MEM. TYPE,BLK#1
                                        ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
                                        ;*                                      900 NSEC CORE=001
                                        ;*                                      300 NSEC BIPOLAR=002
                                        ;*                                      500 NSEC MOS=003
001152  000000                          $MADR1: .WORD   AMADR1          ;;HIGH ADDRESS,BLK#1
                                        ;*                              MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001154     000                          $MAMS2: .BYTE   AMAMS2          ;;HIGH ADDRESS,M.S. BYTE
001155     000                          $MTYP2: .BYTE   AMTYP2          ;;MEM.TYPE,BLK#2
001156  000000                          $MADR2: .WORD   AMADR2          ;;MEM.LAST ADDRESS,BLK#2
001160     000                          $MAMS3: .BYTE   AMAMS3          ;;HIGH ADDRESS,M.S.BYTE
001161     000                          $MTYP3: .BYTE   AMTYP3          ;;MEM.TYPE,BLK#3
001162  000000                          $MADR3: .WORD   AMADR3          ;;MEM.LAST ADDRESS,BLK#3
001164     000                          $MAMS4: .BYTE   AMAMS4          ;;HIGH ADDRESS,M.S.BYTE
001165     000                          $MTYP4: .BYTE   AMTYP4          ;;MEM.TYPE,BLK#4
001166  000000                          $MADR4: .WORD   AMADR4          ;;MEM.LAST ADDRESS,BLK#4
001170  000000                          $VECT1: .WORD   AVECT1          ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001172  000000                          $VECT2: .WORD   AVECT2          ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001174  160010                          $BASE:  .WORD   ABASE           ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001176  000000                          $DEVM:  .WORD   ADEVM           ;;DEVICE MAP
001200  000000                          $CDW1:  .WORD   ACDW1           ;;CONTROLLER DESCRIPTION WORD#1
001202  000000                          $CDW2:  .WORD   ACDW2           ;;CONTROLLER DESCRIPTION WORD#2
001204  000000                          $DDW0:  .WORD   ADDW0           ;;DEVICE DESCRIPTOR WORD#0
001206  000000                          $DDW1:  .WORD   ADDW1           ;;DEVICE DESCRIPTOR WORD#1
001210  000000                          $DDW2:  .WORD   ADDW2           ;;DEVICE DESCRIPTOR WORD#2
001212  000000                          $DDW3:  .WORD   ADDW3           ;;DEVICE DESCRIPTOR WORD#3
001214  000000                          $DDW4:  .WORD   ADDW4           ;;DEVICE DESCRIPTOR WORD#4
001216  000000                          $DDW5:  .WORD   ADDW5           ;;DEVICE DESCRIPTOR WORD#5
```

```
   419  001220  000000                  $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
   420  001222  000000                  $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
   421  001224  000000                  $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
   422  001226  000000                  $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
   423  001230  000000                  $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
   424  001232  000000                  $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
   425  001234  000000                  $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
   426  001236  000000                  $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
   427  001240  000000                  $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
   428  001242  000000                  $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
   429
   430
   431  001244                          $ETEND:
   432
```

```
                                .SBTTL  COMMON TAGS
                                ;;**********************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.
001244                          $CMTAG:                         ;;START OF COMMON TAGS
001244  000000                          .WORD   0
001246  000                     $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
001247  000                     $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
001250  000000                  $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
001252  000000                  $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
001254  000000                  $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
001256  000000                  $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
001260  000                     $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
001261  001                     $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
001262  000000                  $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001264  000000                  $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
001266  000000                  $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
001270  000000                  $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
001272  000000                  $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
001274  000000                          .WORD   0               ;;RESERVED--NOT TO BE USED
001276  000000                          .WORD   0
001300  000                     $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
001301  000                     $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
001302  000000                          .WORD   0
001304  177570                  SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
001306  177570                  DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
001310  177560                  $TKS:   177560                  ;;TTY KBD STATUS
001312  177562                  $TKB:   177562                  ;;TTY KBD BUFFER
001314  177564                  $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
001316  177566                  $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
001320  000                     $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
001321  002                     $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001322  012                     $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001323  000                     $TPFLG: .BYTE   0               ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001324  000000                  $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
                                                                ;;WHICH  ($REG0) WAS OBTAINED
001326  000000                  $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
001330  000000                  $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
001332  000000                  $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
001334  000000                  $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
001336  000000                  $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
001340  000000                  $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
001342  000000                  $TMP0:  .WORD   0               ;;USER DEFINED
001344  000000                  $TMP1:  .WORD   0               ;;USER DEFINED
001346  000000                  $TMP2:  .WORD   0               ;;USER DEFINED
001350  000000                  $TMP3:  .WORD   0               ;;USER DEFINED
001352  000000                  $TMP4:  .WORD   0               ;;USER DEFINED
001354  000000                  $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
001356  077                     $QUES:  .ASCII  /?/             ;;QUESTION MARK
001357  015                     $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
001360  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 SITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF SITEMB IS 0 THE ONLY PERTINENT DATA IS (SERRPC).
                                ;*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

001362                          $ERRTB:

                                        ;PROGRAM CONTROL PARAMETERS
                                        ;-------------------------

001362  000000                  NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
001364  000000                  LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT TEST,TIGHT LOOP

                                        ;PROGRAM VARIABLES
                                        ;-----------------

001366  000017                  LINE:   17                      ;DEFAULT ALL FOUR LINES RUNNING
001370  017470                  PAR:    17470                   ;PARAMETERS: 8 BITS/CHAR,2 STOP BITS,19200 BAUD,NO PARIT
001372  000000                  MODE:   0                       ;DEFAULT MAINTENANCE MODE
001374  000000                  SAVLIN: 0                       ;LINE NUMBER
001376  000000                  XMTLIN: 0                       ;TRANSMISSION LINE NUMBER
001400  000000                  XMTCNT: 0                       ;COUNT OF WORDS IN A TRANSMISSION PATTERN
001402  000000                  REGIST: 0                       ;DEVICE ADDRESS STORAGE LOCATION
001404  000000                  SAVPC:  0                       ;PROGRAM COUNTER STORAGE
001406  000001                  DZVACTV:.BLKW   1               ;*DZV11'S SELECTED ACTIVE.
001410  000001                  SAVACTV:.BLKW   1               ;*A BIT MAP OF DZV11'S IN THE SYSTEM
001412  000001                  RUN:    1                       ;*POINTER ONE PAST RUNNING DEVICE.
001414  000001                  DZVNUM: .BLKB 1                 ;*OCTAL NUMBER OF DZV11'S IN THE SYSTEM
001415      001                 SAVNUM: .BYTE 1                 ;*WORKABLE NUMBER.
001416  000001                  SAVNO:  .BLKB   1               ;*OCTAL NUMBER OF DZV11'S BEING TESTED
                001420          .EVEN
001420  001500                  ACTIVE: DZV.MAP                 ;TABLE POINTER.
```

```
                                        ;PROGRAM CONTROL FLAGS
                                        ;---------------------

001422  000                   INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001423  000                   HDRFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG FOR HEADER MAP
001424  000                   MNTFLG: .BYTE   0               ;MAINTENANCE BIT SET FLAG
001425  000                   DONFLG: .BYTE   0               ;TRANSMISSION COMPLETION FLAG
                              .EVEN
                              ;DATA VARIABLES
001426  000000                TD0:    .WORD   0
001430  000000                TD1:    .WORD   0
001432  000000                TD2:    .WORD   0
001434  000000                TD3:    .WORD   0
001436  000000                TR0:    .WORD   0
001440  000000                TR1:    .WORD   0
001442  000000                TR2:    .WORD   0
001444  000000                TR3:    .WORD   0
001446                        STOP:
                              .SBTTL  APT PARAMETER BLOCK

                              ;;*****************************************************************
                              ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                              ;;*****************************************************************
        001446                        .$X=.     ;;SAVE CURRENT LOCATION
        000024                        .=24      ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                        200       ;;FOR APT START UP
        000044                        .=44      ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001446                        $APTHDR   ;;POINT TO APT HEADER BLOCK
        001446                        .=.$X     ;;RESET LOCATION COUNTER
                              ;;*****************************************************************
                              ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                              ;INTERFACE SPEC.

001446                        $APTHD:
001446  000000                $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001450  001120                $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001452  000000                $TSTM:  .WORD   0.      ;;RUN TIM OF LONGEST TEST
001454  000000                $PASTM: .WORD   0.      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001456  000000                $UNITM: .WORD   0.      ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001460  000052                        .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                              ;DZV11 STATUS TABLE AND ADDRESS ASSIGNMENTS
                              ;-----------------------------------------

        001500                .=1500
001500                        DZV.MAP:

001500  000001                DZCR0:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 0
001502  000001                DZVC0:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 0
001504  000001                LINE0:  .BLKW   1       ;ALL LINES SELECTED
001506  000001                PAR0:   .BLKW   1       ;PARAMETERS
001510  000001                MANT0:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

001512  000001                DZCR1:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 1
001514  000001                DZVC1:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 1
001516  000001                LINE1:  .BLKW   1       ;ALL LINES SELECTED
```

```
  583  001520  000001                PAR1:   .BLKW   1       ;PARAMETERS
  584  001522  000001                MAINT1: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  585
  586  001524  000001                DZCR2:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 2
  587  001526  000001                DZVC2:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 2
  588  001530  000001                LINE2:  .BLKW   1       ;ALL LINES SELECTED
  589  001532  000001                PAR2:   .BLKW   1       ;PARAMETERS
  590  001534  000001                MAINT2: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  591
  592  001536  000001                DZCR3:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 3
  593  001540  000001                DZVC3:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 3
  594  001542  000001                LINE3:  .BLKW   1       ;ALL LINES SELECTED
  595  001544  000001                PAR3:   .BLKW   1       ;PARAMETERS
  596  001546  000001                MAINT3: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  597
  598  001550  000001                DZCR4:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 4
  599  001552  000001                DZVC4:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 4
  600  001554  000001                LINE4:  .BLKW   1       ;ALL LINES SELECTED
  601  001556  000001                PAR4:   .BLKW   1       ;PARAMETERS
  602  001560  000001                MAINT4: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  603
  604  001562  000001                DZCR5:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 5
  605  001564  000001                DZVC5:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 5
  606  001566  000001                LINE5:  .BLKW   1       ;ALL LINES SELECTED
  607  001570  000001                PAR5:   .BLKW   1       ;PARAMETERS
  608  001572  000001                MAINT5: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  609
  610  001574  000001                DZCR6:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 6
  611  001576  000001                DZVC6:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 6
  612  001600  000001                LINE6:  .BLKW   1       ;ALL LINES SELECTED
  613  001602  000001                PAR6:   .BLKW   1       ;PARAMETERS
  614  001604  000001                MAINT6: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  615
  616  001606  000001                DZCR7:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 7
  617  001610  000001                DZVC7:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 7
  618  001612  000001                LINE7:  .BLKW   1       ;ALL LINES SELECTED
  619  001614  000001                PAR7:   .BLKW   1       ;PARAMETERS
  620  001616  000001                MAINT7: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
  621
  622  001620  000001                DZCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 10
  623  001622  000001                DZVC10: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 10
  624  001624  000001                LINE10: .BLKW   1       ;ALL LINES SELECTED
  625  001626  000001                PAR10:  .BLKW   1       ;PARAMETERS
  626  001630  000001                MAINT10: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
  627
  628  001632  000001                DZCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 11
  629  001634  000001                DZVC11: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 11
  630  001636  000001                LINE11: .BLKW   1       ;ALL LINES SELECTED
  631  001640  000001                PAR11:  .BLKW   1       ;PARAMETERS
  632  001642  000001                MAINT11: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
  633
  634  001644  000001                DZCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 12
  635  001646  000001                DZVC12: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 12
  636  001650  000001                LINE12: .BLKW   1       ;ALL LINES SELECTED
  637  001652  000001                PAR12:  .BLKW   1       ;PARAMETERS
  638  001654  000001                MAINT12: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
```

```
639
640  001656  000001          DZCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 13
641  001660  000001          DZVC13: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 13
642  001662  000001          LINE13: .BLKW   1       ;ALL LINES SELECTED
643  001664  000001          PAR13:  .BLKW   1       ;PARAMETERS
644  001666  000001          MAINT13: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
645
646  001670  000001          DZCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 14
647  001672  000001          DZVC14: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 14
648  001674  000001          LINE14: .BLKW   1       ;ALL LINES SELECTED
649  001676  000001          PAR14:  .BLKW   1       ;PARAMETERS
650  001700  000001          MAINT14: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
651
652  001702  000001          DZCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 15
653  001704  000001          DZVC15: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 15
654  001706  000001          LINE15: .BLKW   1       ;ALL LINES SELECTED
655  001710  000001          PAR15:  .BLKW   1       ;PARAMETERS
656  001712  000001          MAINT15: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
657
658  001714  000001          DZCR16: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 16
659  001716  000001          DZVC16: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 16
660  001720  000001          LINE16: .BLKW   1       ;ALL LINES SELECTED
661  001722  000001          PAR16:  .BLKW   1       ;PARAMETERS
662  001724  000001          MAINT16: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
663
664  001726  000001          DZCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 17
665  001730  000001          DZVC17: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 17
666  001732  000001          LINE17: .BLKW   1       ;ALL LINES SELECTED
667  001734  000001          PAR17:  .BLKW   1       ;PARAMETERS
668  001736  000001          MAINT17: .BLKW  1       ;MAINTENANCE MODE FOR THIS DEVICE
669
670  001740  177777          DZV.END:        177777
```

```
                                        ;DEFINITIONS FOR TRAP SUBROUTINE CALLS
                                        ;POINTERS TO SUBROUTINES CAN BE FOUND
                                        ;IN THE TABLE IMMEDIATELY FOLLOWING THE DEFINITIONS

                                ;:**************************************************************************
                                ;--------------------------------------------------------------------------
001742                          .TRPTAB:
104400                          ADVANCE=TRAP+0          ;CALL TO ADVANCE TO NEXT TEST
001742  004572                          .ADVANCE
104401                          SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
001744  003104                          .SCOP1
104402                          TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
001746  003130                          .TYPE
104403                          INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
001750  003676                          .INSTR
104404                          INSTER=TRAP+4           ;CALL TO INPUT ERROR HANDLER
001752  004002                          .INSTER
104405                          PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
001754  004022                          .PARAM
104406                          SETFLG=TRAP+6           ;CALL TO  SET FLAG ROUTINE
001756  006432                          .SETFLG
104407                          SAVOS=TRAP+7            ;CALL TO REGISTER SAVE ROUTINE
001760  004222                          .SAVOS
104410                          RESOS=TRAP+10           ;CALL TO REGISTER RESTORE ROUTINE
001762  004262                          .RESOS
104411                          CONVRT=TRAP+11          ;CALL TO DATA OUTPUT ROUTINE
001764  004314                          .CONVRT
104412                          CNVRT=TRAP+12           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001766  004320                          .CNVRT
104413                          DEVICE.CLR=TRAP+13              ;CALL TO ISSUE A DEVICE CLEAR
001770  004520                          .DEVICE.CLR
104414                          DELAY=TRAP+14           ;CALL TO DELAY FOR FAST CPU'S
001772  004552                          .DELAY
104415                          PARMD=TRAP+15           ;CONVERT DECIMAL STRING TO OCTAL
001774  002710                          .PARMD
104416                          PAWCH=TRAP+16           ;SET FLAG    ECHO OR  CABLE
001776  006552                          .PAWCH
104417                          DCLASM=TRAP+17          ;CLEAR DEVICE, SET MAINT. BIT IF I MODE
002000  004540                          .DCLASM
104420                          SHIFT=TRAP+20           ;CALL TO ROTATE LINE POINTER
002002  004604                          .SHIFT
104421                          LPRSET=TRAP+21          ;CALL TO SET UP LPR DEVICE REGISTER
002004  004622                          .LPRSET
104422                          BUFSET=TRAP+22          ;CALL TO ZERO BUFFER AREA
002006  004662                          .BUFSET

                                ;--------------------------------------------------------------------------
                                ;:**************************************************************************
```

```
                                        ;DZV11 VECTOR AND REGISTER INDIRECT POINTERS
                                        ;WORKING AREA

002010  160040                 DZVCSR: 160040  ;R/W
002012  160041                 HDZVCSR:160041  ;R/W
002014  160042                 DZVRBUF:160042  ;READ ONLY
002016  160043                 HDZVRBUF:160043 ;READ ONLY
002020  160042                 DZVLPR: 160042  ;WRITE ONLY
002022  160043                 HDZVLPR:160043  ;WRITE ONLY
002024  160044                 DZVTCR: 160044  ;R/W
002026  160045                 HDZVTCR:160045  ;R/W
002030  160046                 DZVMSR: 160046  ;READ ONLY
002032  160047                 HDZVMSR:160047  ;READ ONLY
002034  160046                 DZVTDR: 160046  ;WRITE ONLY
002036  160047                 HDZVTDR:160047  ;WRITE ONLY

                                        ;DEFAULT DZV VECTORS

002040  000300                 DZVRIV: 300     ;REC INTR VECTOR
002042  000302                 DZVRIS: 302     ;REC INTR STATUS
002044  000304                 DZVTIV: 304     ;XMIT INTR VECTOR
002046  000306                 DZVTIS: 306     ;XMIT INTR STATUS
```

```
                                        ;TIME TABLE FOR RELATIVE TIMING TESTS
                                        ;-----------------------------------

002050                          TMTBL:
002050  000000                  T50:    0
002052  000000                  T75:    0
002054  000000                  T110:   0
002056  000000                  T134:   0
002060  000000                  T150:   0
002062  000000                  T300:   0
002064  000000                  T600:   0
002066  000000                  T1200:  0
002070  000000                  T1800:  0
002072  000000                  T2000:  0
002074  000000                  T2400:  0
002076  000000                  T3600:  0
002100  000000                  T4800:  0
002102  000000                  T7200:  0
002104  000000                  T9600:  0
002106  000000                  TEIGHT: 0
002110  000000                  TSEVEN: 0
002112  000000                  TSIX:   0
002114  000000                  TFIVE:  0
```

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

002116  000005                        .START: RESET                   ;CLEAR THE WORLD
002120  012706  001120                  MOV     #STACK,SP               ;SET UP PROCESSOR STACK
002124  106427  000200                  MTPS    #MASK                   ;LOCK OUT INTERRUPTS
002130  012737  005576  000024          MOV     #SPWRDN,@#24            ;SET UP FOR POWER FAIL
002136  012737  002116  001252          MOV     #.START,$LPADR          ;SET UP IN CASE OF POWER FAIL
002144  105737  001141                  TSTB    $ENVM                   ;RUNNING UNDER APT?
002150  100004                          BPL     1$                      ;IF NOT SKIP SWR SETUP FOR APT
002152  012737  001142  001304          MOV     #$SWREG,SWR             ;SETUP FOR APT SWR
002160  000403                          BR      2$                      ;SKIP SOFTWARE SWR SETUP
002162  012737  000176  001304  1$:     MOV     #SWREG,SWR              ;SETUP SOFTWARE SWITCH REGISTER OTHERWISE
002170  012737  000174  001306  2$:     MOV     #DISPREG,DISPLAY                ;SETUP DISPLAY REGISTER
002176  005037  007024                  CLR     STFLG                   ;CLEAR TEST START FLAG
00 02   00 037  001126                  CLR     $PASS                   ;CLEAR PASS COUNT
00 36   00 037  001256                  CLR     $ERTTL                  ;CLEAR ERROR COUNT
00 212  105037  001247                  CLRB    $ERFLG                  ;CLEAR ERROR FLAG
00 216  00 037  001246                  CLR     $TSTNM                  ;CLEAR TEST NO. INDICATOR
00  2   00 037  007030                  CLR     LAST                    ;CLEAR LAST ERROR PC
00  6   105737  001422                  TSTB    INIFLG                  ;HAS TITLE BEEN TYPED YET?
00 232  001010                          BNE     VEC1                    ;IF YES SKIP PRINTING AGAIN
00 234  023727  000042  002644          CMP     @#42,#SENDAD            ;RUNNING UNDER ACT?
00 242  001402                          BEQ     3$                      ;IF YES DON'T PRINT TITLE
00 244  104402  001000                  TYPE    ,MTITLE                 ;PRINT TITLE
00 250  105337  001422          3$:     DECB    INIFLG                  ;INDICATE TITLE ALREADY TYPED
00 254  012701  000300          VEC1:   MOV     #300,R1
00 260  012702  000302                  MOV     #302,R2
00  64  010221                  1$:     MOV     R2,(R1)+                ;RESTORE TRAPCATCHER
00 266  005022                          CLR     (R2)+                   ;IN FLOATING VECTOR AREA
002270  022122                          CMP     (R1)+,(R2)+             ;UPDATE THE POINTERS
00 272  020127  001000                  CMP     R1,#1000
00 276  001372                          BNE     1$
002300  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE VECTOR
002302  007056                          MVECTOR                         ;MESSAGE "VECTOR ADDRESS-"
002304  104405                          PARAM                           ;CONVERT STRING TO OCTAL
002306  000300                          300                             ;LOW LIMIT
002310  000770                          770                             ;HIGH  LIMIT
002312  002040                          DZVRIV                          ;LOCATIONS TO BE FILLED
002314     003                  .BYTE   3                               ;LSB MASK
002315     004                  .BYTE   4                               ;NUMBER OF LOCATIONS
002316  104403                          INSTR                           ;INPUT ADDRESS OF DEVICE CSR
002320  007100                          MREGAD                          ;MESSAGE "CONTROL REGISTER ADDRESS-"
002322  104405                          PARAM                           ;CONVERT STRING TO OCTAL
002324  160000                          160000                          ;LOW LIMIT
002326  163770                          163770                          ;HIGH LIMIT
002330  001174                          $BASE                           ;LOCATION TO BE FILLED
002332     007                  .BYTE   7                               ;LSB MASK
002333     001                  .BYTE   1                               ;NUMBER OF LOCATIONS
002334  004737  007660                  JSR     PC,DZVLEV               ;GO BUILD DEVICE POINTERS
002340  104403                          INSTR                           ;INPUT WHICH TEST YOU ARE RUNNING
```

```
                                        MWHICH                  ;ECHO OR CABLE
                                        PWHCH                   ;SET FLAG
                                        WCHFLG                  ;THIS FLAG
BAUD:                                   INSTR                   ;INPUT BAUD RATE
                                        MSPEED                  ;MESSAGE "BAUD RATE-"
                                        PARMD                   ;CONVERT DECIMAL STRING TO OCTAL
                                        50.                     ;LOW LIMIT
                                        9600.                   ;HIGH LIMIT
                                        LINESP                  ;LOCATION TO BE FILLED
                                .BYTE   0                       ;LSB MASK
                                .BYTE   1                       ;NUMBER OF LOCATIONS
LINEX:                                  DEVICE.CLR              ;CLEAR DEVICE
                                        CLR     STFLG           ;CLEAR PROGRAM START FLAG
                                        INSTR                   ;INPUT LINE NUMBER
                                        MLINE                   ;MESSAGE "LINE NUMBER-"
                                        PARAM                   ;CONVERT  STRING TO OCTAL
                                        0                       ;LOW LIMIT
                                        3                       ;HIGH LIMIT
                                        SAVLIN                  ;LOCATION TO BE FILLED
                                .BYTE   0                       ;LSB MASK
                                        .BYTE   1               ;NUMBER OF LOCATIONS
                                        JSR     R5,SET

XBEGIN:                         MTPS    #MASK                   ;LOCK OUT INTERRUPTS
                                MOV     #STACK,SP               ;SET UP PROCESSOR STACK
                                CLR     LOCKUP                  ;CLEAR TIMEOUT
                                TST     WCHFLG                  ;ECHO OR CABLE TEST ?
                                BEQ     2$                      ;ECHO
                                MOV     #TST2,$LPADR            ;CABLE TEST
                                TST     STFLG                   ;ARE YOU LOOPING ?
                                BNE     1$                      ;YES
                                COM     STFLG                   ;NO
                                TYPE    ,MCABLE                 ;TYPE CABLE TEST
                                BR      1$
                                MOV     #TST1,$LPADR            ;SET UP ECHO TEST
2$:                             TST     STFLG                   ;ARE YOU LOOPING ?
                                BNE     1$                      ;YES
                                COM     STFLG                   ;NO
                                TYPE    ,MTERM                  ;TYPE ECHO TEST
1$:
RESTART:                        JMP     @$LPADR                 ;START TESTING,THIS LOCATION IS ALSO
                                                                ;USED BY THE POWER UP ROUTINE
```

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

                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO XBEGIN

002516                          $EOP:
002516  005037  001262                  CLR     $ERRPC          ;CLEAR LAST ERROR PC
002522  105037  001247                  CLRB    $ERFLG          ;CLEAR ERROR FLAG
        104402  006013                  TYPE    ,MEPASS         ;TYPE END PASS
        104402  006175                  TYPE    ,MCSRX          ;TYPE CSR
        104412  002660                  CNVRT   ,XCSR           ;SHOW IT
        104402  006203                  TYPE    ,MVECX          ;TYPE VECTOR
        104412  002666                  CNVRT   ,XVEC           ;SHOW IT
        005237  001126                  INC     $PASS           ;RAISE PASS COUNT
        104402  006211                  TYPE    ,MPASSX         ;TYPE PASSES
        104412  002674                  CNVRT   ,XPASS          ;SHOW IT
        005337  001126                  DEC     $PASS           ;RESTORE PASS COUNT
        104402  006222                  TYPE    ,MERRX          ;TYPE ERRORS
        104412  002702                  CNVRT   ,XERR           ;SHOW IT
        005037  001354                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
        005237  001126                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
002612  042737  100000  001126          BIC     #100000,$PASS   ;;DON'T ALLOW A MFG. NUMBER
        005327                          DEC     (PC)+           ;;LOOP?
002622  000001                  $EOPCT: .WORD   1
002624  003013                          BGT     $DOAGN          ;;YES
        012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
        000001                  $ENDCT: .WORD   1
                                        $EOPCT
002634  013700  000042          $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
        001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
        000005                          RESET                   ;;CLEAR THE WORLD
002644  004710                  $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
002646  000240                          NOP                     ;;SAVE ROOM
002650  000240                          NOP                     ;;FOR
002652  000240                          NOP                     ;;ACT11
002654                          $DOAGN:
002654  000137                          JMP     @(PC)+          ;;RETURN
002656  002416                  $RTNAD: .WORD   XBEGIN
                                
002660  000001                  XCSR:   1
002662     006      002                 .BYTE   6,2
002664  002010                          DZVCSR
002666  000001                  XVEC:   1
002670     003      002                 .BYTE   3,2
002672  002040                          DZVRIV
002674  000001                  XPASS:  1
002676     006      002                 .BYTE   6,2
002700  001126                          $PASS
002702  000001                  XERR:   1
```

```
                                        .BYTE   6,2
                                        SERTTL

                                        ;CONVERT DECIMAL ASCII STRING TO OCTAL
                                .PARMD: MOV     (SP),R5
                                        MOV     (R5)+,6$
                                        MOV     (R5)+,7$
                                        MOV     (R5)+,8$
                                        MOVB    (R5)+,9$
                                        MOVB    (R5)+,10$
                                        MOV     R5,(SP)
                                2$:     CLR     R5
                                        MOV     #INBUF,R4
                                        CMPB    #15,(R4)
                                        BEQ     3$
                                1$:     CMPB    (R4),#'0
                                        BLT     3$
                                        CMPB    (R4),#'9
                                        BGT     3$
                                        BICB    #'0,(R4)
                                        CLR     R2
                                        BISB    (R4)+,R2
                                        ADD     R2,R5
                                        CMPB    #15,(R4)
                                        BEQ     4$
                                        ASL     R5          ;X2
                                        MOV     R5,R2       ;SAVE X2
                                        ASL     R5          ;X4
                                        ASL     R5          ;X8
                                        ADD     R2,R5       ;TIMES 10
                                        BR      1$
                                3$:     INSTER
                                        BR      2$

                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS

                                4$:     CMP     R5,7$
                                        BHI     3$
                                        CMP     R5,6$
                                        BLO     3$
                                        BITB    9$,R5
                                        BNE     3$

                                        ;STORE NUMBER AT SPECIFIED ADDRESS

                                        MOV     8$,R4
                                5$:     MOV     R5,(R4)+
                                        ADD     #2,R5
                                        DECB    10$
                                        BNE     5$
                                        RTI
                                6$:     0
                                7$:     0
                                8$:     0
                                9$:     .BYTE 0
                                10$:    .BYTE 0
```

```
                                        ;CHECK FOR FREEZE ON CURRENT DATA
                                        ;-------------------------------

003104  032777  010000  176172  .SCOP1: BIT     #SW09,@SWR      ;IS SW09=1(SET)?
003112  001405                          BEQ     1$              ;BR IF NOT SET.
003114  005737  001364                  TST     LOCK            ;IS THERE A TIGHT LOOP SPECIFIED?
003120  001402                          BEQ     1$              ;IF NO, RETURN
003122  013716  001364                  MOV     LOCK,(SP)       ;IF YES, GOTO THE ADDRESS IN LOCK.
003126  000002                  1$:     RTI                     ;GO BACK.

003130  032777  010000  176146  .TYPE:  BIT     #SW12,@SWR      ;INHIBIT ALL PRINTOUT??
003136  001403                          BEQ     $TYPE           ;IF NOT, GO TYPE
003140  062716  000002                  ADD     #2,(SP)         ;SKIP OVER MESSAGE POINTER
003144  000002                          RTI                     ;RETURN TO WHERE PROCEDURE WAS INVOKED
                                .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
                                ;*

003146  105737  001323          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
003152  100002                          BPL     1$              ;;BR IF YES
003154  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
003156  000430                          BR      3$              ;;LEAVE
003160  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
003162  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
003166  122737  000001  001140          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
003174  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
003176  132737  000100  001141          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
003204  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
003206  010037  003216                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
003212  004737  003436                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
003216  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
003220  132737  000040  001141  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
003226  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
003230  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
003232  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
003234  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
003236  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
003240  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
003244  000002                          RTI                     ;;RETURN
003246  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
003252  001430                          BEQ     8$
003254  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
```

```
1033  003260  001006                        BNE     5$
1034  003262  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
1035  003264  104402                        TYPE                    ;;TYPE A CR AND LF
1036  003266  001357                        $CRLF
1037  003270  105037  003424                CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
1038  003274  000755                        BR      2$              ;;GET NEXT CHARACTER
1039  003276  004737  003360        5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
1040  003302  123726  001322        6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
1041  003306  001370                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
1042  003310  013746  001320                MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
1043                                                                ;;AND THE NULL CHAR.
1044  003314  105366  000001        7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
1045  003320  002370                        BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
1046  003322  004737  003360                JSR     PC,$TYPEC       ;;GO TYPE A NULL
1047  003326  105337  003424                DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
1048  003332  000770                        BR      7$              ;;LOOP
1049
1050                                        ;HORIZONTAL TAB PROCESSOR
1051
1052  003334  112716  000040        8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
1053  003340  004737  003360        9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
1054  003344  132737  000007  003424        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
1055  003352  001372                        BNE     9$              ;;TAB STOP
1056  003354  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
1057  003356  000724                        BR      2$              ;;GET NEXT CHARACTER
1058  003360  105777  175730        $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
1059  003364  100375                        BPL     $TYPEC
1060  003366  116677  000002  175722        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
1061  003374  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
1062  003402  001003                        BNE     1$              ;;BRANCH IF NO
1063  003404  105037  003424                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
1064  003410  000406                        BR      $TYPEX          ;;EXIT
1065  003412  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
1066  003420  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
1067  003422  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
1068  003424  000000        $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
1069  003426  000207        $TYPEX: RTS     PC
1070
1071                                        .SBTTL  APT COMMUNICATIONS ROUTINE
1072
1073                                        ;;**************************************************************
1074  003430  112737  000001  003674  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
1075  003436  112737  000001  003672  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
1076  003444  000403                        BR      $ATYC
1077  003446  112737  000001  003674  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
1078  003454                        $ATYC:
1079  003454  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
1080  003456  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1081  003460  105737  003672                TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
1082  003464  001450                        BEQ     5$              ;;IF NOT:  BR
1083  003466  122737  000001  001140        CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
1084  003474  001031                        BNE     3$              ;;IF NOT:  BR
1085  003476  132737  000100  001141        BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
1086  003504  001425                        BEQ     3$              ;;IF NOT:  BR
1087  003506  017600  000004                MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
1088  003512  062766  000002  000004        ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
```

```
1089  00[illegible]  005737  001120          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
1090  0[illegible]   001375                          BNE     1$              ;;IF NOT:  WAIT
1091  0[illegible]   01[illegible]37  001134         MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
1092  0[illegible]   105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
1093  0[illegible]   001376                          BNE     2$
1094  0[illegible]   163700  001134                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
1095  0[illegible]   006[illegible]0                  ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
1096  0[illegible]   01[illegible]37  001136         MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
1097  0[illegible]   01[illegible]37  000004  001120 MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
1098  0[illegible]   0[illegible]413                  BR      5$
1099  0[illegible]   01[illegible]37  000004  003604  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
1100  0[illegible]   06[illegible]6   00[illegible]02  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
1101  0[illegible]   013[illegible]46  177776          MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
1102  0[illegible]   00[illegible]737  003146          JSR     PC,$TYPE        ;;CALL TYPE MACRO
1103  0[illegible]   000000                  4$:     .WORD   0
1104  0[illegible]   5                       5$:
1105  0[illegible]   105737  003674          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
1106  0[illegible]   001416                          BEQ     12$             ;;IF NOT:  BR
1107  0[illegible]   005737  001140                  TST     $ENV            ;;RUNNING UNDER APT?
1108  0[illegible]   001413                          BEQ     12$             ;;IF NOT:  BR
1109  0[illegible]   005737  001120          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
1110  0[illegible]   001375                          BNE     11$             ;;IF NOT:  WAIT
1111  0[illegible]   017637  000004  001122         MOV     @4(SP),$FATAL   ;;GET ERROR #
1112  0[illegible]   062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
1113  0[illegible]   00[illegible]237  001120        INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
1114  0[illegible]   1[illegible]37  003674          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
1115  0[illegible]   105037  003673                  CLRB    $LFLG           ;;CLEAR LOG FLAG
1116  0[illegible]   105037  003672                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
1117  0[illegible]   012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
1118  0[illegible]   012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1119  00[illegible]  000207                          RTS     PC              ;;RETURN
1120  003672         000             $MFLG:  .BYTE   0               ;;MESSG. FLAG
1121  003673         000             $LFLG:  .BYTE   0               ;;LOG FLAG
1122  003674         000             $FFLG:  .BYTE   0               ;;FATAL FLAG
1123                 003676                  .EVEN
1124                 000200          APTSIZE=200
1125                 000001          APTENV=001
1126                 000100          APTSPOOL=100
1127                 000040          APTCSUP=040
1128
1129                                         ;STRING INPUT ROUTINE
1130                                         ;---------------------
1131
1132  003676  010346                  .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
1133  00[illegible]  010446                  MOV     R4,-(SP)        ;SAVE R4 ON STACK
1134  003702  017637  000004  003720         MOV     @4(SP),.MSG     ;GET THE ADDRESS OF THE MESSAGE TO BE PRINTED
1135  003710  062766  000002  000004         ADD     #2,4(SP)        ;POINT TO INS[illegible]CTION AFTER ADDRESS POINTER
1136  003716  104[illegible]2                  .INST1: TYPE                    ;PRINT THE ME[illegible]E
1137  003720  00[illegible]0                  .MSG:   0                       ;MESSAGE IS PO[illegible]TED TO FROM HERE
1138  003722  012704  007512                  MOV     #INBUF,R4       ;POINT R4 TO THE INPUT BUFFER
1139  003726  012703  00[illegible]007                MOV     #7,R3           ;SET THE MAXIM[illegible]M N[illegible]ER OF CHARACTERS ALLOWED
1140  003732  105777  175352          1$:     TSTB    @$TKS           ;HAS A CHA[illegible]RACTER[illegible]N RECEIVED?
1141  003736  100375                          BPL     1$              ;IF NO, KEEP WAITING FOR IT
1142  00[illegible]740  117714  175346         MOVB    @$TKB,(R4)      ;IF YES, SAVE IT IN THE INPUT BUFFER
1143  00[illegible]744  142714  00[illegible]200         BICB    #200,(R4)       ;KEEP ONLY THE 7-BIT ASCII INF[illegible]RMATION
1144  003750  122427  000015                  CMPB    (R4)+,#15       ;IS THIS CHARACTER A LINE FEED?
```

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1145  003754  001417                          BEQ     INSTR2          ;IF SO, TERMINATE THE INPUT SEQUENCE
1146  003756  105777  175332          2$:     TSTB    @$TPS           ;IF NOT, CHECK TO SEE IF THE CHARACTER CAN PRINT
1147  003762  100375                          BPL     2$              ;IF WE CAN'T, WAIT UNTIL WE CAN
1148  003764  017777  175322  175324          MOV     @$TKB,@$TPB     ;ECHO THE CHARACTER BACK
1149  003772  005303                          DEC     R3              ;REDUCE THE NUMBER OF CHARACTERS RECEIVED
1150  003774  001356                          BNE     1$              ;IF WE DON'T HAVE 7, GO GET SOME MORE
1151  003776  012604                          MOV     (SP)+,R4        ;IF WE HAVE 7, RESTORE R4
1152  004000  012603                          MOV     (SP)+,R3        ;RESTORE R3
1153  004002  010346                  .INSTE: MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
1154  004004  010446                          MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1155  004006  104402  001356                  TYPE    ,$QUES          ;PRINT A QUESTION MARK... WHAT'S GOING ON?
1156  004012  000741                          BR      .INST1          ;GO PRINT THE MESSAGE AGAIN
1157  004014  012604                  INSTR2: MOV     (SP)+,R4        ;RESTORE R4
1158  004016  012603                          MOV     (SP)+,R3        ;RESTORE R3
1159  004020  000002                          RTI                     ;RETURN TO THE MAIN PROCEDURE
1160
1161                                          ;CONVERT ASCII STRING TO OCTAL
1162                                          ;-----------------------------
1163
1164  004022  010546                  .PARAM: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
1165  004024  010446                          MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1166  004026  016605  000004                  MOV     4(SP),R5        ;GET THE SETUP INFORMATION POINTER
1167  004032  012537  004212                  MOV     (R5)+,LOLIM     ;SET THE LOW LIMIT FOR THE INPUT
1168  004036  012537  004214                  MOV     (R5)+,HILIM     ;SET THE HIGH LIMIT FOR THE INPUT
1169  004042  012537  004216                  MOV     (R5)+,DEVADR    ;SAVE THE ADDRESS WHERE THE RESULT WILL BE STORED
1170  004046  112537  004220                  MOVB    (R5)+,LOBITS    ;GET THE MASK OF THE INCORRECT BITS
1171  004052  112537  004221                  MOVB    (R5)+,ADRCNT    ;GET THE COUNT OF ITEMS TO BE STORED
1172  004056  010566  000004                  MOV     R5,4(SP)        ;POINT TO WHERE MAIN LINE PROGRAM WILL RESUME
1173  004062  005005                  PARAM1: CLR     R5              ;INITIALIZE THE ASCII TO OCTAL RESULT WORD
1174  004064  012704  007512                  MOV     #INBUF,R4       ;POINT TO THE INPUT BUFFER
1175  004070  122714  000015                  CMPB    #15,(R4)        ;IS THIS CHARACTER A CARRIAGE RETURN?
1176  004074  001420                          BEQ     PARERR          ;IF SO, PRINT THE MESSAGE AGAIN
1177  004076  121427  000060          1$:     CMPB    (R4),#60        ;IS THIS CHARACTER BELOW THE NUMERIC RANGE?
1178  004102  002415                          BLT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1179  004104  121427  000067                  CMPB    (R4),#67        ;IS THIS CHARACTER ABOVE THE NUMERIC RANGE?
1180  004110  003012                          BGT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1181  004112  142714  000060                  BICB    #60,(R4)        ;ISOLATE THE NUMBER THE CHARACTER REPRESENTS
1182  004116  152405                          BISB    (R4)+,R5        ;CONCATENATE THESE BITS TO THE ALREADY EXISTING STRING
1183  004120  122714  000015                  CMPB    #15,(R4)        ;IS THE NEXT CHARACTER A CARRIAGE RETURN?
1184  004124  001406                          BEQ     LIMITS          ;IF SO, GO SEE IF NUMBER IS WITHIN LIMITS
1185  004126  006305                          ASL     R5              ;CLEAR BIT POSITION 0, MOVE EXISTING STRING TO LEFT
1186  004130  006305                          ASL     R5              ;CLEAR POSITION 1, MOVE STRING TO LEFT AGAIN
1187  004132  006305                          ASL     R5              ;MOVE THE STRING ONE MORE TIME TO MAKE ROOM FOR
1188                                                                  ;NEXT THREE BITS
1189  004134  000760                          BR      1$              ;GO GET THE NEXT CHARACTER
1190  004136  104404                  PARERR: INSTER                  ;THERE WAS AN ERROR... GO PRINT MESSAGE AGAIN
1191  004140  000750                          BR      PARAM1          ;TRY GETTING THE PARAMETERS AGAIN
1192
1193                                          ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
1194                                          ;--------------------------------------
1195
1196  004142  020537  004214          LIMITS: CMP     R5,HILIM        ;DOES RESULT EXCEED ITS MAXIMUM CORRECT VALUE?
1197  004146  101373                          BHI     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
1198  004150  020537  004212                  CMP     R5,LOLIM        ;IS THE RESULT LOWER THAN ALLOWED?
1199  004154  103770                          BLO     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
1200  004156  133705  004220                  BITB    LOBITS,R5       ;ARE ANY INCORRECT BITS SET IN THE RESULT?
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1201  004162  001365                          BNE     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1202
1203                                          ;STORE NUMBER AT SPECIFIED ADDRESS
1204
1205  004164  013704  004216                  MOV     DEVADR,R4       ;POINT TO THE LOCATION WHERE THE RESULT WILL BE STORED
1206  004170  010524                1$:      MOV     R5,(R4)+        ;STORE THE RESULT
1207  004172  062705  000002                  ADD     #2,R5           ;CALCULATE THE NEXT DATUM
1208  004176  105337  004221                  DECB    AORCNT          ;REDUCE COUNT OF STORED RESULTS. IS IT EXCEEDED?
1209  004202  001372                          BNE     1$              ;IF NOT, GO STORE THE NEXT DATUM
1210  004204  012604                          MOV     (SP)+,R4        ;RESTORE R4
1211  004206  012605                          MOV     (SP)+,R5        ;RESTORE R5
1212  004210  000002                          RTI                     ;RETURN TO THE MAIN PROGRAM
1213
1214  004212  000000                LOLIM:   0                       ;LOWEST ACCEPTABLE VALUE
1215  004214  000000                HILIM:   0                       ;HIGHEST ACCEPTABLE
1216  004216  000000                DEVADR:  0                       ;LOCATION WHERE RESULT WILL BE STORED
1217  004220     000                LOBITS:  .BYTE   0               ;INCORRECT BITS MASK
1218  004221     000                AORCNT:  .BYTE   0               ;COUNT OF ITEMS TO BE STORED
1219
1220                                          ;SAVE PC OF TEST THAT FAILED AND R0-R5
1221                                          ;-------------------------------------
1222
1223  004222  016637  000004  001404  .SAVOS: MOV     4(SP),SAVPC     ;SAVE R7 (PC)
1224
1225                                          ;SAVE R0-R5
1226
1227  004230  010537  001340          SVOS:   MOV     R5,$REG5        ;SAVE R5
1228  004234  010437  001336                  MOV     R4,$REG4        ;SAVE R4
1229  004240  010337  001334                  MOV     R3,$REG3        ;SAVE R3
1230  004244  010237  001332                  MOV     R2,$REG2        ;SAVE R2
1231  004250  010137  001330                  MOV     R1,$REG1        ;SAVE R1
1232  004254  010037  001326                  MOV     R0,$REG0        ;SAVE R0
1233  004260  000002                          RTI                     ;LEAVE.
1234
1235                                          ;RESTORE R0-R5
1236
1237  004262  013700  001326          .RESOS: MOV     $REG0,R0        ;RESTORE R0
1238  004266  013701  001330                  MOV     $REG1,R1        ;RESTORE R1
1239  004272  013702  001332                  MOV     $REG2,R2        ;RESTORE R2
1240  004276  013703  001334                  MOV     $REG3,R3        ;RESTORE R3
1241  004302  013704  001336                  MOV     $REG4,R4        ;RESTORE R4
1242  004306  013705  001340                  MOV     $REG5,R5        ;RESTORE R5
1243  004312  000002                          RTI                     ;LEAVE
1244
1245                                          ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
1246                                          ;-----------------------------------------------------
1247
1248  004314  104402  001357          .CONVR: TYPE    ,$CRLF          ;PRINT A CARRIAGE RETURN
1249  004320  010046                  .CNVRT: MOV     R0,-(SP)        ;SAVE R0
1250  004322  010146                          MOV     R1,-(SP)        ;SAVE R1
1251  004324  010346                          MOV     R3,-(SP)        ;SAVE R3
1252  004326  010446                          MOV     R4,-(SP)        ;SAVE R4
1253  004330  010546                          MOV     R5,-(SP)        ;SAVE R5
1254  004332  017601  000012                  MOV     @12(SP),R1      ;PLACE THE ADDRESS OF THE ARGUMENTS IN R1
1255  004336  062766  000002  000012          ADD     #2,12(SP)       ;POINT TO WHERE MAIN PROGRAM WILL RESUME
1256  004344  012137  004470                  MOV     (R1)+,WRDCNT    ;GET NUMBER OF WORDS TO BE PRINTED
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1257  004350  112105            1$:     MOVB    (R1)+,R5        ;GET THE NUMBER OF CHARACTERS TO BE PRINTED
1258  004352  112100                    MOVB    (R1)+,R0        ;GET THE NUMBER OF SPACES TO PRINT
1259  004354  013104                    MOV     @(R1)+,R4       ;COPY THE WORD TO BE CONVERTED
1260  004356  110537  004472            MOVB    R5,CHRCNT       ;COPY THE CHARACTER COUNT
1261  004362  010403            3$:     MOV     R4,R3           ;COPY THE ARGUMENT WORD AGAIN
1262  004364  042703  177770            BIC     #^C<7>,R3       ;ISOLATE THREE BITS TO BE TREATED AS A CHARACTER
1263  004370  062703  000060            ADD     #060,R3         ;MAKE AN ASCII CHARACTER OUT OF THEM
1264  004374  110346                    MOVB    R3,-(SP)        ;SAVE THAT CHARACTER
1265  004376  006004                    ROR     R4              ;MOVE THE NEXT THREE BITS INTO PLACE
1266  004400  006204                    ASR     R4              ;MOVE THEM AGAIN
1267  004402  006204                    ASR     R4              ;AND FINALLY A THIRD TIME
1268  004404  005305                    DEC     R5              ;REDUCE CHARACTER COUNT.ARE ALL CHARACTERS
1269                                                            ;BUILT?
1270  004406  001365                    BNE     3$              ;IF NO, GO BUILD THE NEXT ONE.
1271  004410  012703  007616            MOV     #MDATA,R3       ;NOW POINT TO WHERE NUMBER WILL BE PRINTED FROM
1272  004414  112623            4$:     MOVB    (SP)+,(R3)+     ;STORE THE CHARACTER, STARTING WITH THE MOST
1273  004416  105337  004472            DECB    CHRCNT          ;REDUCE COUNT. ARE ALL CHARACTERS TRANSFERRED?
1274  004422  001374                    BNE     4$              ;IF NO, GO TRANSFER ANOTHER
1275  004424  105700                    TSTB    R0              ;ARE ANY SPACES TO BE PRINTED?
1276  004426  001404                    BEQ     6$              ;IF NO, DON'T SET UP ANY
1277  004430  112723  000040    5$:     MOVB    #040,(R3)+      ;ADD A SPACE TO THE OUTPUT BUFFER
1278  004434  105300                    DECB    R0              ;REDUCE THE COUNT. SHOULD WE PRINT MORE?
1279  004436  001374                    BNE     5$              ;IF YES, GO ADD ANOTHER SPACE
1280  004440  105013            6$:     CLRB    (R3)            ;TERMINATE THE OUTPUT BUFFER WITH A ZERO
1281  004442  104402  007616            TYPE    ,MDATA          ;PRINT THE STRING WE JUST BUILT
1282  004446  005337  004470            DEC     WRDCNT          ;REDUCE THE WORD COUNT. ARE ANY MORE WORDS LEFT?
1283  004452  001336                    BNE     1$              ;IF YES, GO CONVERT THEM
1284  004454  012605                    MOV     (SP)+,R5        ;RESTORE R5
1285  004456  012604                    MOV     (SP)+,R4        ;RESTORE R4
1286  004460  012603                    MOV     (SP)+,R3        ;RESTORE R3
1287  004462  012601                    MOV     (SP)+,R1        ;RESTORE R1
1288  004464  012600                    MOV     (SP)+,R0        ;RESTORE R0
1289  004466  000002                    RTI                     ;RETURN TO THE MAIN PROGRAM
1290  004470  000000            WRDCNT: 0
1291  004472     000             CHRCNT: .BYTE                   ;NUMBER OF CHARACTERS TO PRINT
1292  004473     000             SPACNT: .BYTE   0               ;NUMBER OF SPACES TO PRINT
1293
1294  004474  000000            BINWRD: 0
1295
1296
1297                                    ;TRAP DISPATCH SERVICE
1298                                    ;ARGUMENT OF TRAP IS EXTRACTED
1299                                    ;AND USED AS OFFSET TO OBTAIN POINTER
1300                                    ;TO SELECTED SUBROUTINE
1301
1302  004476  010046            .TRPSR: MOV     R0,-(SP)        ;SAVE R0. USE R0 TO FIND TRAP ROUTINE
1303  004500  016600  000002            MOV     2(SP),R0        ;GET TRAP ADDRESS
1304  004504  005740                    TST     -(R0)           ;GET TRAP
1305  004506  111000                    MOVB    (R0),R0         ;GET RIGHT BYTE OF TRAP(TRAP OFFSET)
1306  004510  006300                    ASL     R0              ;POSITION OFFSET FOR TABLE INDEXING
1307  004512  016000  001742            MOV     .TRPTAB(R0),R0  ;PLACE INDEXED ADDRESS OF TABLE IN R0
1308  004516  000200                    RTS     R0              ;TRANSFER TO THAT ADDRESS AND RESTORE OLD R0
1309
1310                                    ;DEVICE CLEAR ROUTINE
1311                                    ;ISSUE A DEVICE CLEAR
1312                                    ;--------------------
```

```
1313  004520                          .DEVICE.CLR:
1314  004520  052777  000020  175262          BIS     #DCLR,@DZVCSR   ;SET DCLR
1315  004526  032777  000020  175254  1$:     BIT     #DCLR,@DZVCSR   ;DID IT CLEAR?
1316  004534  001374                          BNE     1$              ;BR IF NO
1317  004536  000002                          RTI                     ;EXIT ROUTINE
1318
1319                                          ;ROUTINE TO HANDLE MAINTENANCE BIT SETTING WITH DEVICE CLEAR
1320                                          ;-----------------------------------------------------------
1321  004540  104413                  .DCLASM:DEVICE.CLR              ;ISSUE A DEVICE CLEAR
1322  004542  153777  001424  175240          BISB    MNTFLG,@DZVCSR  ;LOAD THE MAINTENANCE BIT IF IT IS I MODE
1323  004550  000002                          RTI                     ;RETURN TO CALLING ROUTINE
1324
1325  004552                          .DELAY:
1326  004552  010046                          MOV     R0,-(SP)        ;SAVE R0
1327  004554  013700  004570                  MOV     DLYCNT,R0       ;SET COUNT
1328  004560  005300                  1$:     DEC     R0              ;DELAY
1329  004562  001376                          BNE     1$              ;
1330  004564  012600                          MOV     (SP)+,R0        ;RESTORE R0
1331  004566  000002                          RTI                     ;LEAVE ROUTINE
1332  004570  000001                  DLYCNT: .WORD     1             ;PATCHABLE LOC FOR MORE TIME
1333
1334                                          ;ADVANCE TO NEXT TEST HANDLER
1335                                          ;----------------------------
1336
1337  004572  013716  001362          .ADVANCE:MOV    NEXT,(SP)       ;CRUNCH STACK WITH ADDRESS OF NEXT TEST
1338  004576  005037  001364                  CLR     LOCK            ;RESET TIGHT LOOP ADDRESS
1339  004602  000002                          RTI                     ;CHECK TO SEE IF OLD TEST GETS REPEATED
1340
1341                                          ;ROUTINE TO SHIFT LINE POINTER
1342                                          ;AND SWITCH TESTS IF NECESSARY
1343                                          ;-----------------------------
1344  004604  106302                  .SHIFT: ASLB    R2              ;POINT TO THE NEXT LINE
1345  004606  032702  000020                  BIT     #BIT4,R2        ;HAVE WE PASSED ALL LINE POINTERS?
1346  004612  001402                          BEQ     1$              ;IF NOT, RETURN TO THE TEST
1347  004614  022626                          POP2SP                  ;REMOVE THE TRAP CALL FROM THE STACK
1348  004616  104400                          ADVANCE                 ;GO TO THE NEXT TEST
1349  004620  000002                  1$:     RTI                     ;RETURN TO THE PRESENT TEST
1350
```

```
1351                                            ;LINE PARAMETER REGISTER SETUP ROUTINE
1352
1353  004622  010146                .LPRSET:MOV     R1,-(SP)        ;SAVE CONTENTS OF R1
1354  004624  010246                        MOV     R2,-(SP)        ;SAVE CONTENTS OF R2
1355  004626  013701  001370                MOV     @PAR,R1         ;MOVE DEFAULT PARAM. INTO R1
1356  004632  012702  000001                MOV     #1,R2   ;INIT. FOR LINE 1
1357  004636  010177  175156        1$:     MOV     R1,@DZVLPR      ;LOAD PARAM. REGISTER
1358  004642  005201                        INC     R1              ;SET R1 FOR NEXT LINE
1359  004644  106302                        ASLB    R2              ;SET R2 FOR NEXT LINE
1360  004646  032702  000020                BIT     #BIT4,R2        ;ALL LINES DONE?
1361  004652  001771                        BEQ     1$              ;IF NO LOAD NEXT LINE
1362  004654  012602                        MOV     (SP)+,R2        ;RELOAD R2
1363  004656  012601                        MOV     (SP)+,R1        ;RELOAD R1
1364  004660  000002                        RTI                     ;RETURN
1365
1366                                            ;ROUTINE TO ZERO DATA BUFFER
1367
1368  004662  010046                .BUFSET:MOV     R0,-(SP)        ;SAVE CONTENTS OF R0
1369  004664  012700  001426                MOV     #TOO,R0         ;SET R0 TO TOP OF BUFFER
1370  004670  005020                1$:     CLR     (R0)+           ;CLEAR BUFFER LOCATION
1371  004672  022700  001446                CMP     #STOP,R0        ;IS BUFFER ALL CLEARED
1372  004676  001374                        BNE     1$              ;IF NOT CLEAR NEXT LOCATION
1373  004700  012600                        MOV     (SP)+,R0        ;RELOAD R0
1374  004702  000002                        RTI                     ;RETURN
1375
1376                                            ;ERROR HANDLER
1377                                            ;-------------
1378
1379  004704  004737  005332        $ERROR: JSR     PC,SERV.G       ;FIND OUT IF <↑G> WAS HIT
1380  004710  032777  010000  174366        BIT     #SW12,@SWR      ;BELL ON ERROR?
1381  004716  001406                        BEQ     XBX             ;BR IF NO BELL
1382  004720  105777  174370                TSTB    @$TPS           ;TTY READY.
1383  004724  100003                        BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
1384  004726  112777  000207  174362        MOVB    #207,@$TPB      ;PUSH A BELL AT THE TTY.
1385  004734  032777  020000  174342  XBX:  BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1386  004742  001113                        BNE     HALT$           ;BR IF NO PRINT OUT WANTED.
1387  004744  021637  001262                CMP     (SP),SERRPC     ;WAS THIS ERROR FOUND LAST TIME?
1388  004750  001404                        BEQ     1$              ;BR IF YES
1389  004752  011637  001262                MOV     (SP),SERRPC     ;RECORD BEING HERE
1390  004756  105037  001247                CLRB    $ERFLG          ;PREPARE HEADER
1391  004762  104407                1$:     SAVOS                   ;SAVE ALL PROC REGISTERS
1392  004764  011605                        MOV     (SP),R5         ;GET THE PC OF ERROR
1393  004766  162705  000002                SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
1394  004772  011504                        MOV     (R5),R4         ;GET ERROR INSTRUCTION
1395  004774  110437  001260                MOVB    R4,$ITEMB       ;COPY TEST NUMBER FOR APT HANDLING
1396  005000  006304                        ASL     R4              ;MULT BY TWO
1397  005002  061504                        ADD     (R5),R4         ;DOUBLE IT
1398  005004  006304                        ASL     R4              ;MULT AGAIN
1399  005006  042704  177001                BIC     #177001,R4      ;CLEAR JUNK
1400  005012  062704  011064                ADD     #.ERRTAB,R4     ;GET POINTER
1401  005016  012437  005142                MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
1402  005022  012437  005154                MOV     (R4)+,DATAHD    ;GET DATA HEADRER
1403  005026  011437  005166                MOV     (R4),DATABP     ;GET DATA TABLE
1404  005032  105737  001247                TSTB    $ERFLG          ;TYPE HEADER
1405  005036  001403                        BEQ     TYPMSG          ;BR IF YES
1406  005040  005737  005166                TST     DATABP          ;DOES DATA TABLE EXIST?
```

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1407  005044  001044                        BNE     TYPDAT          ;BR IF YES.
1408  005046  104402  001357        TYPMSG: TYPE    ,$CRLF          ;TYPE A CARRIAGE RETURN
1409  005052  104402  001357                TYPE    ,$CRLF          ;AND TYPE ANOTHER
1410  005056  005737  001364                TST     LOCK
1411  005062  001402                        BEQ     1$
1412  005064  104402  006245                TYPE    ,MASTEK
1413  005070  104402  006233        1$:     TYPE    ,MTSTN
1414  005074  104412  005324                CNVRT   ,XTSTN          ;SHOW IT
1415  005100  104402  006323                TYPE    ,MERRPC         ;TYPE PC.
1416  005104  104412  005316                CNVRT   ,ERTABO         ;SHOW IT
1417  005110  104402  006175                TYPE    ,MCSRX
1418  005114  104412  002660                CNVRT   ,XCSR
1419  005120  104402  001357                TYPE    ,$CRLF          ;GIVE A CR/LF
1420  005124  112737  177777  001247        MOVB    #-1,$ERFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1421  005132  005737  005142                TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1422  005136  001402                        BEQ     WTBS.FM         ;BR IF NO.
1423  005140  104402                        TYPE                    ;TYPE
1424  005142  000000        ERRMSG: 0                               ;    ERROR MESSAGE
1425  005144                WTBS.FM:                                ;
1426  005144  005737  005154                TST     DATAHD          ;DATA HEADER?
1427  005150  001402                        BEQ     TYPDAT          ;BR IF NO
1428  005152  104402                        TYPE                    ;TYPE
1429  005154  000000        DATAHD: 0                               ;    DATA HEADER
1430  005156  005737  005166        TYPDAT: TST     DATABP          ;DATA TABLE?
1431  005162  001402                        BEQ     RESREG          ;BR IF NO.
1432  005164  104411                        CONVRT                  ;SHOW
1433  005166  000000        DATABP: 0                               ;    DATA TABLE
1434  005170  104410        RESREG: RESOS                           ;RESTORE PROC REGISTERS
1435  005172  122737  000001  001140  HALTS:  CMPB    #APTENV,$ENV    ;IS APT RUNNING?
1436  005200  001007                        BNE     15$             ;SKIP APT CALL IF NOT
1437  005202  113737  001260  005214        MOVB    $ITEMB,5$       ;COPY ERROR NUMBER
1438  005210  004737  003446                JSR     PC,$ATY4        ;CALL APT SERVICE
1439  005214  000000        5$:     .WORD   0                       ;ERROR NUMBER STUCK HERE
1440  005216  000777        10$:    BR      10$                     ;LOCK UP HERE
1441  005220  022737  002644  000042  15$:     CMP     #SENDAD,@#42    ;CHECK TO SEE IF IN ACT-11 MODE
1442  005226  001403                        BEQ     20$             ;IF SO, HANDLE ACCORDINGLY
1443  005230  005777  174050                TST     @SWR            ;HALT ON ERROR?
1444  005234  100004                        BPL     EXITER          ;BR IF NO HALT ON ERROR
1445  005236  016677  000002  174042  20$:     MOV     2(SP),@DISPLAY  ;SHOW ERROR PC IN DATA DISPLAY
1446  005244  000000                        HALT                    ;HALT
1447  005246  005237  001256        EXITER: INC     SERTTL          ;UPDATE ERROR COUNT
1448  005252  004737  005332                JSR     PC,SERV.G       ;FIND OUT IF ↑G WAS TYPED
1449  005256  032777  000400  174020        BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1450  005264  001007                        BNE     1$              ;BR IF YES
1451  005266  032777  002000  174010        BIT     #SW10,@SWR      ;GOTO NEXT TEST?
1452  005274  001407                        BEQ     2$              ;BR IF NO
1453  005276  013737  001362  001252        MOV     NEXT,$LPADR     ;SET FOR NEXT TEST
1454  005304  012706  001120        1$:     MOV     #STACK,SP       ;RESET SP
1455  005310  000177  173736                JMP     @$LPADR         ;GOTO SPECIFIED TEST
1456  005314  000002        2$:     RTI                             ;RETURN
1457  005316  000001        ERTABO: 1
1458  005320     006     002                .BYTE   6,2
1459  005322  001404                        SAVPC
1460  005324  000001        XTSTN:  1
1461  005326     002     002                .BYTE   2,2
1462  005330  001246                        $TSTNM
```

```
1463  005332  017746  173754          SERV.G: MOV     @#TKB,-(SP)     ;OTHERWISE, GET THE LAST CHARACTER TYPED
1464  005336  042716  000200                  BIC     #BIT7,(SP)      ;STRIP PARITY(EIGHTH) BIT
1465  005342  122726  000007                  CMPB    #7,(SP)+        ;IS IT ↑G?
1466  005346  001076                          BNE     6$              ;IF NOT, IGNORE INPUT
1467  005350  032777  004000  173732          BIT     #4000,@#TKS     ;RX BUSY?
1468  005356  001365                          BNE     SERV.G          ;BR IF YES
1469  005360  017737  173720  005566          MOV     @#SWR,90$       ;SAVE (SWR).
1470  005366  104402  005546          1$:     TYPE    ,89$            ;TYPE HEADER FOR OLD SWITCH REGISTER
1471  005372  104412  005560                  CNVRT   ,88$            ;TYPE THE NUMBER ITSELF
1472  005376  104402  005570                  TYPE    ,91$            ;AFTER HAVING CONVERTED IT TO ASCII
1473  005402  105037  005574                  CLRB    92$             ;CLEAR SWR CHANGE FLAG
1474  005406  005077  173672                  CLR     @#SWR           ;CLEAR THE SOFTWARE SWITCH REGISTER
1475  005412  105777  173672          3$:     TSTB    @#TKS           ;WAIT FOR DONE.
1476  005416  100375                          BPL     3$              ;CONTINUE WAITING FOR IT
1477  005420  017746  173666                  MOV     @#TKB,-(SP)     ;PUT THE CHARACTER ON THE STACK
1478  005424  042716  000200                  BIC     #BIT7,(SP)      ;STRIP PARITY BIT
1479  005430  122726  000015                  CMPB    #15,(SP)+       ;IS IT THE CARRIAGE RETURN CHAR?
1480  005434  001433                          BEQ     4$              ;IF SO, GO PRINT CRLF
1481  005436  105777  173652          2$:     TSTB    @#TPS           ;IS THE OUTPUT BUFFER AVAILABLE
1482  005442  100375                          BPL     2$              ;IF NOT, WAIT FOR IT TO BE READY
1483  005444  105237  005574                  INCB    92$             ;INDICATE THAT THE SWR WAS CHANGED
1484  005450  014677  173642                  MOV     -(SP),@#TPB     ;PLACE THE CHARACTER THERE(ECHO BACK)
1485  005454  000241                          CLC                     ;GET READY TO ROTATE
1486  005456  006177  173622                  ROL     @#SWR           ;MOVE THE EXISTING BITS OVER
1487  005462  006177  173616                  ROL     @#SWR           ;TO MAKE ROOM FOR THE INCOMING
1488  005466  006177  173612                  ROL     @#SWR           ;THREE BITS FROM THIS CHARACTER
1489  005472  103735                          BCS     1$              ;ERROR
1490  005474  026627  000060                  CMP     (SP)+,#60       ;IS IT LOWER THAN 0?
1491  005500  002732                          BLT     1$              ;IF SO, GO ASK AGAIN
1492  005502  026627  177776  000067          CMP     -2(SP),#67      ;IS IT HIGHER THAN 7?
1493  005510  003326                          BGT     1$              ;IF SO, GO ASK AGAIN
1494  005512  042746  177770                  BIC     #↑C<7>,-(SP)    ;ISOLATE INFORMATION BITS
1495  005516  052677  173562                  BIS     (SP)+,@#SWR     ;ADD THEM TO THE SWITCH REGISTER
1496  005522  000733                          BR      3$              ;GO CHECK FOR THE NEXT CHARACTER
1497  005524  105737  005574          4$:     TSTB    92$             ;HAS THE SWR BEEN CHANGED?
1498  005530  001003                          BNE     5$              ;IF YES GO TYPE CRLF
1499  005532  013777  005566  173544          MOV     90$,@#SWR       ;IF NOT RESTORE SWR
1500  005540  104402  001357          5$:     TYPE    ,$CRLF          ;TYPE A CARRIAGE RETURN AND LINE FEED
1501  005544  000207                  6$:     RTS     PC              ;RETURN TO CALLING PROCEDURE
1502
1503  005546  020200  051450  051127  89$:    .ASCIZ  <200>? (SWR)=/?
1504  005554  036451  000057
1505                                  .EVEN
1506  005560  000001                  88$:    1
1507  005562     006     000                  .BYTE   6,0
1508  005564  005566                          90$
1509  005566  000000                  90$:    .WORD   0
1510  005570  036457  000057          91$:    .ASCIZ  ?/=/?
1511  005574     000                  92$:    .BYTE   0
1512          005576                  .EVEN
1513                                  .SBTTL  POWER DOWN AND UP ROUTINES
1514
1515                                  ;;**********************************************************************
1516                                  ;POWER DOWN ROUTINE
1517  005576  012737  005742  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
1518  005604  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
```

```
1519  005612  010046                          MOV     R0,-(SP)          ;;PUSH R0 ON STACK
1520  005614  010146                          MOV     R1,-(SP)          ;;PUSH R1 ON STACK
1521  005616  010246                          MOV     R2,-(SP)          ;;PUSH R2 ON STACK
1522  005620  010346                          MOV     R3,-(SP)          ;;PUSH R3 ON STACK
1523  005622  010446                          MOV     R4,-(SP)          ;;PUSH R4 ON STACK
1524  005624  010546                          MOV     R5,-(SP)          ;;PUSH R5 ON STACK
1525  005626  017746  173452                  MOV     @SWR,-(SP)        ;;PUSH @SWR ON STACK
1526  005632  010637  005746                  MOV     SP,$SAVR6         ;;SAVE SP
1527  005636  012737  005650  000024          MOV     #$PWRUP,@#PWRVEC  ;;SET UP VECTOR
1528  005644  000000                          HALT
1529  005646  000776                          BR      .-2               ;;HANG UP
1530
1531                                  ;;*****************************************************************
1532                                  ;POWER UP ROUTINE
1533  005650  012737  005742  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC  ;;SET FOR FAST DOWN
1534  005656  013706  005746                  MOV     $SAVR6,SP         ;;GET SP
1535  005662  005037  005746                  CLR     $SAVR6            ;;WAIT LOOP FOR THE TTY
1536  005666  005237  005746          1$:     INC     $SAVR6            ;;WAIT FOR THE INC
1537  005672  001375                          BNE     1$                ;;OF  WORD
1538  005674  012677  173404                  MOV     (SP)+,@SWR        ;;POP STACK INTO @SWR
1539  005700  012605                          MOV     (SP)+,R5          ;;POP STACK INTO R5
1540  005702  012604                          MOV     (SP)+,R4          ;;POP STACK INTO R4
1541  005704  012603                          MOV     (SP)+,R3          ;;POP STACK INTO R3
1542  005706  012602                          MOV     (SP)+,R2          ;;POP STACK INTO R2
1543  005710  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
1544  005712  012600                          MOV     (SP)+,R0          ;;POP STACK INTO R0
1545  005714  012737  005576  000024          MOV     #$PWRON,@#PWRVEC  ;;SET UP THE POWER DOWN VECTOR
1546  005722  012737  000340  000026          MOV     #340,@#PWRVEC+2   ;;PRIO:7
1547  005730  104402                          TYPE                      ;;REPORT THE POWER FAILURE
1548  005732  005750                  SPWRMG: .WORD   MPFAIL            ;;POWER FAIL MESSAGE POINTER
1549  005734  012716                          MOV     (PC)+,(SP)        ;;RESTART AT RESTART
1550  005736  002512                  SPWRAD: .WORD   RESTART           ;;RESTART ADDRESS
1551  005740  000002                          RTI
1552  005742  000000                  $ILLUP: HALT                      ;;THE POWER UP SEQUENCE WAS STARTED
1553  005744  000776                          BR      .-2               ;; BEFORE THE POWER DOWN WAS COMPLETE
1554  005746  000000                  $SAVR6: 0                         ;;PUT THE SP HERE
1555  005750  050200  051127  043040  MPFAIL: .ASCIZ  <200>/PWR FAILED. RESTART AT LAST TEST /
 (2)  006013     200  047105  020104  MEPASS: .ASCIZ  <200>/END PASS DVDZC-A  /
 (2)  006037     200  052522  047116  MR:     .ASCIZ  <200>/RUNNING   /
 (2)  006053     200  051120  043517  MERR2:  .ASCIZ  <200>/PROGRAM INDICATES NO DEVICES PRESENT./
 (2)  006122  044600  051516  043125  MERR3:  .ASCIZ  <200>/INSUFFICIENT DATA!/
 (2)  006146  046200  041517  020113  MLOCK:  .ASCIZ  <200>/LOCK ON SELECTED TEST/
 (2)  006175     103  051123  020072  MCSRX:  .ASCIZ   /CSR: /
 (2)  006203     126  041505  020072  MVECX:  .ASCIZ  /VEC: /
 (2)  006211     120  051501  042523  MPASSX: .ASCIZ  /PASSES: /
 (2)  006222  051105  047522  051522  MERRX:  .ASCIZ  /ERRORS: /
 (2)  006233     124  051505  020124  MTSTN:  .ASCIZ  /TEST NO: /
 (2)  006245      52  000040          MASTEK: .ASCIZ  /* /
 (2)  006250  051600  052105  051440  MNEW:   .ASCIZ  <200>/SET SWITCH REG TO DZV11'S DESIRED ACTIVE./
 (2)  006323     120  035103  000040  MERRPC: .ASCIZ  /PC: /
 (2)  006330  046600  050101  047440  XHEAD:  .ASCIZ  <200>/MAP OF DZV11 STATUS/<200>
 (2)  006356  044600  046114  043505  MBADLN: .ASCIZ  <200>/ILLEGAL ENTRY IN STAGGERED MODE/<200>
 (2)                                  .EVEN
 (2)  006420  000002                  XSTATQ: 2
1556  006422     006     003                  .BYTE   6,3
1557  006424  001344                          $TMP1
```

```
1558  006426      006     002                    .BYTE   6,2
1559  006430  001346                             $TMP2
1560                                .EVEN
```

```
1561                                                ;THIS ROUTINE ESTABLISHES WHICH MAINTENANCE MODE THE DEVICE IS IN
1562                                                ;-----------------------------------------------------------------
1563                                                ;E=EXTERNAL LOOP BACK
1564                                                ;I=INTERNAL LOOP BACK
1565                                                ;S=STAGGERED LOOP BACK
1566  006432  017605  000000            .SETFLG:   MOV     @(SP),R5        ;PICK UP ADDRESS OF TAG
1567  006436  042737  000040  007512               BIC     #40,INBUF       ;STRIP LOWER CASE
1568  006444  122737  000105  007512               CMPB    #'E,INBUF       ;IS IT EXTERNAL LOOP BACK ?
1569  006452  001005                               BNE     4$              ;NO
1570  006454  013715  006544                       MOV     1$,(R5)         ;YES STORE INFO
1571  006460  105037  001424                       CLRB    MNTFLG          ;SET MAINT BIT =0
1572  006464  000422                               BR      7$              ;GET OUT
1573  006466  122737  000111  007512  4$:          CMPB    #'I,INBUF       ;IS IT INTERNAL LOOP BACK ?
1574  006474  001006                               BNE     5$              ;NO
1575  006476  013715  006546                       MOV     2$,(R5)         ;YES STORE INFO
1576  006502  112737  000010  001424               MOVB    #MAINT,MNTFLG   ;SET UP THE MAINTENANCE FLAG LOADER
1577  006510  000410                               BR      7$              ;GET OUT
1578  006512  122737  000123  007512  5$:          CMPB    #'S,INBUF       ;IS IT STAGGERED LOOP BACK ?
1579  006520  001007                               BNE     6$              ;WHAT ?
1580  006522  013715  006550                       MOV     3$,(R5)         ;YES STORE INFO
1581  006526  105037  001424                       CLRB    MNTFLG          ;ZERO BITS
1582  006532  062716  000002            7$:        ADD     #2,(SP)         ;POP AROUND
1583  006536  000002                               RTI
1584  006540  104404                    6$:        INSTER                  ;RETRY
1585  006542  000733                               BR      .SETFLG         ;DITTO
1586  006544  000200                    1$:        .WORD   200             ;EXTERNAL = E
1587  006546  000000                    2$:        .WORD   0               ;INTERNAL = I
1588  006550  100000                    3$:        .WORD   100000          ;STAGGERED = S
1589
1590                                                ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
1591                                                ;BUFFER TO THE CHARACTERS "E" AND "C".
1592                                                ;IF THE CHARACTER IS "E" CLEAR THE FLAG
1593                                                ;IF THE CHARACTER IS "C" SET THE FLAG
1594
1595  006552  017605  000000            .PAWCH:    MOV     @(SP),R5
1596  006556  142737  000040  007512               BICB    #40,INBUF       ;SET FOR LOWER CASE INPUT
1597  006564  122737  000105  007512               CMPB    #'E,INBUF       ;IS IT "E" ?
1598  006572  001002                               BNE     1$
1599  006574  105015                               CLRB    (R5)            ;000
1600  006576  000406                               BR      2$
1601  006600  122737  000103  007512  1$:          CMPB    #'C,INBUF       ;IS IT "C" ?
1602  006606  001005                               BNE     3$
1603  006610  112715  177777                       MOVB    #-1,(R5)        ;3177
1604  006614  062716  000002            2$:        ADD     #2,(SP)
1605  006620  000002                               RTI
1606  006622  104404                    3$:        INSTER                  ;RETRY
1607  006624  000752                               BR      .PAWCH
```

```
1608                                    ;THIS ROUTINE CONVERTS LINE SPEED (LINESP) AND
1609                                    ;LINE NUMBER (SAVLIN) FOR DZVLPR, DZVTCR AND DZVCSR
1610                                    ;REGISTER USAGE.
1611
1612  006626  013737  001374  007044  SET:    MOV     SAVLIN,NUMLIN   ;SAVE SAVLIN
1613  006634  013700  001374          MOV     SAVLIN,R0       ;COPY THE LINE NUMBER FOR LOOP CONTROL
1614  006640  005037  007046          CLR     NUMTCR          ;SET A DEFAULT OF LINE 0 OR NO LINES
1615  006644  012702  000001          MOV     #1,R2           ;SET A BIT POINTER TO THE FIRST LINE
1616  006650  005300                  XTCR1:  DEC     R0              ;REDUCE THE INDICATOR.IS IT MINUS YET?
1617  006652  100402                  BMI     SET1            ;IF SO, R2 POINTS TO THE RIGHT LINE
1618  006654  006302                  ASL     R2              ;IF NOT, MOVE THE POINTER TO THE NEXT LINE
1619  006656  000774                  BR      XTCR1           ;GO SEE IF THIS LINE IS THE ONE
1620  006660  012701  006722          SET1:   MOV     #TABLE2,R1
1621  006664  010237  007046          MOV     R2,NUMTCR       ;COPY THE CORRECT BIT POINTER
1622  006670  022137  007040          1$:     CMP     (R1)+,LINESP
1623  006674  001407                  BEQ     2$
1624  006676  005721                  TST     (R1)+           ;IS IT THE END OF TABLE?
1625  006700  001373                  BNE     1$              ;NO
1626  006702  104402  007150          TYPE    ,MINVAL         ;INVALID BAUD RATE,BEGIN AGAIN
1627  006706  012705  002350          MOV     #BAUD,R5        ;JUMP TO BAUD THRU R5
1628  006712  000402                  BR      3$
1629  006714  011137  007042          2$:     MOV     (R1),SPEED      ;SET UP BAUD RATE
1630  006720  000205                  3$:     RTS     R5
1631
1632
1633
1634                                    ;THE FOLLOWING IS A TABLE OF LEGAL BAUD RATES (8 BITS/CHAR)
1635  006722  000062          TABLE2: .WORD   50.              ;50 BAUD
1636  006724  010070                  .WORD   10070            ;
1637  006726  000113                  .WORD   75.              ;75 BAUD
1638  006730  010470                  .WORD   10470            ;
1639  006732  000156                  .WORD   110.             ;110 BAUD
1640  006734  011070                  .WORD   11070            ;TWO STOP BITS
1641  006736  000207                  .WORD   135.             ;134.5 BAUD
1642  006740  011470                  .WORD   11470            ;TWO STOP BITS
1643  006742  000226                  .WORD   150.             ;150 BAUD
1644  006744  012070                  .WORD   12070            ;TWO STOP BITS
1645  006746  000454                  .WORD   300.             ;300 BAUD
1646  006750  012430                  .WORD   12430            ;ONE STOP BIT
1647  006752  001130                  .WORD   600.             ;600 BAUD
1648  006754  013030                  .WORD   13030            ;ONE STOP BIT
1649  006756  002260                  .WORD   1200.            ;1200 BAUD
1650  006760  013430                  .WORD   13430            ;ONE STOP BIT
1651  006762  003410                  .WORD   1800.            ;1800 BAUD
1652  006764  014030                  .WORD   14030            ;ONE STOP BIT
1653  006766  003720                  .WORD   2000.            ;2000 BAUD
1654  006770  014430                  .WORD   14430            ;ONE STOP BIT
1655  006772  004540                  .WORD   2400.            ;2400 BAUD
1656  006774  015030                  .WORD   15030            ;ONE STOP BIT
1657  006776  007020                  .WORD   3600.            ;3600 BAUD
1658  007000  015430                  .WORD   15430            ;ONE STOP BIT
1659  007002  011360                  .WORD   4800.            ;4800 BAUD
1660  007004  016030                  .WORD   16030            ;ONE STOP BIT
1661  007006  016040                  .WORD   7200.            ;7200 BAUD
1662  007010  016430                  .WORD   16430            ;ONE STOP BIT
1663  007012  022600                  .WORD   9600.            ;9600 BAUD
```

```
1664  007014  017030                        .WORD   17030           ;
1665  007016  177777  000000                .WORD   -1,0            ;TABLE TERMINATOR
1666
1667
1668  007022  000000                WCHFLG:0                        ;ECHO OR CABLE FLAG
1669  007024  000000                STFLG:  0                       ;PROGRAM START FLAG
1670  007026  000000                LOCKUP: 0                       ;TIMEOUT FLAG
1671  007030  000000                LAST:   0                       ;LAST ERROR PC
1672  007032  000000                TDATA:  0
1673  007034  000000                RDATA:  0
1674  007036  000000                BYTCNT: 0
1675  007040  000156                LINESP: 110.                    ;DEFAULT BAUD RATE
1676  007042  011070                SPEED:  11070                   ;DEFAULT 110 BAUD, 8 BITS/CHAR,
1677                                                                ;FDX, 2 STOP BITS
1678  007044  000000                NUMLIN: 0
1679
1680  007046  000001                NUMTCR: 1                       ;DEFAULT VALUE,TCR BIT 0
1681  007050  000200                PRIO:   200                     ;DEFAULT DEVICE PRIORITY
1682                                                                ;MASK OUT INTERRUPTS
1683  007052  000000                RECDAT: 0
1684  007054  000000                TBUF:   0
1685  007056  053200  041505  047524  MVECTO: .ASCIZ  <200>/VECTOR ADDRESS- /
 (2)  007103  041600  047117  051124  MREGAD: .ASCIZ  <200>/CONTROL REGISTER ADDRESS- /
 (2)  007134  050200  051501  020123  MPASS:  .ASCIZ  <200>/PASS DONE./
 (2)  007150  044400  053116  046101  MINVAL: .ASCIZ  <200>/INVALID BAUD RATE - /
 (2)  007176  046400  047111  035105  MLINE:  .ASCIZ  <200>/LINE: /
 (2)  007206  041200  052501  020104  MSPEED: .ASCIZ  <200>/BAUD RATE - /
 (2)  007224  052200  050131  020105  MCHAR:  .ASCIZ  <200>/TYPE A CHAR. ON DZV11 TERMINAL /
 (2)  007265    2400  044127  041511  MWHICH: .ASCIZ  <200>/WHICH TEST ? ECHO OR CABLE (E OR C) /
 (2)  007333     200  042524  046522  MTERM:  .ASCIZ  <200>/TERMINAL ECHO TEST /
 (2)  007360  041600  041101  042514  MCABLE: .ASCIZ  <200>/CABLE TEST /
 (2)  007375     377  177415  005377  MQUICK: .ASCII  <377><15><377><377><12><377><377>
 (2)  007404  044124  020105  052521          .ASCII  /THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789/
 (2)  007501     377  177415  005377          .ASCII  <377><15><377><377><12><377><377><377><0>
 (2)                                  .EVEN
 (2)
1686                                          ;BUFFERS FOR INPUT-OUTPUT
1687
1688  007512  000000                INBUF:  0
1689          007554                .=.+40
1690  007554  000000                TEMP:   0
1691          007616                .=.+40
1692  007616  000000                MDATA:  0
1693          007660                .=.+40
1694
```

```
1695
1696  007660  013700  002040          ;THIS UTILITY SETS UP CSR'S,SETS UP VECTORS.
1697  007664  062700  000002  DZVLEV: MOV     DZVRIV,R0       ;PLACE THE BASE VECTOR ADDRESS IN R0
1698  007670  010037  002042          ADD     #2,R0           ;CALCULATE THE RECEIVER INTERRUPT STATUS ADDR.
1699  007674  062700  000002          MOV     R0,DZVRIS       ;STORE IT HERE
1700  007700  010037  002044          ADD     #2,R0           ;CALCULATE THE TRANSMITTER INTERRUPT VECTOR
1701  007704  062700  000002          MOV     R0,DZVTIV       ;STORE IT HERE
1702  007710  010037  002046          ADD     #2,R0           ;CALCULATE THE TRANSMITTER VECTOR STATUS ADDRESS
1703                                  MOV     R0,DZVTIS       ;STORE IT HERE
1704
1705                                  ;THIS SEGMENT SETS UP POINTERS FOR THE GIVEN DZV11. $BASE IS THE BASE ADDRESS
1706  007714  013700  001174          ;OF THE DEVICE
1707  007720  010037  002010          MOV     $BASE,R0        ;COPY THE ADDRESS BEING LOADED
1708  007724  005200                  MOV     R0,DZVCSR       ;XXX0
1709  007726  010037  002012          INC     R0
1710  007732  005200                  MOV     R0,HDZVCSR      ;XXX1
1711  007734  010037  002014          INC     R0
1712  007740  010037  002020          MOV     R0,DZVRBUF      ;XXX2
1713  007744  005200                  MOV     R0,DZVLPR       ;XXX2
1714  007746  010037  002016          INC     R0
1715  007752  010037  002022          MOV     R0,HDZVRBUF     ;XXX3
1716  007756  005200                  MOV     R0,HDZVLPR      ;XXX3
1717  007760  010037  002024          INC     R0
1718  007764  005200                  MOV     R0,DZVTCR       ;XXX4
1719  007766  010037  002026          INC     R0
1720  007772  005200                  MOV     R0,HDZVTCR      ;XXX5
1721  007774  010037  002030          INC     R0
1722  010000  010037  002034          MOV     R0,DZVMSR       ;XXX6
1723  010004  005200                  MOV     R0,DZVTDR       ;XXX6
1724  010006  010037  002032          INC     R0
1725  010012  010037  002036          MOV     R0,HDZVMSR      ;XXX7
1726  010016  000207                  MOV     R0,HDZVTDR      ;XXX7
                                      RTS     PC
```

```
1727
1728                                        ;**********  ECHO TEST  **********
1729                                        ;*THIS TEST WILL ACCEPT 1 CHARACTER AT A TIME
1730                                        ;*(IN INTERRUPT MODE) AND TRANSMIT THAT SAME CHARACTER,
1731                                        ;*ONE LINE AT A TIME, ANY LINE 0 THRU 7 (OCTAL)
1732
1733  010020  104413                TST1:   DEVICE.CLR              ;CLEAR DZV11
1734  010022  012737  000001  001246        MOV     #1,$TSTNM
1735  010030  013777  007046  171766        MOV     NUMTCR,@DZVTCR  ;SET TCR BIT
1736  010036  013737  007044  001370        MOV     NUMLIN,PAR      ;SET PARAMETERS
1737  010044  053737  007042  001370        BIS     SPEED,PAR       ;SET BAUD RATE
1738  010052  013777  001370  171740        MOV     PAR,@DZVLPR     ;LOAD PARAM.
1739  010060  012777  000040  171722        MOV     #MSENAB,@DZVCSR ;SET SCANN ENABLE
1740  010066  005004                        CLR     R4
1741  010070  012705  007375          4$:   MOV     #MQUICK,R5      ;SET MESSAGE BUFFER
1742  010074  005777  171710          3$:   TST     @DZVCSR         ;TRDY?
1743  010100  100404                        BMI     2$              ;BR IF YES
1744  010102  104414                        DELAY                   ;WAIT
1745  010104  005304                        DEC     R4              ;
1746  010106  001372                        BNE     3$              ;
1747  010110  104003                        ERROR   3               ;NO TRDY SET! WHY?
1748  010112  005004                2$:     CLR     R4              ;RESET COUNTER TO 0
1749  010114  112577  171714                MOVB    (R5)+,@DZVTDR   ;LOAD CHAR
1750  010120  001365                        BNE     3$              ;
1751  010122  004737  005332                JSR     PC,SERV.G       ;(↑G)?
1752  010126  122777  000377  171150        CMPB    #377,@SWR       ;SWR SET TO 377?
1753  010134  001755                        BEQ     4$              ;IF YES LOOP ON QUICK MESSAGE
1754  010136  012737  002516  001362        MOV     #$EOP,NEXT
1755  010144  012777  010220  171666        MOV     #INTSVC,@DZVRIV ;SET UP INTERRUPT SERVICE
1756  010152  012777  000200  171662        MOV     #MASK,@DZVRIS   ;AND LEVEL
1757  010160  106427  000000                MTPS    #CLEAR          ;ALLOW INTERRUPTS
1758  010164  012777  000140  171616        MOV     #RIE!MSENAB,@DZVCSR ;SET RECEIVER INTERRUPT ENABLE
1759  010172  104402  007224                TYPE    ,MCHAR          ;TYPE "ANY CHARACTER"
1760  010176  105777  171106          1$:   TSTB    @$TKS           ;IF SOMBODY HITS A KEY- GET NEW LINE #
1761  010202  100375                        BPL     1$              ;LOOP HERE
1762  010204  106427  000200                MTPS    #MASK           ;MASK FURTHER INTERRUPTS
1763  010210  004737  005332                JSR     PC,SERV.G       ;MAKE SURE IT WASN'T (↑G)
1764  010214  000137  002366                JMP     LINEX           ;
1765
1766
1767                                        ;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
1768  010220  105777  171564          INTSVC: TSTB    @DZVCSR         ;TEST REC. FLAG
1769  010224  100401                        BMI     .+4
1770  010226  104004                        ERROR   4               ;ERROR - INTERRUPT NOT CAUSED BY FLAG
1771  010230  017737  171560  007052        MOV     @DZVRBUF,RECDAT
1772  010236  100401                        BMI     .+4
1773  010240  104023                        ERROR   23              ;NON- VALID CHARACTER
1774  010242  032737  020000  007052        BIT     #BIT13,RECDAT   ;CHECK FOR FRAMING ERROR
1775  010250  001401                        BEQ     .+4             ;BR IF NO ERROR
1776  010252  104025                        ERROR   25              ;EITHER SOMBODY HIT THE
1777                                                                ;"BREAK KEY" OR YOU HAVE AN ERROR!
1778  010254  113737  007052  007054        MOVB    RECDAT,TBUF     ;MOVE CHARACTER TO OUTPUT AREA
1779  010262  113737  007052  007512        MOVB    RECDAT,INBUF    ;MOVE CHARACTER TO CHECK FOR ↑C
1780  010270  042737  177600  007512        BIC     #↑C<177>,INBUF  ;STRIP JUNK PLUS PARITY
1781  010276  042737  176377  007052        BIC     #176377,RECDAT  ;SAVE ONLY LINE  NUMBER
1782  010304  000337  007052                SWAB    RECDAT
```

```
1783  010310  023737  001374  007052          CMP     SAVLIN,RECDAT   ;DOES THE LINE # COMPARE?
1784  010316  001407                          BEQ     2$
1785  010320  013737  007052  001374          MOV     RECDAT,SAVLIN   ;ADJUST LINE NO. FOR ERROR
1786  010326  104015                          ERROR   15              ;*WRONG LINE NUMBER
1787  010330  013737  007044  001374          MOV     NUMLIN,SAVLIN   ;CORRECT LINE NO. INDICATOR
1788  010336  123727  007512  000003  2$:     CMPB    INBUF,#3                ;IS IT A ^C ?
1789  010344  001004                          BNE     1$              ;NO
1790  010346  104413                          DEVICE.CLR
1791  010350  012716  002516                  MOV     #$EOP,(SP)      ;CRUNCH STACK
1792  010354  000002                          RTI
1793  010356  005777  171426          1$:     TST     @DZVCSR         ;TRDY SET
1794  010362  100375                          BPL     1$              ;IF NOT THEN WAIT
1795  010364  113777  007054  171442          MOVB    TBUF,@DZVTDR    ;TRANSMIT THE CHARACTER
1796  010372  000002                          RTI
1797
1798
1799                                          ;**********   CABLE TEST   **********
1800                                          ;*THIS TEST TRANSMITS A BINARY COUNT PATTERN
1801                                          ;*VIA INTERRUPT MODE TO THE RECEIVER
1802                                          ;*...THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR
1803
1804  010374  106427  000200          TST2:   MTPS    #MASK           ;DISABLE INTERRUPTS
1805  010400  012737  000002  001246          MOV     #2,$TSTNM
1806  010406  012737  002516  001362          MOV     #$EOP,NEXT
1807  010414  104413                          DEVICE.CLR              ;
1808                                          ;*TEST TO VERIFY THAT SETTING DTR FOR A GIVEN LINE
1809                                          ;*WILL BRING UP "CO" AND "RING" FOR THE SAME LINE
1810                                          ;*JUMPERS W1,W2,W3 AND W4 MUST BE INSTALLED ON THE
1811                                          ;*INTERFACE MODULE OTHERWISE AN ERROR REPORT WILL RESULT.
1812  010416  012737  010424  001364          MOV     #1$,LOCK        ;LOOP
1813  010424  113777  007046  171374  1$:     MOVB    NUMTCR,@#DZVTCR ;SET DTR
1814  010432  005005                          CLR     R5              ;
1815  010434  153705  007046                  BISB    NUMTCR,R5       ;BUILD EXPECTED
1816  010440  000305                          SWAB    R5              ;PUT IN HIGH BYTE
1817  010442  153705  007046                  BISB    NUMTCR,R5       ;
1818  010446  104414                          DELAY                   ;WAIT FOR CABLE DELAY
1819  010450  017704  171354                  MOV     @DZVMSR,R4      ;READY MODEM BITS
1820  010454  020504                          CMP     R5,R4           ;ARE THEY OK?
1821  010456  001401                          BEQ     2$              ;BR IF YES
1822  010460  104022                          ERROR   22              ;IS THE TEST CONNECTOR ON?
1823                                                                  ;HAS RIGHT LINE BEEN SELECTED?
1824                                                                  ;IF SO- YOU HAVE A PROBLEM!
1825                                                                  ;MODEM BITS NOT RIGHT
1826  010462  104401                  2$:     SCOP1                   ;LOOP
1827  010464  104413                  3$:     DEVICE.CLR              ;INIT DZV11
1828  010466  005037  001364                  CLR     LOCK            ;CLEAR SCOP1 LOCK ADDRESS
1829  010472  013737  007042  001370          MOV     SPEED,PAR       ;SET LINE SPEED
1830  010500  053737  007044  001370          BIS     NUMLIN,PAR      ;SELECT LINE #
1831  010506  052737  010000  001370          BIS     #RCVON,PAR      ;ENABLE THE RECEIVER FOR THIS LINE
1832  010514  013777  001370  171276          MOV     PAR,@DZVLPR     ;SET THE PARAMETERS AND TURN ON RECEIVER
1833  010522  012777  010644  171310          MOV     #INTREC,@DZVRIV ;SET UP INTR SERVICE
1834  010530  012777  000200  171304          MOV     #MASK,@DZVRIS   ;SET UP LEVEL
1835  010536  012777  011034  171300          MOV     #INTRAN,@DZVTIV ;SET UP INTR SERVICE
1836  010544  012777  000200  171274          MOV     #MASK,@DZVTIS   ;SET UP LEVEL
1837  010552  012777  040140  171230          MOV     #TIE!RIE!MSENAB,@DZVCSR ;SET TRANSMITTER INTERRUPT ENABLE
1838  010560  105037  001425                  CLRB    DONFLG          ;INIT INTERRUPT DONE INDICATOR
```

```
 1839  010564  005001                          CLR     R1              ;RX DATA POINTER- SET TO 0
 1840  010566  005002                          CLR     R2              ;TX DATA POINTER- SET TO 0
 1841  010570  013777  007046  171226          MOV     NUMTCR,@DZVTCR  ;SET UP TCR BIT
 1842  010576  106427  000000                  MTPS    #0              ;ALLOW INTERRUPTS
```

```
 1895  011042  104003                          ERROR   3               ;*FALSE INTERRUPT
 1896  011044  110277  170764                  MOVB    R2,@DZVTDR      ;TRANSMIT A CHARACTER
 1897  011050  105202                          INCB    R2              ;UPDATE TX DATA
 1898  011052  001003                          BNE     1$              ;BIT PATTERN DONE?
 1899  011054  042777  040000  170726          BIC     #TIE,@DZVCSR    ;IF YES THEN CLEAR TIE
 1900  011062  000002                  1$:     RTI                     ;IF NOT THEN RETURN
```

```
 1901                                                ;ERROR TABLE
 1902  011064  000000                  .ERRTAB:      0          ;ERROR 0
 1903  011066  000000                                0
 1904  011070  000000                                0
 1905
 1906  011072  011312                                EM1        ;ERROR
 1907  011074  012642                                DH1
 1908  011076  013042                                DT1
 1909
 1910  011100  011365                                EM2        ;ERROR 2
 1911  011102  012666                                DH2
 1912  011104  013054                                DT2
 1913
 1914  011106  011413                                EM3        ;ERROR 3
 1915  011110  012721                                DH3
 1916  011112  013072                                DT3
 1917
 1918  011114  011452                                EM4        ;ERROR 4
 1919  011116  012721                                DH3
 1920  011120  013072                                DT3
 1921
 1922  011122  011501                                EM5        ;ERROR 5
 1923  011124  012733                                DH4
 1924  011126  013100                                DT4
 1925
 1926  011130  011530                                EM6        ;ERROR 6
 1927  011132  012733                                DH4
 1928  011134  013100                                DT4
 1929
 1930  011136  011567                                EM7        ;ERROR 7
 1931  011140  012721                                DH3
 1932  011142  013072                                DT3
 1933
 1934  011144  011630                                EM8        ;ERROR 10
 1935  011146  012721                                DH3
 1936  011150  013072                                DT3
 1937
 1938  011152  011672                                EM9        ;ERROR 11
 1939  011154  012721                                DH3
 1940  011156  013072                                DT3
 1941
 1942  011160  011730                                EM10       ;ERROR 12
 1943  011162  012721                                DH3
 1944  011164  013072                                DT3
 1945
 1946  011166  011767                                EM13       ;ERROR 13
 1947  011170  012721                                DH3
 1948  011172  013072                                DT3
 1949
 1950  011174  012020                                EM14       ;ERROR 14
 1951  011176  012721                                DH3
 1952  011200  013072                                DT3
 1953
 1954  011202  012052                                EM15       ;ERROR 15
 1955  011204  000000                                0
 1956  011206  000000                                0
```

```
 1957
 1958  011210  012114                          EM16
 1959  011212  012721                          DH3
 1960  011214  013072                          DT3
 1961
 1962  011216  012166                          EM17    ;ERROR 17
 1963  011220  012721                          DH3
 1964  011222  013072                          DT3
 1965
 1966  011224  012224                          EM20
 1967  011226  012721                          DH3
 1968  011230  013072                          DT3
 1969
 1970  011232  012265                          EM21    ;ERROR 21
 1971  011234  012762                          DH5
 1972  011236  013116                          DT5
 1973
 1974  011240  012315                          EM22    ;ERROR 22
 1975  011242  012733                          DH4
 1976  011244  013100                          DT4
 1977
 1978  011246  012357                          EM23    ;ERROR 23
 1979  011250  012721                          DH3
 1980  011252  013072                          DT3
 1981
 1982  011254  012407                          EM24
 1983  011256  012721                          DH3
 1984  011260  013072                          DT3
 1985
 1986  011262  012435                          EM25
 1987  011264  012721                          DH3
 1988  011266  013072                          DT3
 1989
 1990  011270  012465                          EM26
 1991  011272  012721                          DH3
 1992  011274  013072                          DT3
 1993
 1994  011276  012514                          EM27
 1995  011300  012721                          DH3
 1996  011302  013072                          DT3
 1997
 1998  011304  012562                          EM30
 1999  011306  012721                          DH3
 2000  011310  013072                          DT3
```

```
                                        ;ERROR MESSAGES
011312  047200  020117  052502  EM1:    .ASCIZ  <200>/NO BUS REPLY RESPONSE FROM DZV11 REGISTER/
011365    200  042522  044507  EM2:    .ASCIZ  <200>'REGISTER R/W FAILURE'
011413    200  051124  047101  EM3:    .ASCIZ  <200>/TRANSMIT READY (TRDY) NOT SET/
011452  051200  041505  044505  EM4:    .ASCIZ  <200>/RECEIVER DONE NOT SET/
011501    200  040504  040524  EM5:    .ASCIZ  <200>/DATA COMPARISON ERROR/
011530  042200  053132  030461  EM6:    .ASCIZ  <200>/DZV11 #RECEIVER BUFFER# ERROR/
011567    200  051124  047101  EM7:    .ASCIZ  <200>/TRANSMITTER FAILED TO INTERRUPT/
011630  052600  042516  050130  EM8:    .ASCIZ  <200>/UNEXPECTED TRANSMITTER INTERRUPT/
011672  051200  041505  044505  EM9:    .ASCIZ  <200>/RECEIVER FAILED TO INTERRUPT/
011730  052600  042516  050130  EM10:   .ASCIZ  <200>/UNEXPECTED RECEIVER INTERRUPT/
011767    200  044523  047514  EM13:   .ASCIZ  <200>/SILO ALARM SET TOO SOON/
012020  051600  046111  020117  EM14:   .ASCIZ  <200>/SILO ALARM FAILED TO SET/
012052  040600  052103  047511  EM15:   .ASCIZ  <200>/ACTION DETECTED ON INVALID LINE./
012114  051200  040505  044504  EM16:   .ASCIZ  <200>/READING DZVRBUF DID NOT CLEAR SILO ALARM/
012166  042200  052101  020101  EM17:   .ASCIZ  <200>/DATA VALID SHOULD NOT BE SET/
012224  051200  041505  044505  EM20:   .ASCIZ  <200>/RECEIVER DONE SHOULD NOT BE SET/
012265    200  042522  040514  EM21:   .ASCIZ  <200>/RELATIVE TIMING ERROR./
012315    200  047515  042504  EM22:   .ASCIZ  <200>/MODEM SIGNAL ERROR ON CABLE TEST/
012357    200  040504  040524  EM23:   .ASCIZ  <200>/DATA VALID IS NOT SET!/
012407    200  040504  040524  EM24:   .ASCIZ  <200>/DATA OVERRUN IS SET!/
012435    200  051106  046501  EM25:   .ASCIZ  <200>/FRAMING ERROR OCCURRED/
012465    200  040520  044522  EM26:   .ASCIZ  <200>/PARITY ERROR OCCURRED/
012514  051600  046111  020117  EM27:   .ASCIZ  <200>/SILO ALARM FAILED TO CAUSE INTERRUPT/
012562  046200  047111  020105  EM30:   .ASCIZ  <200>/LINE DID NOT RECEIVE FULL BINARY COUNT PATTERN/

012642  052200  040522  020120  DH1:    .ASCIZ  <200>/TRAP PC  DZV11 REG/
012666  042600  050130  041505  DH2:    .ASCIZ  <200>/EXPECTED  FOUND  REGISTER/
012721    200  044514  042516  DH3:    .ASCIZ  <200>/LINE NO./
012733    200  054105  042520  DH4:    .ASCIZ  <200>/EXPECTED  FOUND  LINE/
012762  052200  020130  044514  DH5:    .ASCIZ  <200>/TX LINE PREVIOUS TIME  ACTUAL TIME  PARAMETER/

013042                          .EVEN
                                        ;DATA TABLES FOR ERROR MESSAGES
013042  000002                  DT1:    2
013044     006  003                     .BYTE   6,3
013046  001330                          $REG1
013050     006  001                     .BYTE   6,1
013052  001326                          $REG0

013054  000003                  DT2:    3
013056     006  004                     .BYTE   6,4
013060  001340                          $REG5
013062     006  001                     .BYTE   6,1
013064  001336                          $REG4
013066     006  001                     .BYTE   6,1
013070  001326                          $REG0

013072  000001                  DT3:    1
013074     003  001                     .BYTE   3,1
013076  001374                          SAVLIN

013100  000003                  DT4:    3
013102     006  004                     .BYTE   6,4
013104  001340                          $REG5
013106     006  001                     .BYTE   6,1
```

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2025  013110  001336                          $REG4
2026  013112     003      001                .BYTE   3,1
2027  013114  001374                          SAVLIN
2028
2029  013116  000004                  DTS:    4
2030  013120     003      005                .BYTE   3,5
2031  013122  001374                          SAVLIN
2032  013124     006      011                .BYTE   6,9.
2033  013126  001340                          $REG5
2034  013130     006      007                .BYTE   6,7
2035  013132  001344                          $TMP1
2036  013134     006      001                .BYTE   6,1
2037  013136  001402                          REGIST
2038                                          ;TABLE OF DELAY TIMES FOR INDIVIDUAL BAUD RATES
2039                                          ;---------------------------------------------
2040
2041  013140  002450                  DLYTBL: 2450                    ;TIME FOR   50 BAUD
2042  013142  001560                          1560                    ;TIME FOR   75 BAUD
2043  013144  001120                          1120                    ;TIME FOR  110 BAUD
2044  013146  000750                           750                    ;TIME FOR  134 BAUD
2045  013150  000660                           660                    ;TIME FOR  150 BAUD
2046  013152  000330                           330                    ;TIME FOR  300 BAUD
2047  013154  000150                           150                    ;TIME FOR  600 BAUD
2048  013156  000060                            60                    ;TIME FOR 1200 BAUD
2049  013160  000040                            40                    ;TIME FOR 1800 BAUD
2050  013162  000030                            30                    ;TIME FOR 2000 BAUD
2051  013164  000020                            20                    ;TIME FOR 2400 BAUD
2052  013166  000010                            10                    ;TIME FOR 3600 BAUD
2053  013170  000001                             1                    ;TIME FOR 4800 BAUD
2054  013172  000001                             1                    ;TIME FOR 7200 BAUD
2055  013174  000001                             1                    ;TIME FOR 9600 BAUD
2056  013176  000001                             1                    ;TIME OF DELAY FOR 19200 BAUD
2057
2058                                  ;DELAYS WERE COMPUTED TO ALLOW MAXIMUM TIME AT EACH BAUD RATE
2059                                  ;FOR ALL TESTS TO FUNCTION CORRECTLY ON A LSI11.
2060
2061  013200                  CORMAX:
2062          000001          .END
```

```
ABASE = 160010          1#    368     409
ACOM1 = 000000          368   411
ACOM2 = 000000          368   412
ACPUOP= 000000          368   383
ACTIVE  001420          526#
ADDM0 = 000000          368   413
ADDM1 = 000000          368   414
ADDM10= 000000          368   423
ADDM11= 000000          368   424
ADDM12= 000000          368   425
ADDM13= 000000          368   426
ADDM14= 000000          368   427
ADDM15= 000000          368   428
ADDM2 = 000000          368   415
ADDM3 = 000000          368   416
ADDM4 = 000000          368   417
ADDM5 = 000000          368   418
ADDM6 = 000000          368   419
ADDM7 = 000000          368   420
ADDM8 = 000000          368   421
ADDM9 = 000000          368   422
ADEVCT= 000000          368   374
ADEVM = 000000          368   410
ADRCNT  004221         1171*  1208*  1218#
ADVANC= 104400          678#  1348
AENV  = 000000          368   379
AENVM = 000000          368   380
AFATAL= 000000          368   371
AMSCR1= 000000          368   396
AMSCR2= 000000          368   400
AMSCR3= 000000          368   403
AMSCR4= 000000          368   406
AMSGS1= 000000          368   390
AMSGS2= 000000          368   398
AMSGS3= 000000          368   401
AMSGS4= 000000          368   404
AMSGAD= 000000          368   376
AMSGLG= 000000          368   377
AMSGTY= 000000          368   370
AMTYP1= 000000          368   391
AMTYP2= 000000          368   399
AMTYP3= 000000          368   402
AMTYP4= 000000          368   405
APASS = 000000          368   373
APRIOR= 000000          368
APTCSU= 000040         1022   1127#
APTENV= 000001         1015   1083   1125#   1435
APTSIZ= 000200         1124#
APTSPD= 000100         1017   1085   1126#
ASWREG= 000000          368   381
ATESTN= 000000          368   372
AUNIT = 000000          368   375
AUSWR = 000000          368   382
AVECT = 000300            1#
AVECT1= 000000          368   407
AVECT2= 000000          368   408
```

```
BAUD    002350          826#  1627
BIMBRD  004474         1294#
BIT0  = 000001          167#  239   241   278   289
BIT00 = 000001          157#  167
BIT01 = 000002          156#  166
BIT02 = 000004          155#  165
BIT03 = 000010          154#  164
BIT04 = 000020          153#  163
BIT05 = 000040          152#  162
BIT06 = 000100          151#  161
BIT07 = 000200          150#  160
BIT08 = 000400          149#  159
BIT09 = 001000          148#  158
BIT1  = 000002          166#  240   241   279   290
BIT10 = 002000          147#  263   264   265   266   271   272   273   274   284   295   303
BIT11 = 004000          146#  267   268   269   270   271   272   273   274   285   296   304
BIT12 = 010000          145#  206   222   257  1869
BIT13 = 020000          144#  207   223  1774  1866
BIT14 = 040000          143#  208   224  1863
BIT15 = 100000          142#  209   225
BIT2  = 000004          165#  280   291
BIT3  = 000010          164#  201   244   246   248   250   281   292
BIT4  = 000020          163#  202   245   246   249   250  1345  1360
BIT5  = 000040          162#  203   247   248   249   250   255
BIT6  = 000100          161#  204   252
BIT7  = 000200          160#  193   205   253  1464  1478
BIT8  = 000400          159#  214   216   231   233   260   262   264   266   268   270   272   274
                        282   293   301
BIT9  = 001000          158#  215   216   232   233   261   262   265   266   269   270   273   274
                        283   294   302
BPTVEC= 000014          174#
BRK0  = 000400          301#
BRK1  = 001000          302#
BRK2  = 002000          303#
BRK3  = 004000          304#
BUFSET= 104422          714#
BYTCNT  007036         1674#
CHRCNT  004472         1260#  1273#  1291#
CLEAR = 000000          194#  1757#  1842#
CNVRT = 104412          698#   882    884   887   890  1414  1416  1418  1471
CONVRT= 104411          696#  1432
CORMAX  013200         2061#  2062
CO0   = 000400          293#
CO1   = 001000          294#
CO2   = 002000          295#
CO3   = 004000          296#
CR    = 000015           82#  1061  1071
CRLF  = 000200           83#  1032  1071
DATABP  005166         1403#  1406  1430  1433#
DATAHO  005154         1402#  1426  1429#
DCLASM= 104417          708#
DCLR  = 000020          202#  1314  1315
DDISP = 177570           89#   460
DELAY = 104414          702#  1744  1818
DEVADR  004216         1169#  1205  1216#
DEVICE= 104413          700#   834  1321  1733  1790  1807  1827  1854
```

```
DH1       012642            1907    2002#
DH2       012666            1911    2002#
DH3       012721            1915    1919    1931    1935    1939    1943    1947    1951    1959    1963    1967    1979    1983
                            1987    1991    1995    1999    2002#
DH4       012733            1923    1927    1975    2002#
DH5       012762            1971    2002#
DISPLA    001306             460#    785*   1445*
DISPRE    000174             355#    785
DLYCNT    004570            1327    1332#
DLYTBL    013140            2041#
DONFLG    001425             534#   1838*   1849    1888*
DS-A  =   177570              88#    459
DTR0  =   000400             282#
DTR1  =   001000             283#
DTR2  =   002000             284#
DTR3  =   004000             285#
DT1       013042            1908    2003#
DT2       013054            1912    2009#
DT3       013072            1916    1920    1932    1936    1940    1944    1948    1952    1960    1964    1968    1980    1984
                            1988    1992    1996    2000    2017#
DT4       013100            1924    1928    1976    2021#
DT5       013116            1972    2029#
DVALID=   100000             225#
DZCR0     001500             574#
DZCR1     001512             580#
DZCR10    001620             622#
DZCR11    001632             628#
DZCR12    001644             634#
DZCR13    001656             640#
DZCR14    001670             646#
DZCR15    001702             652#
DZCR16    001714             658#
DZCR17    001726             664#
DZCR2     001524             586#
DZCR3     001536             592#
DZCR4     001550             598#
DZCR5     001562             604#
DZCR6     001574             610#
DZCR7     001606             616#
DZDCT     001406             519#
DZVCSR    002010             722#    913    1314#   1315    1322#   1707#   1739#   1742    1758#   1768    1793    1837#   1857
                            1893    1899#
DZVC0     001502             575#
DZVC1     001514             581#
DZVC10    001622             623#
DZVC11    001634             629#
DZVC12    001646             635#
DZVC13    001660             641#
DZVC14    001672             647#
DZVC15    001704             653#
DZVC16    001716             659#
DZVC17    001730             665#
DZVC2     001526             587#
DZVC3     001540             593#
DZVC4     001552             599#
DZVC5     001564             605#
```

```
DZVC6   001576            611#
DZVC7   001610            617#
DZVLEV  007660            821     1696#
DZVLPR  002020            726#    1357*   1712*   1738*   1832*
DZVMAR  000030            730#    1721*   1819
DZVMM   001414            522#
DZVMU   000014            724#    1711*   1771    1860
DZVRIS  000042            738#    1698*   1756*   1834*
DZVRIV  000040            737#     810     916    1696    1755*   1833*
DZVTCR  000024            728#    1717*   1735*   1841*
DZVTDR  000034            732#    1722*   1749*   1795*   1896*
DZVTIS  000046            740#    1702*   1836*
DZVTIV  002044            739#    1700*   1835*
DZV.EM  001740            670#
DZV.MA  001500            526      572#
EIGHT =  000030           246#
EIGHTS=  000070           250#
EMTVEC=  000030           177#
EM1     011312           1906     2002#
EM10    011730           1942     2002#
EM13    011767           1946     2002#
EM14    012020           1950     2002#
EM15    012052           1954     2002#
EM16    012114           1958     2002#
EM17    012166           1962     2002#
EM2     011365           1910     2002#
EM20    012224           1966     2002#
EM21    012265           1970     2002#
EM22    012315           1974     2002#
EM23    012357           1978     2002#
EM24    012407           1982     2002#
EM25    012435           1986     2002#
EM26    012465           1990     2002#
EM27    012514           1994     2002#
EM3     011413           1914     2002#
EM30    012562           1998     2002#
EM4     011452           1918     2002#
EM5     011501           1922     2002#
EM6     011530           1926     2002#
EM7     011567           1930     2002#
EM8     011630           1934     2002#
EM9     011672           1938     2002#
EPRMSG  005142           1401*    1421    1424#
ERRVEC=  000004           170#
ERTA80  005316           1416     1457#
EVEPAR=  000000           256#
EXITER  000246           1444     1447#
FIVE =  000000            243#
FIVES =  000040           247#
FRMLAR=  000000           223#
HALTS   000172           1386     1435#
HDRFLG  001423            532#
HDZVCS  000012            723#    1709*
HDZVLP  000022            727#    1715*
HDZVMS  000032            731#    1724*
HDZVRB  002016            725#    1714*
```

```
HDZVTC  002026            729#  1719*  1813*
HDZVTD  000036            733#  1725*
HILIM   004214           1168*  1196   1215#
HT    = 000011             80#  1030   1071
INBUF   007512            933   1138   1174   1567*  1568   1573   1578   1596*  1597   1601   1688#  1779*  1780*
                         1788
INIFLG  001422            531#   792    797*
INSTER= 104404            686#   952   1190   1584   1606
INSTR = 104403            684#   805    813    822    826    836
INSTR2  004014           1145   1157#
INTRAN  011034           1835   1893#
INTREC  010644           1833   1856#
INTSVC  010220           1755   1768#
IOTVEC= 000020            175#
LAST    007030            791*  1671#
LF    = 000012             81#  1065   1071
LIMITS  004142           1184   1196#
LINE    001366            511#
LINESP  007040            831   1622   1675#
LINEX   002366            834#  1764   1848
LINE0   001504            576#
LINE1   001516            582#
LINE10  001624            624#
LINE11  001636            630#
LINE12  001650            636#
LINE13  001662            642#
LINE14  001674            648#
LINE15  001706            654#
LINE16  001720            660#
LINE17  001732            666#
LINE2   001530            588#
LINE3   001542            594#
LINE4   001554            600#
LINE5   001566            606#
LINE6   001600            612#
LINE7   001612            618#
L08ITS  004220           1170*  1200   1217#
LOCK    001364            506#   983    985   1338*  1410   1812*  1828*
LOCKUP  007026            848*  1670#  1851*  1856*
LOLIM   004212           1167*  1198   1214#
LPRSET= 104421            712#
LP0   = 000000            238#
LP1   = 000001            239#
LP2   = 000002            240#
LP3   = 000003            241#
MAINT = 000010            201#  1576
MAINT0  001510            578#
MAINT1  001522            584#
MAINT10 001630            626#
MAINT11 001642            632#
MAINT12 001654            638#
MAINT13 001666            644#
MAINT14 001700            650#
MAINT15 001712            656#
MAINT16 001724            662#
MAINT17 001736            668#
```

```
MANT2   001534            590#
MANT3   001546            596#
MANT4   001560            602#
MANT5   001572            608#
MANT6   001604            614#
MANT7   001616            620#
MASK  = 000200            193#   777*   846*   1756   1762*  1804*  1834   1836
MASTEX  006245           1412   1555#
MBADLN  006356           1555#
MCABLE  007360            855   1685#
MCHAR   007224           1685#  1759
MCSRX   006175            881   1417   1555#
MDATA   007616           1271   1281   1692#
MEPASS  006013            880   1555#
MERRPC  006323           1415   1555#
MERRX   006222            889   1555#
MERR2   006053           1555#
MERR3   006122           1555#
MINVAL  007150           1626   1685#
MLINE   007176            837   1685#
MLOCK   006146           1555#
MMEM    006250           1555#
MNTFLG  001424            533#   1322   1571*  1576*  1581*
MODE    001372            513#
MPASS   007134           1685#
MPASSX  006211            886   1555#
MPFAIL  005750           1548   1555#
MQUICK  007375           1685#  1741
MR      006037           1555#
MREGAD  007100            814   1685#
MSENAB= 000040            203#   1739   1758   1837
MSPEED  007206            827   1685#
MTERM   007333            861   1685#
MTITLE  001000            362#   796
MTSTN   006233           1413   1555#
MVECTO  007056            806   1685#
MVECX   006203            883   1555#
MWHICH  007265            823   1685#
NEXT    001362            505#   1337   1453   1754*  1806*
NOLIST= ****** U            1
NUMLIN  007044           1612*  1678#  1736   1787   1830   1885
NUMTCR  007046           1614*  1621*  1680#  1735   1813   1815   1817   1841
ODDPAR= 000200            253#
ONESTO= 000000            254#
OVRRUN= 040000            224#
PAR     001370            512#   1355   1736*  1737*  1738   1829*  1830*  1831*  1832
PARAM = 104405            688#    807    815    838
PARAM1  004062           1173#  1191
PARER = 010000            222#
PARERR  004136           1176   1178   1180   1190#  1197   1199   1201
PARITY= 000100            252#
PARMD = 104415            704#    828
PAR0    001506            577#
PAR1    001520            583#
PAR10   001626            625#
PAR11   001640            631#
```

```
PAR12   001652            637#
PAR13   001664            643#
PAR14   001676            649#
PAR15   001710            655#
PAR16   001722            661#
PAR17   001734            667#
PAR2    001532            589#
PAR3    001544            595#
PAR4    001556            601#
PAR5    001570            607#
PAR6    001602            613#
PAR7    001614            619#
PAWCH = 104416            706#    824
PIRQ  = 177772             87#
PIRQVE= 000240            181#
POPRO = 012600            190#
POP1SP= 005726            188#
POP2SP= 022626            192#   1347
PRIO    007050           1681#
PRO   = 000000            104#
PR1   = 000040            105#
PR2   = 000100            106#
PR3   = 000140            107#
PR4   = 000200            108#
PR5   = 000240            109#
PR6   = 000300            110#
PR7   = 000340            111#
PS    = 177776             84#     85
PSW   = 177776             85#
PUSHRO= 010046            189#
PUSH1S= 005746            187#
PUSH2S= 024646            191#
PWRVEC= 000024            176#   1517*   1518*   1527*   1533*   1545*   1546*
QUITS   010636           1850    1854#
RCVON = 010000            257#   1831
RDATA   007034           1673#
RDONE = 000200            205#
RECOAT  007052           1683#   1771*   1774    1778    1779    1781*   1782*   1783    1785    1860*   1863    1866    1869
                         1873    1879*   1880*   1881    1883
REGIST  001402            517#   2037
RESREG  005170           1431    1434#
RESTAR  002512            863#   1550
RESVEC= 000010            171#
RESOS = 104410            694#   1434
RIE   = 000100            204#   1758    1837
RING0 = 000001            289#
RING1 = 000002            290#
RING2 = 000004            291#
RING3 = 000010            292#
RL0   = 000000            230#
RL1   = 000400            231#
RL2   = 001000            232#
RL3   = 001400            233#
RUN     001412            521#
SAVACT  001410            520#
SAVLIN  001374            514#    841    1612    1613    1783    1785*   1787*   1881    1883*   1885*   2019    2027    2031
```

```
SAVNO   001416            524#
SAVNUM  001415            523#
SAVPC   001404            518#  1223*  1459
SAVOS = 104407            692#  1391
SCOP1 = 104401            680#  1826
SERV.G  005332           1379   1448   1463#  1468   1751   1763   1847
SET     006626            844   1612#
SETFLG= 104406            690#
SET1    006660           1617   1620#
SEVEN = 000020            245#
SEVENS= 000060            249#
SHIFT = 104420            710#
SILOAL= 020000            207#
SILOEN= 010000            206#
SIX   = 000010            244#
SIXS  = 000050            248#
SPACNT  004473           1292#
SPEED   007042           1629*  1676#  1737   1829
SPIN    010602           1845#  1852
STACK = 001120             75#   776    847   1454
STFLG   007024            786*   835*   852    854*   858    860*   1669#
STKLMT= 177774             86#
STOP    001446            545#  1371
SVOS    004230           1227#
SWR     001304            459#   782*   784*   981    988   1380   1385   1443   1449   1451   1469   1474*  1486*
                         1487*  1488*  1495*  1499*  1525  1538*  1752
SWREG   000176            356#   784
S%0   = 000001            139#
S%00  = 000001            129#   139
S%01  = 000002            128#   138
S%02  = 000004            127#   137
S%03  = 000010            126#   136
S%04  = 000020            125#   135
S%05  = 000040            124#   134
S%06  = 000100            123#   133
S%07  = 000200            122#   132
S%08  = 000400            121#   131   1449
S%09  = 001000            120#   130    981
S%1   = 000002            138#
S%10  = 002000            119#  1451
S%11  = 004000            118#
S%12  = 010000            117#   988   1380
S%13  = 020000            116#  1385
S%14  = 040000            115#
S%15  = 100000            114#
S%2   = 000004            137#
S%3   = 000010            136#
S%4   = 000020            135#
S%5   = 000040            134#
S%6   = 000100            133#
S%7   = 000200            132#
S%8   = 000400            131#
S%9   = 001000            130#
S110  = 001000            261#
S1200 = 003400            266#
S134  = 001400            262#
```

```
S150  = 002000            263#
S1800 = 004000            267#
S19200= 007400            274#
S2000 = 004400            268#
S2400 = 005000            269#
S300  = 002400            264#
S3600 = 005400            270#
S4800 = 006000            271#
S50   = 000000            259#
S600  = 003000            265#
S7200 = 006400            272#
S75   = 000400            260#
S9600 = 007000            273#
TABLE2  006722           1620    1635#
TBITVE= 000014            172#
TBUF    007054           1684#   1778*   1795
TCR0  = 000001            278#
TCR1  = 000002            279#
TCR2  = 000004            280#
TCR3  = 000010            281#
TDATA   007032           1672#
TDO     001426            537#   1369
TD1     001430            538#
TD2     001432            539#
TD3     001434            540#
TEIGHT  002106            763#
TEMP    007554           1690#
TFIVE   002114            766#
TIE   = 040000            208#   1837    1899
TKVEC = 000060            179#
TLO   = 000000            213#
TL1   = 000400            214#
TL2   = 001000            215#
TL3   = 001400            216#
TMTBL   002050            747#
TPVEC = 000064            180#
TRAPVE= 000034            178#
TRDY  = 100000            209#
TRTVEC= 000014            173#
TRO     001436            541#
TR1     001440            542#
TR2     001442            543#
TR3     001444            544#
TSEVEN  002110            764#
TSIX    002112            765#
TST1    010020            857    1733#
TST2    010374            851    1804#
TWOSTO= 000040            255#
TYPDAT  005156           1407    1427    1430#
TYPE  = 104402            682#    796     855     861     880     881     883     886     889     1035    1136    1155    1248
                         1281    1408    1409    1412    1413    1415    1417    1419    1423    1428    1470    1472    1500
                         1547    1626    1759
TYPMSG  005046           1405    1408#
T110    002054            750#
T1200   002066            755#
T134    002056            751#
```

```
T150    002060             752#
T1800   002070             756#
T2000   002072             757#
T2400   002074             758#
T300    002062             753#
T3600   002076             759#
T4800   002100             760#
T50     002050             748#
T600    002064             754#
T7200   002102             761#
T75     002052             749#
T9600   002104             762#
VEC1    002254             793     798#
WCHFLG  007022             825     849     1668#
WRDCNT  004470            1256*   1282*   1290#
WTBS.F  005144            1422    1425#
XBEGIN  002416             846#    909
XBX     004734            1381    1383    1385#
XCSR    002660             882     911#    1418
XERR    002702             890     920#
XHEAD   006330            1555#
XMTCNT  001400             516#
XMTLIN  001376             515#
XPASS   002674             887     917#
XSTATQ  006420            1555#
XTCR1   006650            1616#   1619
XTSTN   005324            1414    1460#
XVEC    002666             884     914#
XX    = 160210             573#    579#    585#    591#    597#    603#    609#    615#    621#    627#    633#    639#    645#
                           651#    657#    663#    669#
YY    = 000500             573#    579#    585#    591#    597#    603#    609#    615#    621#    627#    633#    639#    645#
                           651#    657#    663#    669#
ZZ    = 000020             573#    579#    585#    591#    597#    603#    609#    615#    621#    627#    633#    639#    645#
                           651#    657#    663#    669#
$APTHD  001446             555     561#
$ASTAT= ****** U           1105    1120
$ATYC   003454             1076    1078#
$ATY1   003430             1074#
$ATY3   003436             1020    1075#
$ATY4   003446             1077#   1438
$AUTOB  001300              456#
$BASE   001174              409#    818     1706
$BOAOR  001266              451#
$BOOAT  001272              453#
$COM1   001200              411#
$COM2   001202              412#
$CHARC  003424             1037*   1047*   1054    1063*   1068#
$CHTAG  001244              439#
$CM1  = 000006              471#    472#    473#    474#    475#    476#    477#
$CM2  = 000014              471#    472#    473#    474#    475#    476#    477#
$CM3  = 000006              469#    471
$CM4  = 000005              477#    478#    479#    480#    481#    482#
$CPUOP  001146              383#
$CRLF   001357              484#    1036    1071    1248    1408    1409    1419    1500
$DOM0   001204              413#
$DOM1   001206              414#
```

```
$DOW10  001230            423#
$DOW11  001232            424#
$DOW12  001234            425#
$DOW13  001236            426#
$DOW14  001240            427#
$DOW15  001242            428#
$DOW2   001210            415#
$DOW3   001212            416#
$DOW4   001214            417#
$DOW5   001216            418#
$DOW6   001220            419#
$DOW7   001222            420#
$DOW8   001224            421#
$DOW9   001226            422#
$DEVCT  001130            374#
$DEVM   001176            410#
$DOAGN  002654            896     901     907#
$E      = 000002            1#
$ENDAD  000644            349     794     903#    1441
$ENDCT  000630            898#
$ENV    001140            379#    1015    1083    1107    1435
$ENVM   001141            380#     780    1017    1022    1085
$EOP    002516            877#    1754    1791    1806    1855
$EOPCT  002622            895#     899
$ERFLG  001247            442#     789*    879*    1390*   1404    1420*
$ERMAX  001261            448#
$ERROR  004704            339    1379#
$ERRPC  001262            449#     878*    1387    1389*
$ERTB   001362            500#
$ERTTL  001256            446#     788*     922    1447*
$ETABL  001140            378#
$ETEMD  001244            431#     567
$FATAL  001122            371#    1111*
$FFLG   003674           1074#    1077*   1105    1114*   1122#
$FILLC  001322            467#    1040    1071
$FILLS  001321            466#    1071
$FLIP   = 177777            1#
$GOAOR  001264            450#
$GOOAT  001270            452#
$GET42  002634            900#
$HD     = 000001             10      11
$HIBTS  001446            562#
$ICNT   001250            443#
$ILLUP  005742           1517    1533    1552#
$INTAG  001301            457#
$ITEMB  001260            447#    1395*   1437
$LF     001360            485#    1071
$LFLG   003673           1115#    1121#
$LPAOR  001252            444#     779*    851*    857*    863    1453*   1455
$LPERR  001254            445#
$MAOR1  001152            396#
$MAOR2  001156            400#
$MAOR3  001162            403#
$MAOR4  001166            406#
$MAIL   001120            369#     563     567    1015
$MAMS1  001150            390#
```

```
$MOMS2  001154           398#
$MOMS3  001160           401#
$MOMS4  001164           404#
$MBAOR  001450           563#
$MFLG   003672          1075*  1081    1116*   1120#
$MSGAD  001134           376#  1091*   1094
$MSGLG  001136           377#  1096*
$MSGTY  001120           370#  1089    1097*   1109    1113*
$MTYP1  001151           391#
$MTYP2  001155           399#
$MTYP3  001161           402#
$MTYP4  001165           405#
$N    = 000001             1#
$NULL   001320           465#  1042    1071
$PASS   001126           373#   787*    885*    888*    892*    893*    910     919
$PASTM  001454           565#
$PWROD  005736          1550#
$PWRON  005576           337    778     1517#   1545
$PWRMG  005732          1548#
$PWRUP  005650          1527   1533#
$QUES   001356           483#  1071    1155
$_AD    001324           469#
$_B0    001326           471#  1232*   1237    2007    2015
$_G1    001330           472#  1231*   1238    2005
$_G2    001332           473#  1230*   1239
$_G3    001334           474#  1229*   1240
$_G4    001336           475#  1228*   1241    2013    2025
$_G5    001340           476#  1227*   1242    2011    2023    2033
$RTNAD  002656           909#
$SAVR6  005746          1526*  1534    1535*   1536*   1554#
$SETUP= 000000           891
$SVPC = 000040           347#   352
$SWR  = 164000             1#    10     482     483     874     891     902     908     910     1551
$SWREG  001142           381#   782
$TESTN  001124           372#
$TIMES  001354           482#   891*
$TKB    001312           462#  1142    1148    1463    1477
$TKS    001310           461#  1140    1467    1475    1760    1845
$TMP0   001342           477#
$TMP1   001344           478#  1557    2035
$TMP2   001346           479#  1559
$TMP3   001350           480#
$TMP4   001352           481#
$TN   = 000001            10#
$TPB    001316           464#  1060*   1071    1148*   1384*   1484*
$TPFLG  001323           468#  1009    1071
$TPS    001314           463#  1058    1071    1146    1382    1481
$TSTM   001452           564#
$TSTMM  001246           441#   790*   1462    1734*   1805*
$TYPE   003146           989   1009#   1102
$TYPEC  003360          1039   1046    1053    1058#   1059
$TYPEX  003426          1064   1066    1069#
$UNIT   001132           375#
$UNITM  001456           566#
$USWR   001144           382#
$VECT1  001170           407#
```

```
$VECT2  001172          408#
$Y    = 000023          671#    678     680#    682#    684#    686#    688#    690#    692#    694#    696#    698#    700#
                        702#    704#    706#    708#    710#    712#    714#    716#
$SGET4= 000000          902#
.     = 013200          332#    333     336#    347     348#    350#    352#    354#    357#    361#    363#    486     519#
                        520#    522#    524#    525#    551     552#    554#    556#    571#    574#    575#    576#    577#
                        578#    580#    581#    582#    583#    584#    586#    587#    588#    589#    590#    592#    593#
                        594#    595#    596#    598#    599#    600#    601#    602#    604#    605#    606#    607#    608#
                        610#    611#    612#    613#    614#    616#    617#    618#    619#    620#    622#    623#    624#
                        625#    626#    628#    629#    630#    631#    632#    634#    635#    636#    637#    638#    640#
                        641#    642#    643#    644#    646#    647#    648#    649#    650#    652#    653#    654#    655#
                        656#    658#    659#    660#    661#    662#    664#    665#    666#    667#    668#    910     1071
                       1123#   1512#   1529    1553    1689#   1691#   1693#   1769    1772    1775    1858    1861    1864
                       1867    1870    1877    1894    2002#
.ADVAN  004572          679    1337#
.BUFSE  004662          715    1368#
.CNVRT  004320          699    1249#
.CONVR  004314          697    1248#
.DCLAS  004540          709    1321#
.DELAY  004552          703    1325#
.DEVIC  004520          701    1313#
.ERRTA  011064         1400    1902#
.INSTE  004002          687    1153#
.INSTR  003676          685    1132#
.INSTI  003716         1136#   1156
.LPRSE  004622          713    1353#
.MSG    003720         1134*   1137#
.PAPAM  004022          689    1164#
.PARMD  002710          705     925#
.PAUCH  006552          707    1595#   1607
.RESOS  004262          695    1237#
.SAVOS  004222          693    1223#
.SCOPI  003104          681     981#
.SETFL  00 432          691    1566#   1585
.SHIFT  00 4604         711    1344#
.START  002116          358     775#    779
.TRPSR  004476          341    1302#
.TPPTA  001742          677#   1307
.TYPE   003130          683     988#
.$ASTA= ****** U       1075    1078
.$X   = 001446          551#    556
```

```
COMMEN   182#
ENDCOM   182#
ERROR     76#  1747  1770  1773  1776  1786  1822  1853  1859  1862  1865  1868  1871  1878  1884
        1895
ESCAPE   182#
GETPRI   182#
GETSWR   182#
MULT     182#
NEWTST   182#
PASEND     1#   878
POP      182#  1117  1118  1538  1539
PRGEND     1#   865
PRGFRT     1#
PUSH     182#  1078  1080  1101  1519  1525
REPORT     1#   182#
SCOPE     77#
SETPRI   182#
SETUP    182#
SKIP     182#
SLASH    182#
SPACE    182#
STARS    182#   345   364   367   435   548   550   557   872   994  1073  1515  1531
SWRSU    182#
TYPBIN   182#
TYPDEC   182#
TYPNAM   182#
TYPNUM   182#
TYPOCS   182#
TYPOCT   182#
TYPTXT   182#
$BUFFE     1#  1685
$EOP       1#   865
$GETFL     1#
$GETPA     1#
$HEADE     1#    11
$INTSE     1#
$JUNK      1#   573   579   585   591   597   603   609   615   621   627   633   639   645   651
         657   663
$MRESE     1#
$MSG       1#  1555
$SETFL     1#  1561
$STAG      1#
$STAGF     1#
$TRPDE     1#   678   680   682   684   686   688   690   692   694   696   698   700   702   704
         706   708   710   712   714
$TSTN      1#
$VARIA     1#   360
$XZ        1#
$$CMRE   363#   471   472   473   474   475   476
$$CMTM   363#   477   478   479   480   481
$$ESCA   182#
$$NEWT   182#
$$SKIP   182#
.EQUAT     1#    72
.HEADE     1#
.SETUP     1#
```

```
.$ACT1       1#    343
.$APTB       1#    365#
.$APTH       1#    546
.$APTY       1#   1071
.$CATC       1#
.$CMTA     363#
.$EOP        1#    870
.$ERRO       1#
.$POWE       1#   1513
.$TRAP       1#
.$TYPE       1#    992


. ABS.  013200     000


 ERRORS DETECTED:  0

 DVDZCA,DVDZCA.SEQ=DVDZCA.P11
 RUN-TIME: 17 8 1 SECONDS
 RUN-TIME RATIO: 86/27=3.2
 CORE USED:  28K  (55 PAGES)
```