DZV-11

(4) LINE ASYNCHRONOUS MUX

MD-11-DVDZA-A

TESTS, PART 1 OF 2

EP-DVDZA-A-DL-A

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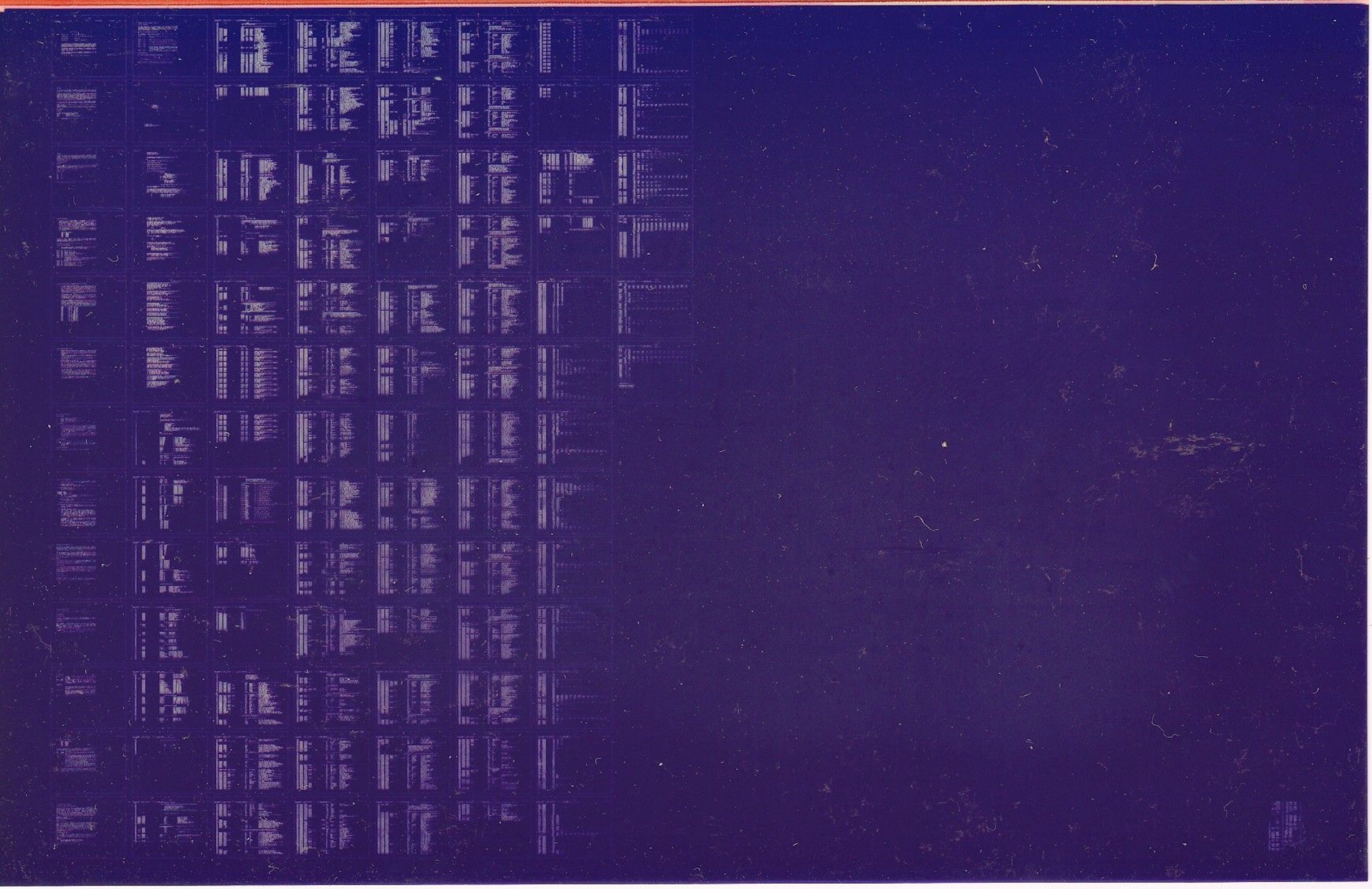

IDENTIFICATION

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

PRODUCT NAME: DZV11 4 LINE ASYNC MUX TESTS PART 1 OF 2

DATE RELEASED: APRIL 1977

MAINTAINER: DIAGNOSTIC ENGINEERING

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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.

Parameters may be supplied to the program by either 'AUTO SIZING' or input from the user on the console by having SW00=1 at start time. Auto sizing will be done only the first time the program is started and SW07=0 and SW00=0 and SW03=0. The AUTOSIZER is designed to detect DZV11 device addresses and vectors only. All remaining parameters will default to certain values (see Sec.8.5). Console input may be controlled at any start time through the use of SW00,SW03, SW04, and SW06 (see Sec. 4.1.1 for a detailed description of these switches).

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)

DZV11	INTERFACE MODULE
H329	Staggered turnaround connector.
H325	Cable turnaround connector.

NOTE: A staggered turnaround connector is needed in order to test the PARITY logic.

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 operator after parameters have been input from console (SW00=1); or after the 'AUTO SIZING' has been done. These locations may be changed if the user understands their meaning and different parameters are required.

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 SWR to zero for 'AUTO SIZING' or set SW00=1 for user parameter input from console terminal. NOTE: loc. 000176 is used as a software Switch Register in all of the DZV11 diagnostics. (see Sec. 4.1) On the first startup of the diagnostic if SW07=1 and SW00=0 the program will assume that the status table has been already built from a previous DZV11 diagnostic run. NOTE: any DZV11 diagnostic will overlay the status table when loaded to preserve its contents and thus will not alter a previously built table.

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) and also the following: (on the first program run or if parameters were changed)

```
'MAP OF DZV11 STATUS'
1500    160100
1502    000300
1504    000017
1506    017470
1510    000000
```

The above is only an example! This would indicate the status table starting at add. 1500 in the program. THE STATUS TABLE MUST BE VERIFIED BY THE USER IF AUTO SIZING IS DONE. For information of status table see section 8.4 for help.

The program will type "Running" and proceed to run the diagnostic.

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:	Loop on current test
SW 13	Set:	Inhibit error print out
SW 12	Set:	Inhibit **ALL** type out/bell on error.
SW 11	Set:	Inhibit iterations. (quick pass)
SW 10	Set:	Escape to next test
SW 09	Set:	Loop with current data
SW 08	Set:	Catch error and loop on it
SW 07	Set:	NO AUTO SIZE. If 1st start of program after loading and if SW00=0 then the program will assume that the status map has been built from a previous DZV11 diagnostic run.
SW 06	Set:	Reselect DZV11's desired active
SW 05	Set:	Reserved
SW 04	Set:	Select delay parameter (see SEC. 4.1.1)
SW 03	Set:	Extra parameter input (see SEC. 4.1.1)
SW 02	Set:	Lock on selected test
SW 01	Set:	Restart program at selected test
SW 00	Set:	Get users parameters from console

4.1.1 SWITCH REGISTER CONTROL OF PARAMETER INPUT FROM CONSOLE

SW 00 GET USERS PARAMETERS FROM CONSOLE. Setting this switch at start up time allows the user to input at the Console terminal the following parameters: base device address, base vector address, mode of operation (EXTERNAL, INTERNAL, OR STAGGERED), and the number of DZV11's that are running. Using this switch alone will default the following parameters: all 4 lines are set to be tested on each DZV11, the default baud rate is set at 19.2 Kbaud and the character length for the majority of testing is set at eight bits per character with two stop bits.

SW 03 EXTRA PARAMETER INPUT. Setting this switch at start up time provides the user with the ability to set the lines active for testing and to set the default baud rate used for the majority of the diagnostic tests. The Delay Parameter is automatically adjusted to the baud rate given by the user.

SW 04 SELECT DELAY PARAMETER. The DELAY parameter this switch controls determines the length of time the program stalls waiting for a character to be completely transmitted or received. This delay count is automatically set to provide enough delay time for the default baud rate specified when running the program on an LSI11 with MOS memory. When running this program on a processor with a faster memory speed this delay count should be adjusted proportionately higher than the following defaulted values:

```
2450          ;time for   50 baud
1560          ;time for   75 baud
1120          ;time for  110 baud
0750          ;time for  134 baud
0660          ;time for  150 baud
0330          ;time for  300 baud
0150          ;time for  600 baud
0060          ;time for 1200 baud
0040          ;time for 1800 baud
0030          ;time for 2000 baud
0020          ;time for 2400 baud
0010          ;time for 3600 baud
0001          ;time for 4800 baud
0001          ;time for 7200 baud
0001          ;time for 9600 baud
0001          ;time for 19.2 kbaud
```

4.1.2 SWITCH REGISTER RESTRICTIONS

SW 06 RESELECT DZV11'S DESIRED ACTIVE. A message is typed out on the console terminal asking the operator to type a bit map of the DZV's desired active. Using this switch allows location DZVACTV to be altered (see Sec. 8.3 for a description of this location).
EXAMPLE:
If the devices corresponding to the DZV11's numbered zero, two, and four in the DZV11 Status Map (Loc. 1500 through 1740) are to be tested, type in: 25
This will set bits zero, two, and four in location DZVACTV. All remaining devices in the status map will then not be tested.

SW 01 RESTART PROGRAM AT SELECTED TEST it is strongly suggested that at least one pass has been made before trying to select a test that is not in the order of sequence the reason being is that the program has to clear areas and set up parameters.
Note: if running multiple DZV11's; the DZV11 you desire to be under test must be selected by the use of SW06 before locking on the test. In other words; each time the program is started; the first DZV11 will be selected to be under test unless SW06 is used to select only one.

SW 09 LOOP ON CURRENT DATA: this switch will only work if call 'SCOP1' is in that test. The reason being that most tests deal with blocks of different data to be sent or received all at once thus in block data, one pattern can't be singled out.
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.

SW 04 SELECT DELAY PARAMETER: THIS SWITCH SHOULD BE USED WITH CARE AS TOO SHORT A DELAY WILL CAUSE VALID TESTS TO FAIL.
(see Sec. 4.1.1)

4.1.3 SWITCH REGISTER PRIORITIES

ERROR SWITCHES

1. SW 12 Delete print out/bell on error.
2. SW 13 Delets error printout.
3. SW 15 Halt on the error.
4. SW 08 Go to beginning of the test(on error).
5. SW 10 Goto next test(on error).

SCOPE SWITCHES

1. SW 09 (if enabled by 'SCOP1'). If an '*' is printed in front of the test no. on an error report (ex. *TEST NO. 10) SW09 is incorporated in that test and therefore SW09 is *usually* the best switch for the scope loop (SW14=0, SW10=0, SW09=1, SW08=0) if the program user is technically trained to electronically isolate signal problems on the DZV11 module.
   If SW09 is not enabeled; and there is a *HARD* error (constant); SW08 is best.
2. For intermittent errors either start the program with SW01 and SW02 set which will allow the user to lock on a selected test, or else set SW14 as an error is being typed out on the terminal. SW14 will continue to loop on that test regardless of whether an error occurs.
3. SW 14 Loop on current test.

4.2 STARTING ADDRESS

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

NOTE: If address 000042 is non-zero the program assumes it is under ACT11 or XXDP control and will act accordingly. After *ALL* available DZV11s are tested the program will return to 'XXDP' or 'ACT-11'.

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 NORMAL START OF DIAGNOSTIC

On the first start of the diagnostic at address 200, if SW00=1 then the following questions are asked and must be answered:

"1ST CSR ADDRESS (160000:163770): "
You must type in the first DZV11 CSR in the system you wish testing to begin at. RANGE: 160000:163770

"1ST VECTOR ADDRESS (300:770): "
You must type in the vector of the first DZV11 in the system under test. RANGE 300:770

"Maintenance Mode
[EXTERNAL <H325> (E)]
[INTERNAL <DZCSR03=1>(I)]
[STAGGERED <H329> (S)] :
Type "E" or "I" or "S" depending on which mode you wish to run in. If running "EXTERNAL"; all selected lines must be terminated by an H325 test connector.

"# OF DZV11'S <IN OCTAL> (1:20): "
Type total number of DZV11's to be tested in the system. RANGE is 1 thru 20 in octal.

********* IF SW03=1 THEN THE FOLLOWING WILL BE PRINTED *********

"LINES ACTIVE BY BIT <IN OCTAL> (001:017):"
Each bit represents a line and any combination of lines may be selected (HOWEVER IN STAGGERED MODE TWO ADJACENT LINES MUST BE SELECTED (0-1, 2-3).

"DEFAULT BAUD RATE <IN OCTAL> (00:17): "
This gives the user a chance to change the default baud rate used in APP. 90% of the test. Baud rate choices are:
"00"(50 baud),"01"(75 baud),"02"(110 baud),"03"(134 baud),
"04"(150 baud),"05"(300 baud),"06"(600 baud),"07"(1200 baud),
"10"(1800 baud),"11"(2000 baud),"12"(2400 baud),"13"(3600 baud),
"14"(4800 baud),"15"(7200 baud),"16"(9600 baud),"17"(19.2 kbaud)
Low default baud rates are not suggested since they lengthen the time to complete a program pass dramatically.

It is important to note that all DZV11's in the system must be CONTIGIOUS for both ADDRESS and VECTORS. Also all the EXTRA PARAMETERS other than CSR and VECTORS are given to the EXISTING DZV11's in the system.
If the mode of operation is different for each DZV11 THIS MUST BE PATCHED INTO THE CORRECT STATUS MAP ENTRY which is printed at start time. An alternative is to put SW00=1 at start time; answer questions about DZV11 under test and INDICATE ONE DZV11 in the system. IF THE STATUS MAP IS TO BE "PATCHED" IT MUST BE DONE AFTER THE QUESTIONS ARE ANSWERED OR AFTER THE AUTO SIZE.

5.2 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 operator to regain control of cpu. If this should happen, look in location 'STSTNM' (address 1246) for the number of the test that was running at the time of the catastrophic error. In this way the operator will have an idea as to what the DZV11 was doing at the time of the error.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

See section 4.1.2
The status table should be verified regardless of how the program was started. Also it is important to use this listing along with the information printed on the TTY to completely isolate problems.

7.2 OPERATING RESTRICTIONS

Parameter must be input from user OR APT if "AUTO SIZING" is not used.

8. MISCELLANEOUS

8.1 EXECUTION TIME

All DZV11 device diagnostics will give an 'END PASS' message (providing no errors and SW12=0) within 2 min. This is assuming SW11=1 (INHIBIT ITERATIONS) is set to give the fastest possible execution.

8.2 PASS COMPLETE

NOTE: *EVERY* time the program is started; the tests will run as if SW11 (delete iterations) was up (=1). This is to 'VERIFY NO *HARD* ERRORS' as soon as possible. Therefore the first pass -EACH TIME PROGRAM IS STARTED- will be a 'QUICK PASS' until all DZV11's in system are tested. When the diagnostic has completed a pass the following is an example of the print out to be expected.

END PASS DVDZA-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

$LPADR (1252)	Contains the address where program will return when iteration count is reached or if loop on test is asserted.
NEXT (1362)	Contains the address of the next test to be peformed.
$TSTNM (1246)	Contains the number of the test now being peformed.
RUN (1412)	The bit in 'RUN' always points one past the DZV11 currently being tested. EXAMPLE: (RUN) 1412/0000000001000000 Means that DZV11 no.5 is the DZV11 now running.
STATUS MAP (1500)-(1740)	These locations contain the information needed to test up to 16 (decimal) DZV11s sequentialy. they contain the CSR,VECTOR and STATUS concerning the configuration of each DZV11.
DZVACTV(1406)	Each bit set in this location indicates that the associated DZV11 will be tested in turn. EXAMPLE: (DZVACTV) 1406/0000000000011111 means that DZV11 no. 00,01,02,03,04 will be tested. EXAMPLE: (DZVACTV) 1406/0000000000010001 Means that DZ11 no. 00,04 will be tested.
$BASE (1174)	Contains the receiver CSR of the current DZV11 under test.

8.4 MORE ON THAT 'STATUS TABLE' (1500-1740)

```
'MAP OF DZV11 STATUS'
1500    160100
1502    000300
1504    000017
1506    017470
1510    000000
```

The above information will be repeated for each of up to 16 DZV11's in the system(these will follow under this table). EXPLANATION:

1500 160100 This is the system control register for the 1st DZV11 in the system.

1502 000300 This is vector 'A' for the first DZV11 in the system.

1504 000017 This is the binary representation of what lines are to be tested.

1506 017470 This is the parameter location used in most of the tests. It indicates parameters of: RX ON, SPEED SELECT 17 (19.2K BAUD) EIGHT BITS PER CHAR, AND TWO STOP BITS. The user may alter the stop bits and the speed, but the remaining parameters should be left alone.
This location is used to load the DZV11 Line Parameter Register for each line. The meaning of the bits set in this location is the same as the function of the related bits in the device Line Parameter Register.

1510 000000 This location will contain either all zeros indicating that internal loop was selected as mode of operation or it will contain 100000 indicating that "staggered mode" was selected or it will contain 000200 indicating that "external" was the mode selected.

The above is repeated for each DZV11 in the system. The table is filled by AUTO SIZING or by the manual parameter input program as described previously. Also if desired by user; the locations may be altered by hand to suit the specific configuration.

8.5 *** METHOD OF AUTO SIZING ***

8.5.1 FINDING THE CONTROL STATUS REGISTER.

The program will start at address 160000 and start 'REFERENCING' the address in the pointer. If a NON-EX MEMORY TRAP occures, the pointer (holding 160000) is updated by 10 and the above is repeated until address 163770 is reached. If a 'BUS REPLY' response was issued by the DZV11 (or any other device) (no nxm trap), "MASTER SCAN ENABLE" is attempted to be set and the TCR bits for all four lines are set. "TRDY" is then tested to be set and "MASTER SCAN ENABLE" is tested to be still set. The diagnostic will then check that at least one TCR bit is still set. If all of the above worked, this device is assumed to be a DZV11. If any of the above failed, updating of the pointer is done and the sequence is repeated.
NOTE: If the program does not find your DZV11, something is wrong and AUTO SIZING should not be done.

8.5.2 FINDING THE VECTOR

The vector area (address 300-776) is filled with the instruction IOT and '.+2' (next address). Bit14 and Bit5 (TX INTERUPT ENABLE AND MSTSCAN ENABLE) are set into the DZVCSR. All TCR bits are set, a delay occurs, and if no interupt occures (because of a bad DZV11) the program assumes vector address 300 and the problem should be fixed in the diagnostic. Once the problem is fixed, the program should be setup again to set the correct vector. If an interupt occurred, the address to which the DZV11 interupted to is picked up and reported as the vector. NOTE: if the vector reported is not the vector set up by you, there is a problem and AUTO SIZING should not be done.

8.5.3 PARAMETER ASSUMPTIONS.

Since too much hardware would need to be turned on to SIZE the rest of the parameters; the program must assume the remaining variations. The result if not to your specific configuration may be altered by hand. In this way 95% of the parameter setup was done by the program and 5% by you.
THEREFORE:
1) ALL FOUR LINES ARE ASSUMED TO BE TESTED.
2) DEFAULT BAUD RATE IS SET TO 17 (19.2 KBAUD).
3) MODE OF OPERATION IS "INTERNAL MODE".

For all parameter adjustments please refer to section 8.4 for greater detail.

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

The diagnostic uses several variables in the region subtitled " APT Mailbox-Etable'. These variables are:

$SWREG -(1142)	used as the software switch register while running under APT.
$VECT1 -(1170)	used to specify the first vector address
$BASE -(1174)	used to indicate bottom address of DZV11 under test
$DEVM -(1176)	a bit map representing which DZV11's will be tested
$CDW1 -(1200)	used to indicate which lines to run on all DZV11's
$CDW2 -(1202)	used to indicate the default test mode. Set to 0 for internal testing, 200 for external loop back (H325 installed), or set to 100000 for staggered loop back testing (H329 installed).
$DDW0 -(1204)	each of the $DDW words describes the parameters (LPR) for a particular DZV11, going up to 16 DZV11's

9.1.3 RUNNING UNDER APT

All of the variables mentioned in section 9.1.2 should be set up prior to running the diagnostic under APT.

NOTE

Be sure $BASE points to the first DZV11 before running

Based on these values, the diagnostic will set up the status table. The user is then free to monitor under APT as normal.

DOCUMENT
****
DVDZAA SEQ
****

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

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

               51       MISCELLANEOUS DEFINITIONS

               63       GENERAL PURPOSE REGISTER DEFINITIONS

               75       PRIORITY LEVEL DEFINITIONS

               85       "SWITCH REGISTER" SWITCH DEFINITIONS

              113       DATA BIT DEFINITIONS (BIT00 TO BIT15)

              141       BASIC "CPU" TRAP VECTOR ADDRESSES

              358                               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

              366                               MEM.TYPE BYTE   --  (HIGH BYTE)
                                                      900 NSEC CORE=001
                                                      300 NSEC BIPOLAR=002
                                                      500 NSEC MOS=003

              371                                 MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABO

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

              462       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:

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

```
1010    INCREMENT THE PASS NUMBER ($PASS)
        IF THERES A MONITOR GO TO IT
        IF THERE ISN'T JUMP TO CYCLE

1072    THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
        AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
        AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
        THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
        SW14=1  LOOP ON TEST
        SW11=1  INHIBIT ITERATIONS
        CALL
                SCOPE           ;;SCOPE=IOT

1147    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

1931    ROUTINE USED TO SET UP THE DIAGNOSTIC VIA APT.
        IF BIT7 IN THE ENVIRONMENT MODE ($ENVM) BYTE IS SET,
        THE PROGRAM WILL LOAD ITS PARAMETERS FROM THE ETABLE.

1964    ROUTINE USED TO "AUTO SIZE" THE DZV11
        CSR AND VECTOR.
        NOTE:   THE CSR MAY BE ANY WHERE IN THE FLOATING
                ADDRESS RANGE (160000:163770)
                AND THE VECTOR MAY BE ANY WHERE IN THE
                FLOATING VECTOR RANGE (300:770)


2072    ********** TEST 1 **********
        THIS TEST PROVES THE BUS REPLY RESPONSE
        DURING A READ OR WRITE TO THE FOLLOWING ADDRESS:
                DZVCSR, DZVRBUF, DZVTCR, DZVMSR

2115    ********** TEST 2 **********
        THIS TEST PROVES THAT BIT "DCLR"
        CAN BE SET AND THAT IT WILL CLEAR
        BY ITSELF
```

```
2134    ********************** TEST 3 ********************************
        TEST TO VERIFY THAT THE R/W BITS OF THE
        DZVCSR REGISTER CAN BE SET. THEN VERIFY THAT
        THESE BITS CAN BE CLEARED. AND FINALLY, VERIFY
        THAT AFTER BEING SET AGAIN THEY CAN BE
        CLEARED BY A "DEVICE CLEAR".
        THE BITS TESTED ARE:  MAINT, MSENAB, SILOEN,
        RIE, AND TIE.

2185    ********************** TEST 4 ********************************
        THIS TESTS THAT ALL OF THE TCR BITS
        CAN BE: SET, CLEARED, AND CLEARED BY A DEVICE CLEAR.
        THIS TEST ALSO DETERMINES IF THE DTR BITS CAN
        BE SET, CLEARED, AND CLEARED BY A RESET.

2243    ********************** TEST 5 ********************************
        THIS TEST VERIFIES THAT
        BITS "RDONE,TRDY, BIT9, BIT8,
        AND SILOAL" ARE READ ONLY AND THAT TRDY IS
        ZERO UNTIL A LINE IS SELECTED AND MSENAB IS SET.


2275    ********************** TEST 6 ********************************
        THIS TEST VERIFIES THAT:
        TIE,SILOEN,RIE,MSENAB,AND MAINT ARE THE
        ONLY R/W BITS IN THE DZVCSR AND THAT
        SETTING "DCLR" IN THE CSR WILL CLEAR THESE BITS.

2315    ********************** TEST 7 ********************************
        THIS TEST PERFORMS RESET TESTING AND
        TESTING OF READ ONLY REGISTER DZVRBUF
        AND TESTING OF WRITE ONLY REGISTER DZVLPR

2339    ********************** TEST 10 *******************************
        THIS TEST PERFORMS RESET TESTING AND
        TESTING OF READ ONLY REGISTER DZVMSR
        AND TESTING OF WRITE ONLY REGISTER DZVTDR

2364    ********************** TEST 11 *******************************
        VERIFY THAT SETTING "DTR" FOR A LINE WILL
        BRING UP "CO" AND "RING" FOR:
        THE SAME LINE IF IN EXTERNAL MODE
        THE STAGGERED LINE IF IN STAGGERED MODE.
        LINES ARE STAGGERED AS FOLLOWS:
        LINE0 WITH LINE1; LINE2 WITH LINE3.
        THIS TEST IS ONLY RUN IF AN H325 OR H329
        IS CONNECTED ON THE DZV UNDER TEST.

2421    ********************** TEST 12 *******************************
         THIS TEST VERIFIES THAT TRDY IS SET WHEN A LINE
         IS READY TO BE LOADED, AND THAT THE LINE SPECI-
         FIED IN BITS 8-9 OF DZVCSR CORRESPOND
         TO THE LINE SELECTED IN DZVTCR
```

```
2458    ********************** TEST 13 ******************************
        TEST TO TRANSMIT ONE CHAR AND
        RECEIVE ONE CHAR ON ONE LINE
        AT A TIME. THE CHAR IS "252" AND
        ALL SELECTED LINES WILL BE TURNED ON .

2463    THIS IS THE FIRST TIME ANY
        DATA IS CHECKED IN THE RECEIVER.
        USING SWITCH NINE WITH THIS TEST CREATES A TIGHT SCOPE LOOP
        WHICH TRANSMITS A STEADY STREAM OF CHARACTERS.

2539    ********************** TEST 14 ******************************
        THIS TEST VERIFIES THAT EACH RECEIVING LINE CAN BE
        DISABLED BY SETTING RCVON (BIT12 IN THE LPR REGISTER)
        TO ZERO FOR EACH LINE.
        THIS TEST ALSO VERIFIES THAT THE SILO CAN BE
        EMPTIED BY ISSUING A DEVICE MASTER CLEAR.

2624    ********************** TEST 15 ******************************
         THIS TEST PROVES THAT THE TRANSMITTER TRANSMITS
        CHARACTERS (FLAG MODE)AND THE RECEIVER RECEIVES (FLAG MODE)
        (ONE LINE AT A TIME   BASED UPON VALID LINES)
        THIS IS THE FIRST TIME THAT ALL DATA IS CHECKED

2698    ********************** TEST 16 ******************************
        THIS TEST WILL PROVE THAT:
         1) THE TRANSMITTER "BREAK BIT" WORKS
         2) THE RECEIVER CAN FLAG "FRAMING ERRORS"
         3) THE RECEIVER CAN FLAG "PARITY ERRORS"
        ONLY ONE LINE AT A TIME WILL BE EXERCISED.

2751    ********************** TEST 17 ******************************
         THIS TEST VERIFIES THAT THE DEVICE DOES NOT INTERRUPT
        WHILE THE PROCESSOR STATUS DOES NOT ALLOW INTERRUPTS
        BUT WILL INTERRUPT IF THE PROCESSOR STATUS
        ALLOWS INTERRUPTS.

2836    ********************** TEST 20 ******************************
        THIS TEST VERIFIES THAT THE RECEIVER WILL
        INTERRUPT BEFORE THE TRANSMITTER EVEN
        THOUGH THE TRANSMITTER WAS ENABLED
        FIRST.  SET PS TO HIGH (MASK INTERRUPTS);
        GET RDONE AND TRDY TO SET;
        SET TX IE AND RX IE;
        CLEAR PS AND EXPECT RX TO INTERRUPT FIRST
```

```
                                .TITLE  MD-11-DVDZA-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
                                        ;LOAD ADDRESS 000200
                                        ;PRESS START
                                        ;PROGRAM WILL TYPE
                                        ;"MAINDEC-11-DVDZAA/<200>/FOUR LINE ASYNC MUX TESTS, PART 1 OF 2"
                                        ;PROGRAM WILL TYPE "RUNNING" TO INDICATE THAT TESTING HAS STARTED
                                        ;AT THE END OF A PASS, PROGRAM WILL TYPE PASS COMPLETE MESSAGE
                                        ;AND THEN RESUME TESTING

                                .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
```

```
                        ODDPAR=BIT7             ;ODD PARITY ENABLED
                        ONESTOP=0               ;ONE STOP BIT ENABLED
                        TWOSTOP=BIT5            ;TWO STOP BITS ENABLED
                        EVEPAR=0                ;EVEN PARITY ENABLED
                        RCVON=BIT12             ;ENABLE RECEIVER (RECEIVER ON)

                        S50=0                   ;SPEED 50 BAUD
                        S75=BIT8                ;SPEED 75 BAUD
                        S110=BIT9               ;SPEED 110 BAUD
                        S134=BIT9!BIT8          ;SPEED 134.5 BAUD
                        S150=BIT10              ;SPEED 150 BAUD
                        S300=BIT10!BIT8         ;SPEED 300 BAUD
                        S600=BIT10!BIT9         ;SPEED 600 BAUD
                        S1200=BIT10!BIT9!BIT8   ;SPEED 1200 BAUD
                        S1800=BIT11             ;SPEED 1800 BAUD
                        S2000=BIT11!BIT8        ;SPEED 2000 BAUD
                        S2400=BIT11!BIT9        ;SPEED 2400 BAUD
                        S3600=BIT11!BIT9!BIT8   ;SPEED 3600 BAUD
                        S4800=BIT11!BIT10       ;SPEED 4800 BAUD
                        S7200=BIT11!BIT10!BIT8  ;SPEED 7200 BAUD
                        S9600=BIT11!BIT10!BIT9  ;SPEED 9600 BAUD
                        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
000010                  TCR3=BIT3               ;ENABLE TRANSMISSION ON LINE 3
000400                  DTR0=BIT8               ;DATA TERMINAL READY FOR LINE 0
001000                  DTR1=BIT9               ;DATA TERMINAL READY FOR LINE 1
002000                  DTR2=BIT10              ;DATA TERMINAL READY FOR LINE 2
004000                  DTR3=BIT11              ;DATA TERMINAL READY FOR LINE 3

                                ;DZVMSR BIT DEFINITIONS
                                ;----------------------

000001                  RING0=BIT0              ;RING INDICATED ON LINE 0
000002                  RING1=BIT1              ;RING INDICATED ON LINE 1
000004                  RING2=BIT2              ;RING INDICATED ON LINE 2
000010                  RING3=BIT3              ;RING INDICATED ON LINE 3
000400                  CO0=BIT8                ;CARRIER PRESENT ON LINE 0
001000                  CO1=BIT9                ;CARRIER PRESENT ON LINE 1
002000                  CO2=BIT10               ;CARRIER PRESENT ON LINE 2
004000                  CO3=BIT11               ;CARRIER PRESENT ON LINE 3

                                ;DZVTDR BIT DEFINITIONS
                                ;----------------------

000400                  BRK0=BIT8               ;BREAK FOR LINE 0
001000                  BRK1=BIT9               ;BREAK FOR LINE 1
002000                  BRK2=BIT10              ;BREAK FOR LINE 2
004000                  BRK3=BIT11              ;BREAK FOR LINE 3
```

```
277
278                                     ;TABLE OF LOOP AROUND FUNCTIONS (H325)
279                                     ;
280                                     ;       ------------------
281                                     ;       I                 ↑
282                                     ;       V                 ↑
283                                     ;       REC               TRANS
284                                     ;       DATA              DATA
285                                     ;
286                                     ;       ------------------
287                                     ;       I                 ↑
288                                     ;       V                 ↑
289                                     ;       CO                RTS
290                                     ;
291                                     ;       ------------------
292                                     ;       I                 ↑
293                                     ;       V                 ↑
294                                     ;       RING              DTR
```

N02


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

            000020                      .=20
000020  004300                                  .SCOPE                  ;SCOPE LOOP HANDLER
000022  000200                                  MASK                    ;HANDLE AT PRIORITY 7
000024  007236                                  $PWRDN                  ;POWER FAIL HANDLER
000026  000340                                  340                     ;SERVICE AT PRIORITY LEVEL 7
000030  006344                                  $ERROR                  ;ERROR HANDLER
000032  000340                                  340                     ;SERVICE AT PRIORITY LEVEL 7
000034  006136                                  .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  004234                                  $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-DVDZAA/<200>/FOUR LINE ASYNC MUX TESTS, PAR
(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" ABO
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  000300                                  $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  000001                                  $DEVM:  .WORD   ADEVM    ;;DEVICE MAP
001200  000017                                  $CDW1:  .WORD   ACDW1    ;;CONTROLLER DESCRIPTION WORD#1
001202  000000                                  $CDW2:  .WORD   ACDW2    ;;CONTROLLER DESCRIPTION WORD#2
001204  017470                                  $DDW0:  .WORD   ADDW0    ;;DEVICE DESCRIPTOR WORD#0
001206  017470                                  $DDW1:  .WORD   ADDW1    ;;DEVICE DESCRIPTOR WORD#1
001210  017470                                  $DDW2:  .WORD   ADDW2    ;;DEVICE DESCRIPTOR WORD#2
001212  017470                                  $DDW3:  .WORD   ADDW3    ;;DEVICE DESCRIPTOR WORD#3
001214  017470                                  $DDW4:  .WORD   ADDW4    ;;DEVICE DESCRIPTOR WORD#4
001216  017470                                  $DDW5:  .WORD   ADDW5    ;;DEVICE DESCRIPTOR WORD#5
```

```
393  001220  017470                    $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
394  001222  017470                    $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
395  001224  017470                    $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
396  001226  017470                    $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
397  001230  017470                    $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
398  001232  017470                    $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
399  001234  017470                    $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
400  001236  017470                    $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
401  001240  017470                    $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
402  001242  017470                    $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
403
404
405  001244                            $ETEND:
406
```

```
                                .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 $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                        ;*NOTE2:       EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

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


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,
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 NO. 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  000120       $TSTM:  .WORD   80.     ;;RUN TIM OF LONGEST TEST
001454  000024       $PASTM: .WORD   20.     ;;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 ADDITION
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
```

```
557  001520  000001                    PAR1:   .BLKW   1       ;PARAMETERS
558  001522  000001                    MANT1:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
559
560  001524  000001                    DZCR2:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 2
561  001526  000001                    DZVC2:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 2
562  001530  000001                    LINE2:  .BLKW   1       ;ALL LINES SELECTED
563  001532  000001                    PAR2:   .BLKW   1       ;PARAMETERS
564  001534  000001                    MANT2:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
565
566  001536  000001                    DZCR3:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 3
567  001540  000001                    DZVC3:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 3
568  001542  000001                    LINE3:  .BLKW   1       ;ALL LINES SELECTED
569  001544  000001                    PAR3:   .BLKW   1       ;PARAMETERS
570  001546  000001                    MANT3:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
571
572  001550  000001                    DZCR4:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 4
573  001552  000001                    DZVC4:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 4
574  001554  000001                    LINE4:  .BLKW   1       ;ALL LINES SELECTED
575  001556  000001                    PAR4:   .BLKW   1       ;PARAMETERS
576  001560  000001                    MANT4:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
577
578  001562  000001                    DZCR5:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 5
579  001564  000001                    DZVC5:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 5
580  001566  000001                    LINE5:  .BLKW   1       ;ALL LINES SELECTED
581  001570  000001                    PAR5:   .BLKW   1       ;PARAMETERS
582  001572  000001                    MANT5:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
583
584  001574  000001                    DZCR6:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 6
585  001576  000001                    DZVC6:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 6
586  001600  000001                    LINE6:  .BLKW   1       ;ALL LINES SELECTED
587  001602  000001                    PAR6:   .BLKW   1       ;PARAMETERS
588  001604  000001                    MANT6:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
589
590  001606  000001                    DZCR7:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 7
591  001610  000001                    DZVC7:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 7
592  001612  000001                    LINE7:  .BLKW   1       ;ALL LINES SELECTED
593  001614  000001                    PAR7:   .BLKW   1       ;PARAMETERS
594  001616  000001                    MANT7:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
595
596  001620  000001                    DZCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 10
597  001622  000001                    DZVC10: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 10
598  001624  000001                    LINE10: .BLKW   1       ;ALL LINES SELECTED
599  001626  000001                    PAR10:  .BLKW   1       ;PARAMETERS
600  001630  000001                    MANT10: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
601
602  001632  000001                    DZCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 11
603  001634  000001                    DZVC11: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 11
604  001636  000001                    LINE11: .BLKW   1       ;ALL LINES SELECTED
605  001640  000001                    PAR11:  .BLKW   1       ;PARAMETERS
606  001642  000001                    MANT11: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
607
608  001644  000001                    DZCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 12
609  001646  000001                    DZVC12: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 12
610  001650  000001                    LINE12: .BLKW   1       ;ALL LINES SELECTED
611  001652  000001                    PAR12:  .BLKW   1       ;PARAMETERS
612  001654  000001                    MANT12: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
```

```
613
614  001656  000001          DZCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 13
615  001660  000001          DZVC13: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 13
616  001662  000001          LINE13: .BLKW   1       ;ALL LINES SELECTED
617  001664  000001          PAR13:  .BLKW   1       ;PARAMETERS
618  001666  000001          MANT13: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
619
620  001670  000001          DZCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 14
621  001672  000001          DZVC14: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 14
622  001674  000001          LINE14: .BLKW   1       ;ALL LINES SELECTED
523  001676  000001          PAR14:  .BLKW   1       ;PARAMETERS
624  001700  000001          MANT14: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
625
626  001702  000001          DZCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 15
627  001704  000001          DZVC15: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 15
628  001706  000001          LINE15: .BLKW   1       ;ALL LINES SELECTED
629  001710  000001          PAR15:  .BLKW   1       ;PARAMETERS
630  001712  000001          MANT15: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
631
632  001714  000001          DZCR16: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 16
633  001716  000001          DZVC16: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 16
634  001720  000001          LINE16: .BLKW   1       ;ALL LINES SELECTED
635  001722  000001          PAR16:  .BLKW   1       ;PARAMETERS
636  001724  000001          MANT16: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
637
638  001726  000001          DZCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZV11 NUMBER 17
639  001730  000001          DZVC17: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZV11 NUMBER 17
640  001732  000001          LINE17: .BLKW   1       ;ALL LINES SELECTED
641  001734  000001          PAR17:  .BLKW   1       ;PARAMETERS
642  001736  000001          MANT17: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
643
644  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( OR SCOPE THIS ONE)
001742  006232                          .ADVANCE
        104401                  SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
001744  004544                          .SCOP1
        104402                  TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
001746  004570                          .TYPE
        104403                  INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
001750  005336                          .INSTR
        104404                  INSTER=TRAP+4           ;CALL TO INPUT ERROR HANDLER
001752  005442                          .INSTER
        104405                  PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
001754  005462                          .PARAM
        104406                  SETFLG=TRAP+6           ;CALL TO  SET FLAG ROUTINE
001756  010074                          .SETFLG
        104407                  SAV05=TRAP+7            ;CALL TO REGISTER SAVE ROUTINE
001760  005662                          .SAV05
        104410                  RES05=TRAP+10           ;CALL TO REGISTER RESTORE ROUTINE
001762  005722                          .RES05
        104411                  CONVRT=TRAP+11          ;CALL TO DATA OUTPUT ROUTINE
001764  005754                          .CONVRT
        104412                  CNVRT=TRAP+12           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
001766  005760                          .CNVRT
        104413                  DEVICE.CLR=TRAP+13              ;CALL TO ISSUE A DEVICE CLEAR
001770  006160                          .DEVICE.CLR
        104414                  DELAY=TRAP+14           ;CALL TO DELAY FOR FAST CPU'S
001772  006212                          .DELAY
        104415                  PARMD=TRAP+15           ;CONVERT DECIMAL STRING TO OCTAL
001774  011142                          .PARMD
        104416                  PAWCH=TRAP+16           ;SET FLAG    ECHO OR  CABLE
001776  010214                          .PAWCH
        104417                  DCLASM=TRAP+17          ;CLEAR DEVICE, SET MAINT. BIT IF I MODE
002000  006200                          .DCLASM
        104420                  SHIFT=TRAP+20           ;CALL TO ROTATE LINE POINTER
002002  006244                          .SHIFT
        104421                  LPRSET=TRAP+21          ;CALL TO SET UP LPR DEVICE REGISTER
002004  006262                          .LPRSET
        104422                  BUFSET=TRAP+22          ;CALL TO ZERO BUFFER AREA
002006  006322                          .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
```

```
717
718                                             ;TIME TABLE FOR RELATIVE TIMING TESTS
719                                             ;----------------------------------
720
721  002050                                     TMTBL:
722  002050  000000                            T50:    0
723  002052  000000                            T75:    0
724  002054  000000                            T110:   0
725  002056  000000                            T134:   0
726  002060  000000                            T150:   0
727  002062  000000                            T300:   0
728  002064  000000                            T600:   0
729  002066  000000                            T1200:  0
730  002070  000000                            T1800:  0
731  002072  000000                            T2000:  0
732  002074  000000                            T2400:  0
733  002076  000000                            T3600:  0
734  002100  000000                            T4800:  0
735  002102  000000                            T7200:  0
736  002104  000000                            T9600:  0
737  002106  000000                            TEIGHT:0
738  002110  000000                            TSEVEN: 0
739  002112  000000                            TSIX:   0
740  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                                  .START:
002116  000005                                 RESET                   ;CLEAR THE WORLD. START NEW ENVIRONMENT
002120  012706  001120                         MOV     #STACK,SP       ;SET UP STACK
002124  106427  000200                         MTPS    #MASK           ;LOCK OUT INTERRUPTS
002130  012737  007236  000024                 MOV     #$PWRDN,@#24    ;SET UP POWER FAIL VECTOR
002136  005037  001126                         CLR     $PASS           ;CLEAR PASS COUNT
002142  105037  001247                         CLRB    $ERFLG          ;CLEAR ERROR FLAG
002146  012737  001500  001420                 MOV     #DZV.MAP,ACTIVE ;GET MAP POINTER.
002154  012737  000001  001412                 MOV     #1,RUN          ;POINT POINTER TO FIRST DEVICE.
002162  005037  001256                         CLR     $ERTTL          ;CLEAR ERROR COUNT
002166  005037  001262                         CLR     $ERRPC          ;CLEAR LAST ERROR POINTER
002172  005037  001246                         CLR     $TSTNM          ;SET UP FOR TEST 1
002176  012737  002116  001252                 MOV     #.START,$LPADR  ;SET UP FOR POWER FAIL BEFORE
                                                                        ;TESTING STARTS
                                                ;SET UP FOR SMALL 11 SWITCH REGISTER COMPATIBILITY
002204  012737  000176  001304                 MOV     #SWREG,SWR      ;POINT TO SOFTWARE SWR
002212  012737  000174  001306                 MOV     #DISPREG,DISPLAY ;POINT TO SOFTWARE DISPLAY REGISTER
002220  105737  001422                         TSTB    INIFLG          ;HAVE WE ALREADY BEEN HERE TODAY?
002224  001010                                 BNE     10$             ;IF SO, SKIP PRINTING THE TITLE
002226  023727  000042  004234                 CMP     @#42,#SENDAD    ;IF RUNNING UNDER ACT
002234  001402                                 BEQ     1$              ;DON'T PRINT TITLE
002236  104402  001000                         TYPE    ,MTITLE         ;PRINT THE DIAGNOSTIC'S TITLE
002242  105337  001422                 1$:     DECB    INIFLG          ;SET THE ONCE ONLY FLAG
002246  105737  001141                 10$:    TSTB    $ENVM           ;DETERMINE WHETHER APT SIZING SHOULD BE DONE
002252  100004                                 BPL     15$             ;IF NOT, GO CHECK FOR AUTO-SIZING
002254  004737  011336                         JSR     PC,SETAPT       ;OTHERWISE, GO DO APT SIZING FROM ETABLE
002260  000137  003540                         JMP     105$            ;GO PRINT DZV STATUS TABLE
002264  032777  000001  177012         15$:    BIT     #SW00,@SWR      ;RESELECT ?
002272  001002                                 BNE     20$             ;IF YES, GO SET UP THE INFORMATION
002274  000137  002576                         JMP     55$             ;IF NO, SKIP THE INTERROGATION
002300  012700  001500                 20$:    MOV     #DZV.MAP,R0     ;POINT TO THE BEGINNING OF THE MAP TABLE
002304  105037  001423                         CLRB    HDRFLG          ;MAKE SURE A MAP GETS PRINTED
002310  005020                         25$:    CLR     (R0)+           ;CLEAR A TABLE LOCATION
002312  020027  001740                         CMP     R0,#DZV.END     ;HAVE THE TABLE BOUNDARIES BEEN EXCEEDED?
002316  001374                                 BNE     25$             ;IF NOT ,CLEAR THE NEXT LOCATION IN THE TABLE
002320  105337  001422                         DECB    INIFLG          ;INSURE NO AUTO SIZING IF QUESTIONS ANSWERED!

                                        ;THE FOLLOWING ARE PARAMETERS USED TO FILL IN THE MAP
                                        ;TABLE AND SET UP THE DIAGNOSTIC.

                                                ;GET THE BASE ADDRESS OF THE DZV11'S

002324  104403                                 INSTR                   ;CALL THE STRING INPUT ROUTINE
002326  003016                                 91$                     ;POINTER TO MESSAGE TO BE PRINTED
002330  104405                                 PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
002332  160000                                 160000                  ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002334  163770                                 163770                  ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002336  001500                                 DZCR0                   ;POINTER TO MAP LOCATION TO BE FILLED
```

```
797  002340  007                                  .BYTE   7               ;MASK OF INVALID BITS FOR THIS PARAMETER
798  002341  001                                  .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
799  002342  013737  001500  001174               MOV     DZCR0,$BASE     ;COPY BASE ADDRESS TO ETABLE
800
801                                               ;GET THE BASE VECTOR ADDRESS
802
803  002350  104403                               INSTR                   ;CALL THE STRING INPUT ROUTINE
804  002352  003062                               92$                     ;POINTER TO MESSAGE TO BE PRINTED
805  002354  104405                               PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
806  002356  000300                               300                     ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
807  002360  000776                               776                     ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
808  002362  001502                               DZVC0                   ;POINTER TO MAP LOCATION TO BE FILLED
809  002364  003                                  .BYTE   3               ;MASK OF INVALID BITS FOR THIS PARAMETER
810  002365  001                                  .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
811  002366  013737  001502  001170               MOV     DZVC0,$VECT1    ;COPY VECTOR TO ETABLE
812                                               ;GET THE MODE OF OPERATION (E,I,S)
813
814  002374  104403                               INSTR                   ;CALL THE STRING INPUT ROUTINE
815  002376  003311                               96$                     ;POINTER TO THE MESSAGE TO BE PRINTED
816  002400  104406                               SETFLG                  ;CALL THE MAINTENANCE FLAG SETUP ROUTINE
817  002402  001510                               MANT0                   ;THIS IS THE FLAG BEING SETUP
818
819                                               ;GET THE NUMBER OF DZV11'S RUNNING
820
821  002404  104403                               INSTR                   ;CALL THE STRING INPUT ROUTINE
822  002406  003246                               95$                     ;POINTER TO MESSAGE TO BE PRINTED
823  002410  104405                               PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
824  002412  000001                               1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
825  002414  000020                               16.                     ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
826  002416  001344                               $TMP1                   ;POINTER TO MAP LOCATION TO BE FILLED
827  002420  000                                  .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
828  002421  001                                  .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
829
830  002422  012737  000017  001504               MOV     #17,LINE0       ;SET UP DEFAULT LINES
831  002430  012737  017470  001506               MOV     #17470,PAR0     ;SET UP DEFAULT LPR PARAMETER
832                                               ;RECEIVER ON; 19.2 KBAUD; 2STOP BITS; 8 BIT/CHAR
833  002436  032777  000010  176640               BIT     #SW03,@SWR      ;DO YOU WANT PARAMETERS?
834  002444  001402                               BEQ     30$             ;IF NO, SKIP THE PARAMETER CALL
835  002446  004737  002626                       JSR     PC,65$          ;GET PARAMETERS
836  002452  012737  000001  001410   30$:        MOV     #1,SAVACTV      ;INITIALIZE ACTIVE DEVICE SELECTION PARAMETER
837  002460  113737  001344  001414               MOVB    $TMP1,DZVNUM    ;COPY THE NUMBER OF DEVICES
838  002466  005337  001344           35$:        DEC     $TMP1           ;$TMP1 CONTAINS THE COUNT OF UNINITIALIZED
839  002472  001404                               BEQ     40$             ;  SELECTED DEVICES
840  002474  000261                               SEC                     ;SET A BIT FLAG TO INDICATE AN ACTIVE DEVICE
841  002476  006137  001410                       ROL     SAVACTV         ;POINT TO THE NEXT DEVICE
842  002502  000771                               BR      35$             ;GO DO THIS PROCEDURE AGAIN
843  002504  013737  001410  001346   40$:        MOV     SAVACTV,$TMP2   ;# OF TIMES
844  002512  012700  001500                       MOV     #DZCR0,R0       ;SET A POINTER TO THE SPECIFIED INFORMATION
845  002516  012701  001512                       MOV     #DZCR1,R1       ;POINT R1 TO THE REST OF THE MAP TABLE
846  002522  012702  001204                       MOV     #$DDW0,R2       ;POINT TO ETABLE'S DEVICE DESCRIPTOR WORDS
847  002526  000241                               CLC                     ;INITIALIZE THE "C" BIT FOR A ROTATION
848  002530  006037  001346                       ROR     $TMP2           ;SKIP MAPPING SETUP FOR DEVICE 0- IT'S DONE
849  002534  006237  001346           45$:        ASR     $TMP2           ;ISOLATE A SELECTION FLAG IN THE "C" BIT
850  002540  103404                               BCS     50$             ;IS THIS DEVICE SELECTED? IF YES, GO LOAD TABLE
851  002542  012711  177777                       MOV     #-1,(R1)        ;TERMINATE THE LIST
852  002546  000137  003514                       JMP     100$            ;GO TO THE NEXT BLOCK
```

```
853  002552  012011                        50$:  MOV   (R0)+,(R1)      ;ADDRESS
854  002554  062721  000010                      ADD   #10,(R1)+       ;POINT TO THE NEXT DZV11 ADDRESS VALUE
855  002560  012011                             MOV   (R0)+,(R1)      ;VECTOR
856  002562  062721  000010                     ADD   #10,(R1)+       ;POINT TO THE NEXT VECTOR VALUE
857  002566  012021                             MOV   (R0)+,(R1)+     ;LINES
858  002570  012021                             MOV   (R0)+,(R1)+     ;PARAMETERS
859  002572  012021                             MOV   (R0)+,(R1)+     ;MAINTENANCE MODE
860  002574  000757                             BR    45$
861  002576  032777  000010  176500        55$:  BIT   #SW03,@SWR      ;ASK PARAMETERS ?
862  002604  001002                             BNE   60$             ;IF NO, GO DO AUTO SIZING
863  002606  000137  003514                     JMP   100$            ;GO SET UP FOR AUTO SIZING
864  002612  004737  002626                60$:  JSR   PC,65$          ;GO ASK PARAMETERS
865  002616  105337  001422                     DECB  INIFLG          ;INSURE NO AUTO SIZE IF QUESTIONS ANSWERED
866  002622  000137  003540                     JMP   105$            ;GO TO THE NEXT BLOCK
867
868                                             ;GET THE ACTIVE LINES PARAMETER
869
870  002626                                65$:
871  002626  104403                             INSTR                 ;CALL THE STRING INPUT ROUTINE
872  002630  003123                             93$                   ;POINTER TO MESSAGE TO BE PRINTED
873  002632  104405                             PARAM                 ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
874  002634  000001                             1                     ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
875  002636  000017                             17                    ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
876  002640  001504                             LINE0                 ;POINTER TO MAP LOCATION TO BE FILLED
877  002642     360                             .BYTE 360             ;MASK OF INVALID BITS FOR THIS PARAMETER
878  002643     001                             .BYTE 1               ;NUMBER OF PARAMETERS TO STORE
879  002644  105037  001423                     CLRB  HDRFLG          ;MAKE SURE THE CHANGES ARE PRINTED
880
881                                             ;THIS SEGMENT CHECKS TO MAKE SURE THE LINE PARAMETER JUST ENTERED
882                                             ;IS LEGITIMATE IN STAGGERED MODE OPERATION IF THAT MODE WAS SELECTED
883
884  002650  005737  001510                     TST   MANTO           ;IS STAGGERED THE MODE OF OPERATION?
885  002654  100021                             BPL   85$             ;IF NOT, SKIP THIS SEGMENT
886  002656  013703  001504                     MOV   LINE0,R3        ;GET A SCRATCH COPY OF THE ACTIVE LINES
887  002662  006003                        70$:  ROR   R3              ;GET A LINE SELECTION BIT(EVEN NUMBER LINE)
888  002664  103410                             BCS   80$             ;IF IT IS SELECTED, CHECK TO SEE IF THE NEXT IS
889  002666  001414                             BEQ   85$             ;IF ALL HAVE BEEN CHECKED, CONTINUE PROCESSING
890  002670  006203                             ASR   R3              ;IF IT IS 0,CHECK TO SEE IF THE NEXT IS TOO
891  002672  103373                             BCC   70$             ;IF THIS ONE'S 0 TOO, GO CHECK THE NEXT PAIR
892  002674  104402  001356                75$:  TYPE  ,$QUES          ;THIS IS AN INCORRECT PARAMETER
893  002700  104402  010020                     TYPE  ,MBADLN         ;LET THE USER KNOW ABOUT IT
894  002704  000750                             BR    65$             ;GO GET THE CORRECT PARAMETER
895  002706  001772                        80$:  BEQ   75$             ;IF ANOTHER FLAG ISN'T SET, THERE'S AN ERROR
896  002710  006203                             ASR   R3              ;GET THE NEXT FLAG
897  002712  103370                             BCC   75$             ;IF IT ISN'T SET, THERE'S AN ERROR
898  002714  000241                             CLC                   ;INITIALIZE THE "C" BIT FOR TESTING OF THE NEXT
899  002716  000761                             BR    70$             ;GO TEST THE NEXT PAIR OF FLAGS
900
901                                             ;GET THE LINE PARAMETER REGISTER ARGUMENT
902
903  002720                                85$:
904  002720  104403                             INSTR                 ;CALL THE STRING INPUT ROUTINE
905  002722  003176                             94$                   ;POINTER TO MESSAGE TO BE PRINTED
906  002724  104405                             PARAM                 ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
907  002726  000000                             0                     ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
908  002730  000017                             17                    ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
```

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 909  002732  001506                                PAR0                    ;POINTER TO MAP LOCATION TO BE FILLED
 910  002734      000                                .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
 911  002735      001                                .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
 912  002736  012702  001504                        MOV     #LINE0,R2       ;POINT TO THE LINE SELECTION PARAMETER
 913  002742  012703  001506                        MOV     #PAR0,R3        ;POINT TO THE CHOSEN PARAMETERS
 914  002746  011304                                MOV     (R3),R4         ;USE BAUD RATE AS AN INDEX IN DELAY TABLE
 915  002750  006304                                ASL     R4              ;ALIGN INDEX ON WORD BOUNDARY
 916  002752  016437  017360  006230                MOV     DLYTBL(R4),DLYCNT ;SET THE DELAY COUNT FOR THIS BAUD RATE
 917  002760  000313                                SWAB    (R3)            ;PLACE IN HIGH BYTE
 918  002762  052713  010070                        BIS     #10070,(R3)     ;PLACE EXTRA PARAMETERS INTO LOC
 919  002766  011262  000012              90$:      MOV     (R2),12(R2)     ;LOAD THE LINES
 920  002772  011363  000012                        MOV     (R3),12(R3)     ;LOAD THE PARAMETERS
 921  002776  062702  000012                        ADD     #12,R2          ;POINT TO THE NEXT SET
 922  003002  062703  000012                        ADD     #12,R3          ;.. OF BOTH PARAMETERS
 923  003006  020327  001734                        CMP     R3,#PAR17       ;HAVE THE TABLE BOUNDARIES BEEN EXCEEDED?
 924  003012  001365                                BNE     90$             ;IF NOT, GO LOAD SOME MORE PARAMETERS
 925  003014  000207                                RTS     PC              ;RETURN TO CALLING BLOCK
 926  003016  030600  052123  041440        91$:    .ASCIZ  <200>/1ST CSR ADDRESS (160000:163770):  /
(1)   003062  030600  052123  053040        92$:    .ASCIZ  <200>/1ST VECTOR ADDRESS (300:770):  /
(1)   003123      200  044514  042516        93$:    .ASCIZ  <200>/LINES ACTIVE BY BIT <IN OCTAL>(001:17):  /
(1)   003176  042200  043105  052501        94$:    .ASCIZ  <200>/DEFAULT BAUD RATE <IN OCTAL>(00:17):  /
(1)   003246  021600  047440  020106        95$:    .ASCIZ  <200>/# OF DZV11'S <IN OCTAL> (1:20):  /
(1)   003311      200  040515  047111        96$:    .ASCII  <200>/MAINTENANCE MODE/
(1)   003332  020200  042533  052130                .ASCII  <200>/ [EXTERNAL  <H325>      (E)]/
(1)   003366  020200  044533  052116                .ASCII  <200>/ [INTERNAL  <DZVCSR03=1>(I)]/
(1)   003423      200  055440  052123                .ASCIZ  <200>/ [STAGGERED <H329>      (S)]: /
(1)   003462  042600  052116  051105        97$:    .ASCIZ  <200>/ENTER DELAY PARAMETER: /
(1)           003514                                .EVEN
(1)   003514                                100$:
 927  003514  122737  000377  001422                CMPB    #377,INIFLG     ;ONLY DO AUTO SIZE ON 1ST START
 928  003522  001006                                BNE     105$            ;
 929  003524  032777  000200  175552                BIT     #BIT7,@SWR      ;BIT7=1??
 930  003532  001002                                BNE     105$            ;BR IF NO AUTO SIZE
 931  003534  004737  011464                        JSR     PC,AUTO.SIZE    ;GO DO THE AUTO SIZE
 932  003540  105737  001423              105$:     TSTB    HDRFLG          ;HAS THE TABLE BEEN TYPED YET?
 933  003544  001021                                BNE     120$            ;IF SO, DON'T TYPE IT AGAIN
 934  003546  105337  001423                        DECB    HDRFLG          ;INDICATE THAT THE TABLE WILL BE TYPED
 935  003552  104402  007772                        TYPE    ,XHEAD          ;TYPE MAP HEADER
 936  003556  012700  001500                        MOV     #DZV.MAP,R0     ;SET POINTER
 937  003562  010037  001344              110$:     MOV     R0,$TMP1        ;POINT TO THE MAP LOCATION
 938  003566  012037  001346                        MOV     (R0)+,$TMP2     ;SET DATA
 939  003572  022737  177777  001346                CMP     #-1,$TMP2       ;END OF LIST?
 940  003600  001403                                BEQ     120$            ;BR IF YES
 941  003602  104411              115$:     CONVRT                          ;CALL THE OCTAL TO ASCII CONVERSION ROUTINE
 942  003604  010062                                XSTATQ                  ;CONVERT THE DATA AT THIS ADDRESS
 943  003606  000765                                BR      110$            ;GO PRINT THE NEXT PARAMETER
 944  003610  013737  001410  001406        120$:   MOV     SAVACTV,DZVACTV ;COPY BIT MAP OF SYSTEM DEVICES ACTIVE
 945  003616  113737  001414  001416                MOVB    DZVNUM,SAVNO    ;COPY NO. OF SYSTEM DEVICES ACTIVE
 946  003624  032777  000100  175452                BIT     #SW06,@SWR      ;DESELECT SPECIFIC DEVICES??
 947  003632  001431                                BEQ     135$            ;BR IF NO.
 948  003634                              121$:
 949  003634  104403                                INSTR                   ;CALL THE STRING INPUT ROUTINE
 950  003636  007710                                MNEW                    ;POINTER TO MESSAGE TO BE PRINTED
 951  003640  104405                                PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
 952  003642  000001                                1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 953  003644  177777                                177777                  ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
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```
 954  003646  001406                          DZVACTV                 ;POINTER TO MAP LOCATION TO BE FILLED
 955  003650     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
 956  003651     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
 957  003652  023737  001406  001410          CMP     DZVACTV,SAVACTV ;IS THE VALUE VALID?
 958  003660  101403                          BLOS    122$            ;BRANCH IF YES
 959  003662  104402  007562                  TYPE    ,MERR3          ;IF NOT THEN TYPE ERROR
 960  003666  000762                          BR      121$            ;GO REASK QUESTION
 961  003670  105037  001416          122$:   CLRB    SAVNO           ;CLEAR NO. OF DEVICES BEING TESTED
 962  003674  013737  001406  001344          MOV     DZVACTV,$TMP1   ;COPY BIT MAP OF ACTIVE DEVICES BEING TESTED
 963  003702  006237  001344          126$:   ASR     $TMP1           ;SHIFT OUT AN ACTIVE BIT
 964  003706  103002                          BCC     127$            ;IF NOT ACTIVE SKIP INCREMENT
 965  003710  105237  001416                  INCB    SAVNO           ;IF ACTIVE RECORD IT
 966  003714  001372                  127$:   BNE     126$            ;IF ALL ACTIVE BITS RECORDED DON'T BRANCH
 967  003716  032777  000020  175360  135$:   BIT     #SW04,@SWR      ;CHECK TO SEE IF DELAY COUNT CHANGES
 968  003724  001407                          BEQ     140$            ;IF NOT, GO CLEAR VECTOR AREA
 969  003726  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
 970  003730  003462                          97$                     ;POINTER TO MESSAGE TO BE PRINTED
 971  003732  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
 972  003734  000001                          1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 973  003736  177777                          177777                  ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 974  003740  006230                          DLYCNT                  ;POINTER TO MAP LOCATION TO BE FILLED
 975  003742     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
 976  003743     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
 977  003744  012700  000300          140$:   MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
 978  003750  012701  000302                  MOV     #302,R1         ;VECTOR AREA. 300-776
 979  003754  010120          145$:   MOV     R1,(R0)+        ;START PUTTING "PC+2 - HALT"
 980  003756  005021                          CLR     (R1)+           ;IN VECTOR AREA.
 981  003760  022021                          CMP     (R0)+,(R1)+     ;POP POINTERS
 982  003762  022700  001000                  CMP     #1000,R0        ;ALL DONE??
 983  003766  001372                          BNE     145$            ;BR IF NO.
 984
 985                                  ;TEST START AND RESTART
 986                                  ;----------------------
 987
 988  003770  012706  001120          .BEGIN: MOV     #STACK,SP       ;SET UP STACK
 989  003774  106427  000200                  MTPS    #MASK           ;LOCK OUT INTERRUPTS
 990  004000  005737  000042                  TST     @#42            ;IS PROGRAM UNDER MONITOR CONTROL
 991  004004  001015                          BNE     2$              ;BR IF YES
 992  004006  032777  000004  175270          BIT     #BIT2,@SWR      ;CHECK FOR LOCK ON TEST
 993  004014  001406                          BEQ     1$              ;BR IF NO LOCK DESIRED.
 994  004016  104402  007606                  TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
 995  004022  012737  000240  004312          MOV     #NOP,TTST       ;ADJUST SCOPE ROUTINE.
 996  004030  000403                          BR      2$              ;CONTINUE ALONG.
 997  004032  013737  004540  004312  1$:     MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
 998  004040  012737  010436  001252  2$:     MOV     #CYCLE,$LPADR   ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
 999  004046  113737  001416  001415          MOVB    SAVNO,SAVNUM    ;COPY ACTIVE DEVICES BEING TESTED
1000  004054  104402  007477                  TYPE    ,MR             ;TYPE "RUNNING"
1001  004060  000177  175166                  JMP     @$LPADR         ;START TESTING
```

```
1002                                                    ;END OF PASS
1003                                                    ;TYPE NAME OF TEST
1004                                                    ;UPDATE PASS COUNT
1005                                                    ;CHECK FOR EXIT TO ACT-11
1006                                                    ;RESTART TEST
1007                                            .SBTTL  END OF PASS ROUTINE
1008
1009                                            ;;**************************************************************************
1010                                            ;*INCREMENT THE PASS NUMBER ($PASS)
1011                                            ;*IF THERES A MONITOR GO TO IT
1012                                            ;*IF THERE ISN'T JUMP TO CYCLE
1013
1014  004064                                    $EOP:
1015  004064  000004                                   SCOPE
1016  004066  005037  001262                           CLR     $ERRPC          ;CLEAR LAST ERROR PC
1017  004072  105037  001247                           CLRB    $ERFLG          ;CLEAR ERROR FLAG
1018  004076  104402  007453                           TYPE    ,MEPASS         ;TYPE END PASS
1019  004102  104402  007635                           TYPE    ,MCSRX          ;TYPE CSR
1020  004106  104412  004250                           CNVRT   ,XCSR           ;SHOW IT
1021  004112  104402  007643                           TYPE    ,MVECX          ;TYPE VECTOR
1022  004116  104412  004256                           CNVRT   ,XVEC           ;SHOW IT
1023  004122  005237  001126                           INC     $PASS           ;RAISE PASS COUNT
1024  004126  104402  007651                           TYPE    ,MPASSX         ;TYPE PASSES
1025  004132  104412  004264                           CNVRT   ,XPASS          ;SHOW IT
1026  004136  005337  001126                           DEC     $PASS           ;RESTORE PASS COUNT
1027  004142  104402  007662                           TYPE    ,MERRX          ;TYPE ERRORS
1028  004146  104412  004272                           CNVRT   ,XERR           ;SHOW IT
1029  004152  005237  001130                           INC     $DEVCT          ;INC DEVCNT FOR APT
1030  004156  105337  001415                           DECB    SAVNUM          ;ARE ALL DEVICES TESTED?
1031  004162  001030                                   BNE     $DOAGN          ;BR IF NO.
1032  004164  113737  001416  001415                   MOVB    SAVNO,SAVNUM    ;RESTORE THE COUNT
1033  004172  005037  001354                           CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
1034  004176  005237  001126                           INC     $PASS           ;;INCREMENT THE PASS NUMBER
1035  004202  042737  100000  001126                   BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
1036  004210  005327                                   DEC     (PC)+           ;;LOOP?
1037  004212  000001                            $EOPCT: .WORD   1
1038  004214  003013                                   BGT     $DOAGN          ;;YES
1039  004216  012737                                   MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
1040  004220  000001                            $ENDCT: .WORD   1
1041  004222  004212                                   $EOPCT
1042  004224  013700  000042                   $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
1043  004230  001405                                   BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
1044  004232  000005                                   RESET                   ;;CLEAR THE WORLD
1045  004234  004710                            $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
1046  004236  000240                                   NOP                     ;;SAVE ROOM
1047  004240  000240                                   NOP                     ;;FOR
1048  004242  000240                                   NOP                     ;;ACT11
1049  004244                                    $DOAGN:
1050  004244  000137                                   JMP     @(PC)+          ;;RETURN
1051  004246  010436                            $RTNAD: .WORD   CYCLE
1052
1053  004250  000001                            XCSR:   1
1054  004252     006     002                            .BYTE   6,2
1055  004254  002010                                   DZVCSR
1056  004256  000001                            XVEC:   1
1057  004260     003     002                            .BYTE   3,2
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1058  004262  002040                          DZVRIV
1059  004264  000001                  XPASS:  1
1060  004266     006     002                  .BYTE   6,2
1061  004270  001126                          $PASS
1062  004272  000001                  XERR:   1
1063  004274     006     002                  .BYTE   6,2
1064  004276  001256                          $ERTTL
1065
1066                                          ;SCOPE LOOP AND ITERATION HANDLER
1067                                          ;------------------------------
1068
1069                                  .SBTTL  SCOPE HANDLER ROUTINE
1070
1071                                  ;;*********************************************************************
1072                                  ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
1073                                  ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
1074                                  ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
1075                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
1076                                  ;*SW14=1         LOOP ON TEST
1077                                  ;*SW11=1         INHIBIT ITERATIONS
1078                                  ;*CALL
1079                                  ;*      SCOPE           ;;SCOPE=IOT
1080
1081  004300                          $SCOPE:
1082  004300  005037  001262          .SCOPE: CLR     $ERRPC          ;CLEAR LAST ERROR PC.
1083  004304  022716  012172                  CMP     #TST1+2,(SP)    ;IS THIS THE SCOPE AT THE BEGINNING OF TST1?
1084  004310  001413                          BEQ     $XTSTR          ;IF SO, DON'T LOOP ON IT
1085  004312  000406                  TTST:   BR      1$              ;GOTO 1$    (IF LOCK SW02=1; THIS LOC =240)
1086  004314  105777  174770                  TSTB    @$TKS           ;KEYBOARD DONE?
1087  004320  100067                          BPL     $OVER           ;BR IF NO. (LOCK: HIT KEY TO GOTO NEXT TEST)
1088  004322  017766  174764  177776          MOV     @$TKB,-2(SP)    ;CLEAR DONE BIT
1089  004330  032777  040000  174746  1$:     BIT     #BIT14,@$WR     ;;LOOP ON PRESENT TEST?
1090  004336  001060                          BNE     $OVER           ;;YES IF SW14=1
1091                                  ;#####START OF CODE FOR THE XOR TESTER#####
1092  004340  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
1093                                                                  ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
1094  004342  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
1095  004346  012737  004366  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
1096  004354  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
1097  004360  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
1098  004364  000436                          BR      $SVLAD          ;;GO TO THE NEXT TEST
1099  004366  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
1100  004370  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
1101  004374  000441                          BR      $OVER           ;;LOOP ON THE PRESENT TEST
1102  004376                          6$:;#####END OF CODE FOR THE XOR TESTER#####
1103  004376  105737  001247          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
1104  004402  001404                          BEQ     3$              ;;BR IF NO
1105  004404  105037  001247          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
1106  004410  005037  001354                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
1107  004414  032777  004000  174662  3$:     BIT     #BIT11,@$WR     ;;INHIBIT ITERATIONS?
1108  004422  001011                          BNE     1$              ;;BR IF YES
1109  004424  005737  001126                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
1110  004430  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
1111  004432  005237  001250                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
1112  004436  023737  001354  001250          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
1113  004444  002015                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
```

```
1114  004446  012737  000001  001250          1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
1115  004454  013737  004542  001354                  MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
1116  004462  105237  001246                  $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
1117  004466  113737  001246  001124                  MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
1118  004474  011637  001252                          MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
1119  004500  013777  001246  174600          $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
1120  004506  013716  001252                          MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
1121  004512  004737  006772                          JSR     PC,SERV.G       ;FIND OUT IF ^G WAS TYPED
1122  004516  105037  001424                          CLRB    MNTFLG          ;CLEAR THE MAINTENANCE BIT SETTER AFTER EACH TES
1123  004522  005737  001372                          TST     MODE            ;HAS THE MODE BEEN CHANGED?
1124  004526  001003                                  BNE     4$              ;IF NOT INTERNAL, GO DO A TEST
1125  004530  112737  000010  001424                  MOVB    #MAINT,MNTFLG   ;IF INTERNAL MODE NOW, SET THE MAINTENANCE BIT
1126  004536  000002                  4$:     RTI                             ;GO DO THE TEST
1127  004540  000406                  BRW:    406
1128  004542  000005                  $MXCNT: 5                               ;;MAX. NUMBER OF ITERATIONS
1129
1130                                          ;CHECK FOR FREEZE ON CURRENT DATA
1131                                          ;-------------------------------
1132
1133  004544  032777  001000  174532  .SCOP1: BIT     #SW09,@SWR      ;IS SW09=1(SET)?
1134  004552  001405                          BEQ     1$              ;BR IF NOT SET.
1135  004554  005737  001364                  TST     LOCK            ;IS THERE A TIGHT LOOP SPECIFIED?
1136  004560  001402                          BEQ     1$              ;IF NO, RETURN
1137  004562  013716  001364                  MOV     LOCK,(SP)       ;IF YES, GOTO THE ADDRESS IN LOCK.
1138  004566  000002                  1$:     RTI                     ;GO BACK.
1139
1140  004570  032777  010000  174506  .TYPE:  BIT     #SW12,@SWR      ;INHIBIT ALL PRINTOUT??
1141  004576  001403                          BEQ     $TYPE           ;IF NOT, GO TYPE
1142  004600  062716  000002                  ADD     #2,(SP)         ;SKIP OVER MESSAGE POINTER
1143  004604  000002                          RTI                     ;RETURN TO WHERE PROCEDURE WAS INVOKED
1144                                  .SBTTL  TYPE ROUTINE
1145
1146                                  ;;**************************************************************
1147                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
1148                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
1149                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
1150                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
1151                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
1152                                  ;*
1153                                  ;*CALL:
1154                                  ;*1) USING A TRAP INSTRUCTION
1155                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
1156                                  ;*OR
1157                                  ;*      TYPE
1158                                  ;*      MESADR
1159                                  ;*
1160
1161  004606  105737  001323          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
1162  004612  100002                          BPL     1$              ;;BR IF YES
1163  004614  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
1164  004616  000430                          BR      3$              ;;LEAVE
1165  004620  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
1166  004622  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
1167  004626  122737  000001  001140          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
1168  004634  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
1169  004636  132737  000100  001141          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
```

```
1170  004644  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
1171  004646  010037  004656                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
1172  004652  004737  005076                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
1173  004656  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
1174  004660  132737  000040  001141  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
1175  004666  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
1176  004670  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
1177  004672  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
1178  004674  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
1179  004676  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
1180  004700  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
1181  004704  000002                          RTI                     ;;RETURN
1182  004706  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
1183  004712  001430                          BEQ     8$
1184  004714  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
1185  004720  001006                          BNE     5$
1186  004722  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
1187  004724  104402                          TYPE                    ;;TYPE A CR AND LF
1188  004726  001357                          $CRLF
1189  004730  105037  005064                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
1190  004734  000755                          BR      2$              ;;GET NEXT CHARACTER
1191  004736  004737  005020          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
1192  004742  123726  001322          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
1193  004746  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
1194  004750  013746  001320                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
1195                                                                  ;;AND THE NULL CHAR.
1196  004754  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
1197  004760  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
1198  004762  004737  005020                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
1199  004766  105337  005064                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
1200  004772  000770                          BR      7$              ;;LOOP
1201
1202                                  ;HORIZONTAL TAB PROCESSOR
1203
1204  004774  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
1205  005000  004737  005020          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
1206  005004  132737  000007  005064          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
1207  005012  001372                          BNE     9$              ;;TAB STOP
1208  005014  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
1209  005016  000724                          BR      2$              ;;GET NEXT CHARACTER
1210  005020  105777  174270          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
1211  005024  100375                          BPL     $TYPEC
1212  005026  116677  000002  174262          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
1213  005034  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
1214  005042  001003                          BNE     1$              ;;BRANCH IF NO
1215  005044  105037  005064                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
1216  005050  000406                          BR      $TYPEX          ;;EXIT
1217  005052  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
1218  005060  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
1219  005062  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
1220  005064  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
1221  005066  000207          $TYPEX: RTS     PC
1222
1223                                  .SBTTL  APT COMMUNICATIONS ROUTINE
1224
1225                                  ;;**************************************************************************
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1226  005070  112737  000001  005334      $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
1227  005076  112737  000001  005332      $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
1228  005104  000403                      $ATYC   BR      $ATYC
1229  005106  112737  000001  005334      $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
1230  005114                              $ATYC:
1231  005114  010046                              MOV     R0,-(SP)        ;;PUSH R0 ON STACK
1232  005116  010146                              MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1233  005120  105737  005332                      TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
1234  005124  001450                              BEQ     5$              ;;IF NOT:  BR
1235  005126  122737  000001  001140              CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
1236  005134  001031                              BNE     3$              ;;IF NOT:  BR
1237  005136  132737  000100  001141              BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
1238  005144  001425                              BEQ     3$              ;;IF NOT:  BR
1239  005146  017600  000004                      MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
1240  005152  062766  000002  000004              ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
1241  005160  005737  001120              1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
1242  005164  001375                              BNE     1$              ;;IF NOT:  WAIT
1243  005166  010037  001134                      MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
1244  005172  105720                      2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
1245  005174  001376                              BNE     2$
1246  005176  163700  001134                      SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
1247  005202  006200                              ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
1248  005204  010037  001136                      MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
1249  005210  012737  000004  001120              MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
1250  005216  000413                              BR      5$
1251  005220  017637  000004  005244      3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
1252  005226  062766  000002  000004              ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
1253  005234  013746  177776                      MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
1254  005240  004737  004606                      JSR     PC,$TYPE        ;;CALL TYPE MACRO
1255  005244  000000              4$:     .WORD   0
1256  005246                      5$:
1257  005246  105737  005334      10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
1258  005252  001416                      BEQ     12$             ;;IF NOT:  BR
1259  005254  005737  001140              TST     $ENV            ;;RUNNING UNDER APT?
1260  005260  001413                      BEQ     12$             ;;IF NOT:  BR
1261  005262  005737  001120      11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
1262  005266  001375                      BNE     11$             ;;IF NOT:  WAIT
1263  005270  017637  000004  001122      MOV     @4(SP),$FATAL   ;;GET ERROR #
1264  005276  062766  000002  000004      ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
1265  005304  005237  001120              INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
1266  005310  105037  005334      12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
1267  005314  105037  005333              CLRB    $LFLG           ;;CLEAR LOG FLAG
1268  005320  105037  005332              CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
1269  005324  012601                      MOV     (SP)+,R1        ;;POP STACK INTO R1
1270  005326  012600                      MOV     (SP)+,R0        ;;POP STACK INTO R0
1271  005330  000207                      RTS     PC              ;;RETURN
1272  005332     000  $MFLG:   .BYTE   0       ;;MESSG. FLAG
1273  005333     000  $LFLG:   .BYTE   0       ;;LOG FLAG
1274  005334     000  $FFLG:   .BYTE   0       ;;FATAL FLAG
1275          005336          .EVEN
1276          000200  APTSIZE=200
1277          000001  APTENV=001
1278          000100  APTSPOOL=100
1279          000040  APTCSUP=040
1280
1281                  ;STRING INPUT ROUTINE
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1282                                                    ;------------------------
1283
1284  005336  010346                            .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
1285  005340  010446                                    MOV     R4,-(SP)        ;SAVE R4 ON STACK
1286  005342  017637  000004  005360                    MOV     @4(SP),.MSG     ;GET THE ADDRESS OF THE MESSAGE TO BE PRINTED
1287  005350  062766  000002  000004                    ADD     #2,4(SP)        ;POINT TO INSTRUCTION AFTER ADDRESS POINTER
1288  005356  104402                            .INST1: TYPE                    ;PRINT THE MESSAGE
1289  005360  000000                            .MSG:   0                       ;MESSAGE IS POINTED TO FROM HERE
1290  005362  012704  010270                            MOV     #INBUF,R4       ;POINT R4 TO THE INPUT BUFFER
1291  005366  012703  000007                            MOV     #7,R3           ;SET THE MAXIMUM NUMBER OF CHARACTERS ALLOWED
1292  005372  105777  173712                    1$:     TSTB    @$TKS           ;HAS A CHARACTER BEEN RECEIVED?
1293  005376  100375                                    BPL     1$              ;IF NO, KEEP WAITING FOR IT
1294  005400  117714  173706                            MOVB    @$TKB,(R4)      ;IF YES, SAVE IT IN THE INPUT BUFFER
1295  005404  142714  000200                            BICB    #200,(R4)       ;KEEP ONLY THE 7-BIT ASCII INFORMATION
1296  005410  122427  000015                            CMPB    (R4)+,#15       ;IS THIS CHARACTER A LINE FEED?
1297  005414  001417                                    BEQ     INSTR2          ;IF SO, TERMINATE THE INPUT SEQUENCE
1298  005416  105777  173672                    2$:     TSTB    @$TPS           ;IF NOT, CHECK TO SEE IF THE CHARACTER CAN PRINT
1299  005422  100375                                    BPL     2$              ;IF WE CAN'T, WAIT UNTIL WE CAN
1300  005424  017777  173662  173664                    MOV     @$TKB,@$TPB     ;ECHO THE CHARACTER BACK
1301  005432  005303                                    DEC     R3              ;REDUCE THE NUMBER OF CHARACTERS RECEIVED
1302  005434  001356                                    BNE     1$              ;IF WE DON'T HAVE 7, GO GET SOME MORE
1303  005436  012604                                    MOV     (SP)+,R4        ;IF WE HAVE 7, RESTORE R4
1304  005440  012603                                    MOV     (SP)+,R3        ;RESTORE R3
1305  005442  010346                            .INSTE: MOV     R3,-(SP)        ;SAVE R3 ON THE STACK
1306  005444  010446                                    MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1307  005446  104402  001356                            TYPE    ,$QUES          ;PRINT A QUESTION MARK... WHAT'S GOING ON?
1308  005452  000741                                    BR      .INST1          ;GO PRINT THE MESSAGE AGAIN
1309  005454  012604                            INSTR2: MOV     (SP)+,R4        ;RESTORE R4
1310  005456  012603                                    MOV     (SP)+,R3        ;RESTORE R3
1311  005460  000002                                    RTI                     ;RETURN TO THE MAIN PROCEDURE
1312
1313                                                    ;CONVERT ASCII STRING TO OCTAL
1314                                                    ;----------------------------
1315
1316  005462  010546                            .PARAM: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
1317  005464  010446                                    MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1318  005466  016605  000004                            MOV     4(SP),R5        ;GET THE SETUP INFORMATION POINTER
1319  005472  012537  005652                            MOV     (R5)+,LOLIM     ;SET THE LOW LIMIT FOR THE INPUT
1320  005476  012537  005654                            MOV     (R5)+,HILIM     ;SET THE HIGH LIMIT FOR THE INPUT
1321  005502  012537  005656                            MOV     (R5)+,DEVADR    ;SAVE THE ADDRESS WHERE THE RESULT WILL BE STORE
1322  005506  112537  005660                            MOVB    (R5)+,LOBITS    ;GET THE MASK OF THE INCORRECT BITS
1323  005512  112537  005661                            MOVB    (R5)+,ADRCNT    ;GET THE COUNT OF ITEMS TO BE STORED
1324  005516  010566  000004                            MOV     R5,4(SP)        ;POINT TO WHERE MAIN LINE PROGRAM WILL RESUME
1325  005522  005005                            PARAM1: CLR     R5              ;INITIALIZE THE ASCII TO OCTAL RESULT WORD
1326  005524  012704  010270                            MOV     #INBUF,R4       ;POINT TO THE INPUT BUFFER
1327  005530  122714  000015                            CMPB    #15,(R4)        ;IS THIS CHARACTER A CARRIAGE RETURN?
1328  005534  001420                                    BEQ     PARERR          ;IF SO, PRINT THE MESSAGE AGAIN
1329  005536  121427  000060                    1$:     CMPB    (R4),#60        ;IS THIS CHARACTER BELOW THE NUMERIC RANGE?
1330  005542  002415                                    BLT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1331  005544  121427  000067                            CMPB    (R4),#67        ;IS THIS CHARACTER ABOVE THE NUMERIC RANGE?
1332  005550  003012                                    BGT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1333  005552  142714  000060                            BICB    #60,(R4)        ;ISOLATE THE NUMBER THE CHARACTER REPRESENTS
1334  005556  152405                                    BISB    (R4)+,R5        ;CONCATENATE THESE BITS TO THE ALREADY EXISTING
1335  005560  122714  000015                            CMPB    #15,(R4)        ;IS THE NEXT CHARACTER A CARRIAGE RETURN?
1336  005564  001406                                    BEQ     LIMITS          ;IF SO, GO SEE IF NUMBER IS WITHIN LIMITS
1337  005566  006305                                    ASL     R5              ;CLEAR BIT POSITION 0, MOVE EXISTING STRING TO L
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1338  005570  006305                        ASL     R5              ;CLEAR POSITION 1, MOVE STRING TO LEFT AGAIN
1339  005572  006305                        ASL     R5              ;MOVE THE STRING ONE MORE TIME TO MAKE ROOM FOR
1340                                                                  ;NEXT THREE BITS
1341  005574  000760                        BR      1$              ;GO GET THE NEXT CHARACTER
1342  005576  104404                PARERR: INSTER                  ;THERE WAS AN ERROR... GO PRINT MESSAGE AGAIN
1343  005600  000750                        BR      PARAM1          ;TRY GETTING THE PARAMETERS AGAIN
1344
1345                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
1346                                        ;--------------------------------------
1347
1348  005602  020537  005654        LIMITS: CMP     R5,HILIM        ;DOES RESULT EXCEED ITS MAXIMUM CORRECT VALUE?
1349  005606  101373                        BHI     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
1350  005610  020537  005652                CMP     R5,LOLIM        ;IS THE RESULT LOWER THAN ALLOWED?
1351  005614  103770                        BLO     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
1352  005616  133705  005660                BITB    LOBITS,R5       ;ARE ANY INCORRECT BITS SET IN THE RESULT?
1353  005622  001365                        BNE     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1354
1355                                        ;STORE NUMBER AT SPECIFIED ADDRESS
1356
1357  005624  013704  005656                MOV     DEVADR,R4       ;POINT TO THE LOCATION WHERE THE RESULT WILL BE
1358  005630  010524                1$:     MOV     R5,(R4)+        ;STORE THE RESULT
1359  005632  062705  000002                ADD     #2,R5           ;CALCULATE THE NEXT DATUM
1360  005636  105337  005661                DECB    ADRCNT          ;REDUCE COUNT OF STORED RESULTS. IS IT EXCEEDED?
1361  005642  001372                        BNE     1$              ;IF NOT, GO STORE THE NEXT DATUM
1362  005644  012604                        MOV     (SP)+,R4        ;RESTORE R4
1363  005646  012605                        MOV     (SP)+,R5        ;RESTORE R5
1364  005650  000002                        RTI                     ;RETURN TO THE MAIN PROGRAM
1365
1366  005652  000000                LOLIM:  0                       ;LOWEST ACCEPTABLE VALUE
1367  005654  000000                HILIM:  0                       ;HIGHEST ACCEPTABLE
1368  005656  000000                DEVADR: 0                       ;LOCATION WHERE RESULT WILL BE STORED
1369  005660     000                LOBITS: .BYTE   0               ;INCORRECT BITS MASK
1370  005661     000                ADRCNT: .BYTE   0               ;COUNT OF ITEMS TO BE STORED
1371
1372                                        ;SAVE PC OF TEST THAT FAILED AND R0-R5
1373                                        ;-------------------------------------
1374
1375  005662  016637  000004  001404 .SAV05: MOV     4(SP),SAVPC     ;SAVE R7 (PC)
1376
1377                                        ;SAVE R0-R5
1378
1379  005670  010537  001340        SV05:   MOV     R5,$REG5        ;SAVE R5
1380  005674  010437  001336                MOV     R4,$REG4        ;SAVE R4
1381  005700  010337  001334                MOV     R3,$REG3        ;SAVE R3
1382  005704  010237  001332                MOV     R2,$REG2        ;SAVE R2
1383  005710  010137  001330                MOV     R1,$REG1        ;SAVE R1
1384  005714  010037  001326                MOV     R0,$REG0        ;SAVE R0
1385  005720  000002                        RTI                     ;LEAVE.
1386
1387                                        ;RESTORE R0-R5
1388
1389  005722  013700  001326        .RES05: MOV     $REG0,R0        ;RESTORE R0
1390  005726  013701  001330                MOV     $REG1,R1        ;RESTORE R1
1391  005732  013702  001332                MOV     $REG2,R2        ;RESTORE R2
1392  005736  013703  001334                MOV     $REG3,R3        ;RESTORE R3
1393  005742  013704  001336                MOV     $REG4,R4        ;RESTORE R4
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1394  005746  013705  001340                    MOV     $REGS,R5        ;RESTORE R5
1395  005752  000002                            RTI                     ;LEAVE
1396
1397                                            ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
1398                                            ;-----------------------------------------------------
1399
1400  005754  104402  001357          .CONVR: TYPE    ,$CRLF          ;PRINT A CARRIAGE RETURN
1401  005760  010046                  .CNVRT: MOV     R0,-(SP)        ;SAVE R0
1402  005762  010146                          MOV     R1,-(SP)        ;SAVE R1
1403  005764  010346                          MOV     R3,-(SP)        ;SAVE R3
1404  005766  010446                          MOV     R4,-(SP)        ;SAVE R4
1405  005770  010546                          MOV     R5,-(SP)        ;SAVE R5
1406  005772  017601  000012                  MOV     @12(SP),R1      ;PLACE THE ADDRESS OF THE ARGUMENTS IN R1
1407  005776  062766  000002  000012          ADD     #2,12(SP)       ;POINT TO WHERE MAIN PROGRAM WILL RESUME
1408  006004  012137  006130                  MOV     (R1)+,WRDCNT    ;GET NUMBER OF WORDS TO BE PRINTED
1409  006010  112105                  1$:     MOVB    (R1)+,R5        ;GET THE NUMBER OF CHARACTERS TO BE PRINTED
1410  006012  112100                          MOVB    (R1)+,R0        ;GET THE NUMBER OF SPACES TO PRINT
1411  006014  013104                          MOV     @(R1)+,R4       ;COPY THE WORD TO BE CONVERTED
1412  006016  110537  006132                  MOVB    R5,CHRCNT       ;COPY THE CHARACTER COUNT
1413  006022  010403                  3$:     MOV     R4,R3           ;COPY THE ARGUMENT WORD AGAIN
1414  006024  042703  177770                  BIC     #^C<7>,R3       ;ISOLATE THREE BITS TO BE TREATED AS A CHARACTER
1415  006030  062703  000060                  ADD     #060,R3         ;MAKE AN ASCII CHARACTER OUT OF THEM
1416  006034  110346                          MOVB    R3,-(SP)        ;SAVE THAT CHARACTER
1417  006036  006004                          ROR     R4              ;MOVE THE NEXT THREE BITS INTO PLACE
1418  006040  006204                          ASR     R4              ;MOVE THEM AGAIN
1419  006042  006204                          ASR     R4              ;AND FINALLY A THIRD TIME
1420  006044  005305                          DEC     R5              ;REDUCE CHARACTER COUNT.ARE ALL CHARACTERS
1421                                                                  ;BUILT?
1422  006046  001365                          BNE     3$              ;IF NO, GO BUILD THE NEXT ONE.
1423  006050  012703  010374                  MOV     #MDATA,R3       ;NOW POINT TO WHERE NUMBER WILL BE PRINTED FROM
1424  006054  112623                  4$:     MOVB    (SP)+,(R3)+     ;STORE THE CHARACTER, STARTING WITH THE MOST
1425  006056  105337  006132                  DECB    CHRCNT          ;REDUCE COUNT. ARE ALL CHARACTERS TRANSFERRED?
1426  006062  001374                          BNE     4$              ;IF NO, GO TRANSFER ANOTHER
1427  006064  105700                          TSTB    R0              ;ARE ANY SPACES TO BE PRINTED?
1428  006066  001404                          BEQ     6$              ;IF NO, DON'T SET UP ANY
1429  006070  112723  000040          5$:     MOVB    #040,(R3)+      ;ADD A SPACE TO THE OUTPUT BUFFER
1430  006074  105300                          DECB    R0              ;REDUCE THE COUNT. SHOULD WE PRINT MORE?
1431  006076  001374                          BNE     5$              ;IF YES, GO ADD ANOTHER SPACE
1432  006100  105013                  6$:     CLRB    (R3)            ;TERMINATE THE OUTPUT BUFFER WITH A ZERO
1433  006102  104402  010374                  TYPE    ,MDATA          ;PRINT THE STRING WE JUST BUILT
1434  006106  005337  006130                  DEC     WRDCNT          ;REDUCE THE WORD COUNT. ARE ANY MORE WORDS LEFT?
1435  006112  001336                          BNE     1$              ;IF YES, GO CONVERT THEM
1436  006114  012605                          MOV     (SP)+,R5        ;RESTORE R5
1437  006116  012604                          MOV     (SP)+,R4        ;RESTORE R4
1438  006120  012603                          MOV     (SP)+,R3        ;RESTORE R3
1439  006122  012601                          MOV     (SP)+,R1        ;RESTORE R1
1440  006124  012600                          MOV     (SP)+,R0        ;RESTORE R0
1441  006126  000002                          RTI                     ;RETURN TO THE MAIN PROGRAM
1442  006130  000000          WRDCNT: 0
1443  006132     000          CHRCNT: .BYTE                           ;NUMBER OF CHARACTERS TO PRINT
1444  006133     000          SPACNT: .BYTE   0                       ;NUMBER OF SPACES TO PRINT
1445
1446  006134  000000          BINWRD: 0
1447
1448
1449                                            ;TRAP DISPATCH SERVICE
```

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1450                                            ;ARGUMENT OF TRAP IS EXTRACTED
1451                                            ;AND USED AS OFFSET TO OBTAIN POINTER
1452                                            ;TO SELECTED SUBROUTINE
1453
1454  006136  010046                .TRPSR: MOV     R0,-(SP)        ;SAVE R0, USE R0 TO FIND TRAP ROUTINE
1455  006140  016600  000002                MOV     2(SP),R0        ;GET TRAP ADDRESS
1456  006144  005740                        TST     -(R0)           ;GET TRAP
1457  006146  111000                        MOVB    (R0),R0         ;GET RIGHT BYTE OF TRAP(TRAP OFFSET)
1458  006150  006300                        ASL     R0              ;POSITION OFFSET FOR TABLE INDEXING
1459  006152  016000  001742                MOV     .TRPTAB(R0),R0  ;PLACE INDEXED ADDRESS OF TABLE IN R0
1460  006156  000200                        RTS     R0              ;TRANSFER TO THAT ADDRESS AND RESTORE OLD R0
1461
1462                                            ;DEVICE CLEAR ROUTINE
1463                                            ;ISSUE A DEVICE CLEAR
1464                                            ;--------------------
1465  006160                        .DEVICE.CLR:
1466  006160  052777  000020  173622        BIS     #DCLR,@DZVCSR   ;SET DCLR
1467  006166  032777  000020  173614  1$:   BIT     #DCLR,@DZVCSR   ;DID IT CLEAR?
1468  006174  001374                        BNE     1$              ;BR IF NO
1469  006176  000002                        RTI                     ;EXIT ROUTINE
1470
1471                                            ;ROUTINE TO HANDLE MAINTENANCE BIT SETTING WITH DEVICE CLEAR
1472                                            ;-------------------------------------------------------------
1473  006200  104413                .DCLASM:DEVICE.CLR              ;ISSUE A DEVICE CLEAR
1474  006202  153777  001424  173600        BISB    MNTFLG,@DZVCSR  ;LOAD THE MAINTENANCE BIT IF IT IS I MODE
1475  006210  000002                        RTI                     ;RETURN TO CALLING ROUTINE
1476
1477  006212                        .DELAY:
1478  006212  010046                        MOV     R0,-(SP)        ;SAVE R0
1479  006214  013700  006230                MOV     DLYCNT,R0       ;SET COUNT
1480  006220  005300                1$:     DEC     R0              ;DELAY
1481  006222  001376                        BNE     1$              ;
1482  006224  012600                        MOV     (SP)+,R0        ;RESTORE R0
1483  006226  000002                        RTI                     ;LEAVE ROUTINE
1484  006230  000001                DLYCNT: .WORD     1             ;PATCHABLE LOC FOR MORE TIME
1485
1486                                            ;ADVANCE TO NEXT TEST HANDLER
1487                                            ;----------------------------
1488
1489  006232  013716  001362        .ADVANCE:MOV    NEXT,(SP)       ;CRUNCH STACK WITH ADDRESS OF SCOPE CALL
1490  006236  005037  001364                CLR     LOCK            ;RESET TIGHT LOOP ADDRESS
1491  006242  000002                        RTI                     ;CHECK TO SEE IF OLD TEST GETS REPEATED
1492
1493                                            ;ROUTINE TO SHIFT LINE POINTER
1494                                            ;AND SWITCH TESTS IF NECESSARY
1495                                            ;-----------------------------
1496  006244  106302                .SHIFT: ASLB    R2              ;POINT TO THE NEXT LINE
1497  006246  032702  000020                BIT     #BIT4,R2        ;HAVE WE PASSED ALL LINE POINTERS?
1498  006252  001402                        BEQ     1$              ;IF NOT, RETURN TO THE TEST
1499  006254  022626                        POP2SP                  ;REMOVE THE TRAP CALL FROM THE STACK
1500  006256  104400                        ADVANCE                 ;GO TO THE NEXT TEST
1501  006260  000002                1$:     RTI                     ;RETURN TO THE PRESENT TEST
1502
```

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1503                                            ;LINE PARAMETER REGISTER SETUP ROUTINE
1504
1505  006262  010146                .LPRSET:MOV     R1,-(SP)        ;SAVE CONTENTS OF R1
1506  006264  010246                        MOV     R2,-(SP)        ;SAVE CONTENTS OF R2
1507  006266  013701  001370               MOV     PAR,R1          ;MOVE DEFAULT PARAM. INTO R1
1508  006272  012702  000001               MOV     #1,R2   ;INIT. FOR LINE 1
1509  006276  010177  173516        1$:    MOV     R1,@DZVLPR      ;LOAD PARAM. REGISTER
1510  006302  005201                        INC     R1              ;SET R1 FOR NEXT LINE
1511  006304  106302                        ASLB    R2              ;SET R2 FOR NEXT LINE
1512  006306  032702  000020               BIT     #BIT4,R2        ;ALL LINES DONE?
1513  006312  001771                       BEQ     1$              ;IF NO LOAD NEXT LINE
1514  006314  012602                       MOV     (SP)+,R2        ;RELOAD R2
1515  006316  012601                       MOV     (SP)+,R1        ;RELOAD R1
1516  006320  000002                       RTI                     ;RETURN
1517
1518                                            ;ROUTINE TO ZERO DATA BUFFER
1519
1520  006322  010046                .BUFSET:MOV     R0,-(SP)        ;SAVE CONTENTS OF R0
1521  006324  012700  001426               MOV     #TDO,R0         ;SET R0 TO TOP OF BUFFER
1522  006330  005020                1$:    CLR     (R0)+           ;CLEAR BUFFER LOCATION
1523  006332  022700  001446               CMP     #STOP,R0        ;IS BUFFER ALL CLEARED
1524  006336  001374                       BNE     1$              ;IF NOT CLEAR NEXT LOCATION
1525  006340  012600                       MOV     (SP)+,R0        ;RELOAD R0
1526  006342  000002                       RTI                     ;RETURN
1527
1528                                            ;ERROR HANDLER
1529                                            ;-------------
1530
1531  006344  004737  006772        $ERROR: JSR     PC,SERV.G       ;FIND OUT IF <^G> WAS HIT
1532  006350  032777  010000  172726       BIT     #SW12,@SWR      ;BELL ON ERROR?
1533  006356  001406                       BEQ     XBX             ;BR IF NO BELL
1534  006360  105777  172730               TSTB    @$TPS           ;TTY READY.
1535  006364  100003                       BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
1536  006366  112777  000207  172722       MOVB    #207,@$TPB      ;PUSH A BELL AT THE TTY.
1537  006374  032777  020000  172702 XBX:   BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1538  006402  001113                       BNE     HALT$           ;BR IF NO PRINT OUT WANTED.
1539  006404  021637  001262               CMP     (SP),$ERRPC     ;WAS THIS ERROR FOUND LAST TIME?
1540  006410  001404                       BEQ     1$              ;BR IF YES
1541  006412  011637  001262               MOV     (SP),$ERRPC     ;RECORD BEING HERE
1542  006416  105037  001247               CLRB    $ERFLG          ;PREPARE HEADER
1543  006422  104407                1$:    SAV05                   ;SAVE ALL PROC REGISTERS
1544  006424  011605                       MOV     (SP),R5         ;GET THE PC OF ERROR
1545  006426  162705  000002               SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
1546  006432  011504                       MOV     (R5),R4         ;GET ERROR INSTRUCTION
1547  006434  110437  001260               MOVB    R4,$ITEMB       ;COPY TEST NUMBER FOR APT HANDLING
1548  006440  006304                       ASL     R4              ;MULT BY TWO
1549  006442  061504                       ADD     (R5),R4         ;DOUBLE IT
1550  006444  006304                       ASL     R4              ;MULT AGAIN
1551  006446  042704  177001               BIC     #177001,R4      ;CLEAR JUNK
1552  006452  062704  016200               ADD     #.ERRTAB,R4     ;GET POINTER
1553  006456  012437  006602               MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
1554  006462  012437  006614               MOV     (R4)+,DATAHD    ;GET DATA HEADRER
1555  006466  011437  006626               MOV     (R4),DATABP     ;GET DATA TABLE
1556  006472  105737  001247               TSTB    $ERFLG          ;TYPE HEADER
1557  006476  001403                       BEQ     TYPMSG          ;BR IF YES
1558  006500  005737  006626               TST     DATABP          ;DOES DATA TABLE EXIST?
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1559  006504  001044                          BNE     TYPDAT          ;BR IF YES.
1560  006506  104402  001357          TYPMSG: TYPE    ,$CRLF          ;TYPE A CARRIAGE RETURN
1561  006512  104402  001357                  TYPE    ,$CRLF          ;AND TYPE ANOTHER
1562  006516  005737  001364                  TST     LOCK
1563  006522  001402                          BEQ     1$
1564  006524  104402  007705                  TYPE    ,MASTEK
1565  006530  104402  007673          1$:     TYPE    ,MTSTN
1566  006534  104412  006764                  CNVRT   ,XTSTN          ;SHOW IT
1567  006540  104402  007765                  TYPE    ,MERRPC         ;TYPE PC.
1568  006544  104412  006756                  CNVRT   ,ERTABO         ;SHOW IT
1569  006550  104402  007635                  TYPE    ,MCSRX
1570  006554  104412  004250                  CNVRT   ,XCSR
1571  006560  104402  001357                  TYPE    ,$CRLF          ;GIVE A CR/LF
1572  006564  112737  177777  001247          MOVB    #-1,$ERFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1573  006572  005737  006602                  TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1574  006576  001402                          BEQ     WTBS.FM         ;BR IF NO.
1575  006600  104402                          TYPE                    ;TYPE
1576  006602  000000          ERRMSG: 0                               ;    ERROR MESSAGE
1577  006604                  WTBS.FM:                                ;
1578  006604  005737  006614                  TST     DATAHD          ;DATA HEADER?
1579  006610  001402                          BEQ     TYPDAT          ;BR IF NO
1580  006612  104402                          TYPE                    ;TYPE
1581  006614  000000          DATAHD: 0                               ;    DATA HEADER
1582  006616  005737  006626  TYPDAT: TST     DATABP          ;DATA TABLE?
1583  006622  001402                          BEQ     RESREG          ;BR IF NO.
1584  006624  104411                          CONVRT                  ;SHOW
1585  006626  000000          DATABP: 0                               ;    DATA TABLE
1586  006630  104410          RESREG: RESO5                           ;RESTORE PROC REGISTERS
1587  006632  122737  000001  001140  HALTS:  CMPB    #APTENV,$ENV    ;IS APT RUNNING?
1588  006640  001007                          BNE     15$             ;SKIP APT CALL IF NOT
1589  006642  113737  001260  006654          MOVB    $ITEMB,5$       ;COPY ERROR NUMBER
1590  006650  004737  005106                  JSR     PC,$ATY4        ;CALL APT SERVICE
1591  006654  000000          5$:     .WORD   0                       ;ERROR NUMBER STUCK HERE
1592  006656  000777          10$:    BR      10$             ;LOCK UP HERE
1593  006660  022737  004234  000042  15$:    CMP     #$ENDAD,@#42    ;CHECK TO SEE IF IN ACT-11 MODE
1594  006666  001403                          BEQ     20$             ;IF SO, HANDLE ACCORDINGLY
1595  006670  005777  172410                  TST     @SWR            ;HALT ON ERROR?
1596  006674  100004                          BPL     EXITER          ;BR IF NO HALT ON ERROR
1597  006676  016677  000002  172402  20$:    MOV     2(SP),@DISPLAY  ;SHOW ERROR PC IN DATA DISPLAY
1598  006704  000000                          HALT                    ;HALT
1599  006706  005237  001256  EXITER: INC     $ERTTL          ;UPDATE ERROR COUNT
1600  006712  004737  006772                  JSR     PC,SERV.G       ;FIND OUT IF ↑G WAS TYPED
1601  006716  032777  000400  172360          BIT     #SW08,@SWR      ;GOTO TOP OF TEST?
1602  006724  001007                          BNE     1$              ;BR IF YES
1603  006726  032777  002000  172350          BIT     #SW10,@SWR      ;GOTO NEXT TEST?
1604  006734  001407                          BEQ     2$              ;BR IF NO
1605  006736  013737  001362  001252          MOV     NEXT,$LPADR     ;SET FOR NEXT TEST
1606  006744  012706  001120          1$:     MOV     #STACK,SP       ;RESET SP
1607  006750  000177  172276                  JMP     @$LPADR         ;GOTO SPECIFIED TEST
1608  006754  000002          2$:     RTI                             ;RETURN
1609  006756  000001          ERTABO: 1
1610  006760     006     002                  .BYTE   6,2
1611  006762  001404                          SAVPC
1612  006764  000001          XTSTN:  1
1613  006766     002     002                  .BYTE   2,2
1614  006770  001246                          $TSTNM
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1615  006772  017746  172314          SERV.G: MOV     @$TKB,-(SP)     ;OTHERWISE, GET THE LAST CHARACTER TYPED
1616  006776  042716  000200                  BIC     #BIT7,(SP)      ;STRIP PARITY(EIGHTH) BIT
1617  007002  122726  000007                  CMPB    #7,(SP)+        ;IS IT ↑G?
1618  007006  001076                          BNE     6$              ;IF NOT, IGNORE INPUT
1619  007010  032777  004000  172272          BIT     #4000,@$TKS     ;RX BUSY?
1620  007016  001365                          BNE     SERV.G          ;BR IF YES
1621  007020  017737  172260  007226          MOV     @$WR,90$        ;SAVE (SWR).
1622  007026  104402  007206            1$:   TYPE    ,89$            ;TYPE HEADER FOR OLD SWITCH REGISTER
1623  007032  104412  007220                  CNVRT   ,88$            ;TYPE THE NUMBER ITSELF
1624  007036  104402  007230                  TYPE    ,91$            ;AFTER HAVING CONVERTED IT TO ASCII
1625  007042  105037  007234                  CLRB    92$             ;CLEAR SWR CHANGE FLAG
1626  007046  005077  172232                  CLR     @$WR            ;CLEAR THE SOFTWARE SWITCH REGISTER
1627  007052  105777  172232            3$:   TSTB    @$TKS           ;WAIT FOR DONE.
1628  007056  100375                          BPL     3$              ;CONTINUE WAITING FOR IT
1629  007060  017746  172226                  MOV     @$TKB,-(SP)     ;PUT THE CHARACTER ON THE STACK
1630  007064  042716  000200                  BIC     #BIT7,(SP)      ;STRIP PARITY BIT
1631  007070  122726  000015                  CMPB    #15,(SP)+       ;IS IT THE CARRIAGE RETURN CHAR?
1632  007074  001433                          BEQ     4$              ;IF SO, GO PRINT CRLF
1633  007076  105777  172212            2$:   TSTB    @$TPS           ;IS THE OUTPUT BUFFER AVAILABLE
1634  007102  100375                          BPL     2$              ;IF NOT, WAIT FOR IT TO BE READY
1635  007104  105237  007234                  INCB    92$             ;INDICATE THAT THE SWR WAS CHANGED
1636  007110  014677  172202                  MOV     -(SP),@$TPB     ;PLACE THE CHARACTER THERE(ECHO BACK)
1637  007114  000241                          CLC                     ;GET READY TO ROTATE
1638  007116  006177  172162                  ROL     @$WR            ;MOVE THE EXISTING BITS OVER
1639  007122  006177  172156                  ROL     @$WR            ;TO MAKE ROOM FOR THE INCOMING
1640  007126  006177  172152                  ROL     @$WR            ;THREE BITS FROM THIS CHARACTER
1641  007132  103735                          BCS     1$              ;ERROR
1642  007134  022627  000060                  CMP     (SP)+,#60       ;IS IT LOWER THAN 0?
1643  007140  002732                          BLT     1$              ;IF SO, GO ASK AGAIN
1644  007142  026627  177776  000067          CMP     -2(SP),#67      ;IS IT HIGHER THAN 7?
1645  007150  003326                          BGT     1$              ;IF SO, GO ASK AGAIN
1646  007152  042746  177770                  BIC     #↑C<7>,-(SP)    ;ISOLATE INFORMATION BITS
1647  007156  052677  172122                  BIS     (SP)+,@$WR      ;ADD THEM TO THE SWITCH REGISTER
1648  007162  000733                          BR      3$              ;GO CHECK FOR THE NEXT CHARACTER
1649  007164  105737  007234            4$:   TSTB    92$             ;HAS THE SWR BEEN CHANGED?
1650  007170  001003                          BNE     5$              ;IF YES GO TYPE CRLF
1651  007172  013777  007226  172104          MOV     90$,@$WR        ;IF NOT RESTORE SWR
1652  007200  104402  001357            5$:   TYPE    ,$CRLF          ;TYPE A CARRIAGE RETURN AND LINE FEED
1653  007204  000207                    6$:   RTS     PC              ;RETURN TO CALLING PROCEDURE
1654
1655  007206  020200  051450  051127  89$:    .ASCIZ  <200>? (SWR)=/?
1656  007214  036451  000057
1657                                    .EVEN
1658  007220  000001                    88$:    1
1659  007222      006      000                  .BYTE   6,0
1660  007224  007226                          90$
1661  007226  000000                    90$:    .WORD   0
1662  007230  036457  000057            91$:    .ASCIZ  ?/=/?
1663  007234      000                    92$:    .BYTE   0
1664          007236                    .EVEN
1665                                    .SBTTL  POWER DOWN AND UP ROUTINES
1666
1667                                    ;;**********************************************************************
1668                                    ;POWER DOWN ROUTINE
1669  007236  012737  007402  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
1670  007244  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
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1671   007252  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
1672   007254  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1673   007256  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
1674   007260  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
1675   007262  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
1676   007264  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
1677   007266  017746  172012                  MOV     @$WR,-(SP)      ;;PUSH @$WR ON STACK
1678   007272  010637  007406                  MOV     SP,$SAVR6       ;;SAVE SP
1679   007276  012737  007310  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
1680   007304  000000                          HALT
1681   007306  000776                          BR      .-2             ;;HANG UP
1682
1683                                  ;;*****************************************************************
1684                                  ;POWER UP ROUTINE
1685   007310  012737  007402  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
1686   007316  013706  007406                  MOV     $SAVR6,SP       ;;GET SP
1687   007322  005037  007406                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
1688   007326  005237  007406          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
1689   007332  001375                          BNE     1$              ;;OF  WORD
1690   007334  012677  171744                  MOV     (SP)+,@$WR      ;;POP STACK INTO @$WR
1691   007340  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
1692   007342  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
1693   007344  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
1694   007346  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
1695   007350  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
1696   007352  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1697   007354  012737  007236  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
1698   007362  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
1699   007370  104402                          TYPE                    ;;REPORT THE POWER FAILURE
1700   007372  007410                  $PWRMG: .WORD   MPFAIL          ;;POWER FAIL MESSAGE POINTER
1701   007374  012716                          MOV     (PC)+,(SP)      ;;RESTART AT RESTART
1702   007376  010776                  $PWRAD: .WORD   RESTART         ;;RESTART ADDRESS
1703   007400  000002                          RTI
1704   007402  000000                  $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
1705   007404  000776                          BR      .-2             ;;  BEFORE THE POWER DOWN WAS COMPLETE
1706   007406  000000                  $SAVR6: 0                       ;;PUT THE SP HERE
1707   007410  050200  051127  043040  MPFAIL: .ASCIZ  <200>/PWR FAILED. RESTART AT LAST TEST /
  (2)  007453     200  047105  020104  MEPASS: .ASCIZ  <200>/END PASS DVDZA-A  /
  (2)  007477     200  052522  047116  MR:     .ASCIZ  <200>/RUNNING   /
  (2)  007513     200  051120  043517  MERR2:  .ASCIZ  <200>/PROGRAM INDICATES NO DEVICES PRESENT./
  (2)  007562  044600  051516  043125  MERR3:  .ASCIZ  <200>/INSUFFICIENT DATA!/
  (2)  007606  046200  041517  020113  MLOCK:  .ASCIZ  <200>/LOCK ON SELECTED TEST/
  (2)  007635     103  051123  020072  MCSRX:  .ASCIZ   /CSR: /
  (2)  007643     126  041505  020072  MVECX:  .ASCIZ  /VEC: /
  (2)  007651     120  051501  042523  MPASSX: .ASCIZ  /PASSES: /
  (2)  007662  051105  047522  051522  MERRX:  .ASCIZ  /ERRORS: /
  (2)  007673     124  051505  020124  MTSTN:  .ASCIZ  /TEST NO: /
  (2)  007705      52  000040          MASTEK: .ASCIZ  /* /
  (2)  007710  052200  050131  020105  MNEW:   .ASCIZ  <200>/TYPE A BIT MAP OF DZV11'S DESIRED ACTIVE:  /
  (2)  007765     120  035103  000040  MERRPC: .ASCIZ  /PC: /
  (2)  007772  046600  050101  047440  XHEAD:  .ASCIZ  <200>/MAP OF DZV11 STATUS/<200>
  (2)  010020  044600  046114  043505  MBADLN: .ASCIZ  <200>/ILLEGAL ENTRY IN STAGGERED MODE/<200>
  (2)                                  .EVEN
  (2)  010062  000002                  XSTATQ: 2
1708   010064     006       003                .BYTE   6,3
1709   010066  001344                          $TMP1
```

```
1710  010070  006     002                        .BYTE   6,2
1711  010072  001346                            $TMP2
1712                                     .EVEN
1713                                     ;THIS ROUTINE ESTABLISHES WHICH MAINTENANCE MODE THE DEVICE IS IN
1714                                     ;-----------------------------------------------------------------
1715                                     ;E=EXTERNAL LOOP BACK
1716                                     ;I=INTERNAL LOOP BACK
1717                                     ;S=STAGGERED LOOP BACK
1718  010074  017605  000000             .SETFLG:MOV     @(SP),R5        ;PICK UP ADDRESS OF TAG
1719  010100  042737  000040  010270             BIC     #40,INBUF       ;STRIP LOWER CASE
1720  010106  122737  000105  010270             CMPB    #'E,INBUF       ;IS IT EXTERNAL LOOP BACK ?
1721  010114  001005                            BNE     4$              ;NO
1722  010116  013715  010206                    MOV     1$,(R5)         ;YES STORE INFO
1723  010122  105037  001424                    CLRB    MNTFLG          ;SET MAINT BIT =0
1724  010126  000422                            BR      7$              ;GET OUT
1725  010130  122737  000111  010270     4$:     CMPB    #'I,INBUF       ;IS IT INTERNAL LOOP BACK ?
1726  010136  001006                            BNE     5$              ;NO
1727  010140  013715  010210                    MOV     2$,(R5)         ;YES STORE INFO
1728  010144  112737  000010  001424             MOVB    #MAINT,MNTFLG   ;SET UP THE MAINTENANCE FLAG LOADER
1729  010152  000410                            BR      7$              ;GET OUT
1730  010154  122737  000123  010270     5$:     CMPB    #'S,INBUF       ;IS IT STAGGERED LOOP BACK ?
1731  010162  001007                            BNE     6$              ;WHAT ?
1732  010164  013715  010212                    MOV     3$,(R5)         ;YES STORE INFO
1733  010170  105037  001424                    CLRB    MNTFLG          ;ZERO BITS
1734  010174  062716  000002             7$:     ADD     #2,(SP)         ;POP AROUND
1735  010200  000002                            RTI
1736  010202  104404                     6$:     INSTER                  ;RETRY
1737  010204  000733                            BR      .SETFLG         ;DITTO
1738  010206  000200                     1$:     .WORD   200             ;EXTERNAL =  E
1739  010210  000000                     2$:     .WORD   0               ;INTERNAL = I
1740  010212  100000                     3$:     .WORD   100000          ;STAGGERED = S
1741
```

```
1742                                            ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
1743                                            ;BUFFER TO THE CHARACTERS "E" AND "C".
1744                                            ;IF THE CHARACTER IS "E" CLEAR THE FLAG
1745                                            ;IF THE CHARACTER IS "C" SET THE FLAG
1746
1747  010214  017605  000000            .PAWCH:MOV     @(SP),R5
1748  010220  142737  000040  010270            BICB    #40,INBUF       ;SET FOR LOWER CASE INPUT
1749  010226  122737  000105  010270            CMPB    #'E,INBUF       ;IS IT "E" ?
1750  010234  001002                            BNE     1$
1751  010236  105015                            CLRB    (R5)            ;000
1752  010240  000406                            BR      2$
1753  010242  122737  000103  010270      1$:   CMPB    #'C,INBUF       ;IS IT "C" ?
1754  010250  001005                            BNE     3$
1755  010252  112715  177777                    MOVB    #-1,(R5)        ;3177
1756  010256  062716  000002            2$:    ADD     #2,(SP)
1757  010262  000002                            RTI
1758  010264  104404                     3$:    INSTER                  ;RETRY
1759  010266  000752                            BR      .PAWCH
1760
1761                                            ;BUFFERS FOR INPUT-OUTPUT
1762
1763  010270  000000                    INBUF:  0
1764          010332                            .=.+40
1765  010332  000000                    TEMP:   0
1766          010374                            .=.+40
1767  010374  000000                    MDATA:  0
1768          010436                            .=.+40
1769
```

```
1770
1771                                            ;
1772                                            ;ROUTINE USED TO "CYCLE" THROUGH UP TO SIXTEEN DZV11'S
1773                                            ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
1774                                            ;AND RUNS THE SPECIFIED DZV11'S.   THIS ROUTINE *MUST*
1775                                            ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
1776                                            ;SETUP NECESSARY.
1777                                            ;
1778
1779  010436  005737  001406          CYCLE:  TST     DZVACTV         ;ARE ANY DZV11'S TO BE TESTED?
1780  010442  001004                          BNE     1$              ;BR IF OK.
1781  010444  104402  007513                  TYPE    ,MERR2          ;NO DZV11'S SELECTED!!
1782  010450  000000                          HALT                    ;STOP THE SHOW.
1783  010452  000776                          BR      .-2             ;DISQUALIFY CONT. SW.
1784  010454  013737  004542  001354  1$:     MOV     $MXCNT,$TIMES   ;RESTORE THE NUMBER OF ITERATIONS TO MAKE
1785  010462  033737  001412  001406          BIT     RUN,DZVACTV     ;IS THIS ONE "ACTIVE"
1786  010470  001017                          BNE     2$              ;BR IF GOOD ONE FOUND.
1787  010472  006137  001412                  ROL     RUN             ;UPDATE POINTER
1788  010476  005537  001412                  ADC     RUN             ;CATCH CARRY FROM RUN
1789  010502  062737  000012  001420          ADD     #12,ACTIVE      ;UPDATE ADDRESS POINTER.
1790  010510  022737  001740  001420          CMP     #DZV.END,ACTIVE ;HAVE WE PASSED THE END OF THE MAP?
1791  010516  001356                          BNE     1$              ;IF NO, KEEP GOING; NOT ALL TESTED FOR.
1792  010520  012737  001500  001420          MOV     #DZV.MAP,ACTIVE ;RESET ADDRESS POINTER.
1793  010526  000752                          BR      1$              ;KEEP LOOKING FOR ACTIVE DZV11
1794  010530  006137  001412          2$:     ROL     RUN             ;UPDATE POINTER.
1795  010534  005537  001412                  ADC     RUN             ;CATCH CARRY.
1796  010540  013700  001420                  MOV     ACTIVE,R0       ;GET ADDRESS POINTER.
1797  010544  062737  000012  001420          ADD     #12,ACTIVE      ;UPDATE.
1798  010552  022737  001740  001420          CMP     #DZV.END,ACTIVE
1799                                                                  ;ALL DONE?
1800  010560  001003                          BNE     3$              ;BR IF NO.
1801  010562  012737  001500  001420          MOV     #DZV.MAP,ACTIVE ;RESTORE POINTER.
1802  010570  012037  001174          3$:     MOV     (R0)+,$BASE     ;LOAD SYSTEM CTRL. REG
1803  010574  012037  002040                  MOV     (R0)+,DZVRIV    ;LOAD VECTOR
1804  010600  012037  001366                  MOV     (R0)+,LINE      ;SET UP DZV LINES ACTIVE
1805  010604  012037  001370                  MOV     (R0)+,PAR       ;SET UP PARAMETERIZATION
1806  010610  012037  001372                  MOV     (R0)+,MODE      ;SET UP MAINTENANCE MODE
1807  010614  105037  001424                  CLRB    MNTFLG  ;RESET MAINT. FLAG IF
1808  010620  005737  001372                  TST     MODE            ;RUNNING TESTS
1809  010624  001003                          BNE     9$              ;IN
1810  010626  112737  000010  001424          MOVB    #MAINT,MNTFLG   ;INTERNAL MAINT. MODE
1811  010634  004737  011002          9$:     JSR     PC,DZVLEV       ;SET UP
1812  010640  005737  000042                  TST     @#42            ;ARE WE UNDER MONITOR CONTROL?
1813  010644  001051                          BNE     7$              ;IF YES, SKIP THIS SETUP
1814  010646  032777  000002  170430          BIT     #SW01,@SWR      ;IF SW01=1, GET STARTING TEST #
1815  010654  001445                          BEQ     7$              ;BR IF NO TEST IS TO BE INPUTTED
1816  010656  104402  001357          4$:     TYPE    ,$CRLF
1817  010662  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
1818  010664  007673                          MTSTN                   ;POINTER TO MESSAGE TO BE PRINTED
1819  010666  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
1820  010670  000001                          1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
1821  010672  001000                          1000                    ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
1822  010674  001246                          $TSTNM                  ;POINTER TO MAP LOCATION TO BE FILLED
1823  010676     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
1824  010677     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
1825  010700  012700  012170                  MOV     #TST1,R0
```

```
1826  010704  022710  000004            5$:     CMP     #4,(R0)
1827  010710  001020                      BNE     6$
1828  010712  022760  012737  000002            CMP     #12737,2(R0)
1829  010720  001014                      BNE     6$
1830  010722  023760  001246  000004            CMP     $TSTNM,4(R0)    ;IS THIS THE TEST ?
1831  010730  001010                      BNE     6$                      ;IF NOT, DON'T PROCESS NUMBER
1832  010732  010037  001252                      MOV     R0,$LPADR       ;SAVE PC
1833  010736  062737  000002  001252            ADD     #2,$LPADR       ;POP OVER PREVIOUS SCOPE
1834  010744  104402  001357                      TYPE    ,$CRLF
1835  010750  000412                      BR      8$
1836  010752  005720                6$:   TST     (R0)+
1837  010754  020027  015646                      CMP     R0,#TLAST+10
1838  010760  001351                      BNE     5$
1839  010762  104402  001356                      TYPE    ,$QUES
1840  010766  000733                      BR      4$
1841  010770  012737  012170  001252      7$:     MOV     #TST1,$LPADR    ;PREPARE TEST ADDRESS
1842  010776                            8$:
1843  010776  000177  170250            RESTART:JMP     @$LPADR         ;GO START TESTING.***WARNING!****
1844                                                                    ;THIS JUMP IS USED BY POWER UP ROUTINE!!!!
1845
1846                                    ;THIS UTILITY SETS UP CSR'S,SETS UP VECTORS.
1847  011002  013700  002040            DZVLEV: MOV     DZVRIV,R0       ;PLACE THE BASE VECTOR ADDRESS IN R0
1848  011006  062700  000002                    ADD     #2,R0           ;CALCULATE THE RECEIVER INTERRUPT STATUS ADDR.
1849  011012  010037  002042                    MOV     R0,DZVRIS       ;STORE IT HERE
1850  011016  062700  000002                    ADD     #2,R0           ;CALCULATE THE TRANSMITTER INTERRUPT VECTOR
1851  011022  010037  002044                    MOV     R0,DZVTIV       ;STORE IT HERE
1852  011026  062700  000002                    ADD     #2,R0           ;CALCULATE THE TRANSMITTER VECTOR STATUS ADDRESS
1853  011032  010037  002046                    MOV     R0,DZVTIS       ;STORE IT HERE
1854
1855                                    ;THIS SEGMENT SETS UP POINTERS FOR THE GIVEN DZV11. $BASE IS THE BASE ADDRESS
1856                                    ;OF THE DEVICE
1857  011036  013700  001174                    MOV     $BASE,R0        ;COPY THE ADDRESS BEING LOADED
1858  011042  010037  002010                    MOV     R0,DZVCSR       ;XXX0
1859  011046  005200                            INC     R0
1860  011050  010037  002012                    MOV     R0,HDZVCSR      ;XXX1
1861  011054  005200                            INC     R0
1862  011056  010037  002014                    MOV     R0,DZVRBUF      ;XXX2
1863  011062  010037  002020                    MOV     R0,DZVLPR       ;XXX2
1864  011066  005200                            INC     R0
1865  011070  010037  002016                    MOV     R0,HDZVRBUF     ;XXX3
1866  011074  010037  002022                    MOV     R0,HDZVLPR      ;XXX3
1867  011100  005200                            INC     R0
1868  011102  010037  002024                    MOV     R0,DZVTCR       ;XXX4
1869  011106  005200                            INC     R0
1870  011110  010037  002026                    MOV     R0,HDZVTCR      ;XXX5
1871  011114  005200                            INC     R0
1872  011116  010037  002030                    MOV     R0,DZVMSR       ;XXX6
1873  011122  010037  002034                    MOV     R0,DZVTDR       ;XXX6
1874  011126  005200                            INC     R0
1875  011130  010037  002032                    MOV     R0,HDZVMSR      ;XXX7
1876  011134  010037  002036                    MOV     R0,HDZVTDR      ;XXX7
1877  011140  000207                            RTS     PC
```

```
1878
1879  011142  011605                        ;CONVERT DECIMAL ASCII STRING TO OCTAL
1880  011144  012537  011326        .PARMD: MOV     (SP),R5
1881  011150  012537  011330                MOV     (R5)+,6$
1882  011154  012537  011332                MOV     (R5)+,7$
1883  011160  112537  011334                MOV     (R5)+,8$
1884  011164  112537  011335                MOVB    (R5)+,9$
1885  011170  010516                        MOVB    (R5)+,10$
1886  011172  005005                        MOV     R5,(SP)
1887  011174  012704  010270        2$:     CLR     R5
1888  011200  122714  000015                MOV     #INBUF,R4
1889  011204  001424                        CMPB    #15,(R4)
1890  011206  121427  000060        1$:     BEQ     3$
1891  011212  002421                        CMPB    (R4),#'0
1892  011214  121427  000071                BLT     3$
1893  011220  003016                        CMPB    (R4),#'9
1894  011222  142714  000060                BGT     3$
1895  011226  005002                        BICB    #'0,(R4)
1896  011230  152402                        CLR     R2
1897  011232  060205                        BISB    (R4)+,R2
1898  011234  122714  000015                ADD     R2,R5
1899  011240  001410                        CMPB    #15,(R4)
1900  011242  006305                        BEQ     4$
1901  011244  010502                        ASL     R5      ;X2
1902  011246  006305                        MOV     R5,R2   ;SAVE X2
1903  011250  006305                        ASL     R5      ;X4
1904  011252  060205                        ASL     R5      ;X8
1905  011254  000754                        ADD     R2,R5   ;TIMES 10
1906  011256  104404                        BR      1$
1907  011260  000744        3$:     INSTER
1908                                        BR      2$
1909
1910                                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
1911  011262  020537  011330        4$:     CMP     R5,7$
1912  011266  101373                        BHI     3$
1913  011270  020537  011326                CMP     R5,6$
1914  011274  103770                        BLO     3$
1915  011276  133705  011334                BITB    9$,R5
1916  011302  001365                        BNE     3$
1917
1918                                        ;STORE NUMBER AT SPECIFIED ADDRESS
1919
1920  011304  013704  011332                MOV     8$,R4
1921  011310  010524        5$:     MOV     R5,(R4)+
1922  011312  062705  000002                ADD     #2,R5
1923  011316  105337  011335                DECB    10$
1924  011322  001372                        BNE     5$
1925  011324  000002                        RTI
1926  011326  000000        6$:     0
1927  011330  000000        7$:     0
1928  011332  000000        8$:     0
1929  011334     000        9$:     .BYTE 0
1930  011335     000        10$:    .BYTE 0
```

```
1931                                            ;*ROUTINE USED TO SET UP THE DIAGNOSTIC VIA APT.
1932                                            ;*IF BIT7 IN THE ENVIRONMENT MODE ($ENVM) BYTE IS SET,
1933                                            ;*THE PROGRAM WILL LOAD ITS PARAMETERS FROM THE ETABLE.
1934
1935  011336  012700  001500          SETAPT: MOV     #DZV.MAP,R0     ;POINT TO THE DEVICE MAP TABLE
1936  011342  013701  001174                  MOV     $BASE,R1        ;BUILD DEVICE ADDRESSES IN R1
1937  011346  013702  001170                  MOV     $VECT1,R2       ;BUILD DEVICE VECTORS IN R2
1938  011352  042702  177007                  BIC     #^C<770>,R2     ;STRIP AWAY OTHER INFORMATION
1939
1940  011356  012704  001204                  MOV     #$DDWD,R4       ;POINT TO THE BEGINNING OF DEVICE PARAMETERS
1941  011362  013705  001176                  MOV     $DEVM,R5        ;GET THE MAP OF ACTIVE DEVICES
1942  011366  105037  001414                  CLRB    DZVNUM          ;INITIALIZE NO. OF DEVICES IN SYSTEM
1943  011372  005037  001410                  CLR     SAVACTV         ;CLEAR THE ACTIVE BIT MAP
1944  011376  006005                  1$:     ROR     R5              ;GET A DEVICE SELECTION BIT
1945  011400  103407                          BCS     3$              ;IF IT IS SELECTED, GO SET UP A MAP
1946  011402  001422                          BEQ     5$              ;IF NO MORE ARE SELECTED, GET OUT OF SETUP
1947  011404  005724                          TST     (R4)+           ;POINT TO NEXT DEVICE DESCRIPTOR
1948  011406  062701  000010          2$:     ADD     #10,R1          ;SET UP THE NEXT ADDRESS
1949  011412  062702  000010                  ADD     #10,R2          ;SET UP THE NEXT VECTOR GROUP
1950  011416  000767                          BR      1$              ;GO SEE IF MORE DEVICES REMAIN
1951  011420  006137  001410          3$:     ROL     SAVACTV         ;SET BIT IN ACTIVE DEVICE MAP
1952  011424  105237  001414                  INCB    DZVNUM          ;INCREMENT NO. OF ACTIVE DEVICES IN SYSTEM
1953  011430  010120                          MOV     R1,(R0)+        ;LOAD DEVICE ADDRESS
1954  011432  010220                          MOV     R2,(R0)+        ;LOAD THE VECTOR ADDRESS
1955  011434  013720  001200                  MOV     $CDW1,(R0)+     ;GET THE NUMBER OF LINES IN OPERATION
1956  011440  012420                          MOV     (R4)+,(R0)+     ;LOAD DEVICE PARAMETERS
1957  011442  013720  001202                  MOV     $CDW2,(R0)+     ;LOAD DEFAULT TESTING MODE
1958  011446  000757                          BR      2$              ;GO BUILD THE NEXT ADDRESS
1959  011450  012710  177777          5$:     MOV     #-1,(R0)        ;TERMINATE THE DEVICE MAP
1960  011454  012737  001142  001304          MOV     #$SWREG,SWR     ;SET TO SOFTWARE APT SWITCH REGISTER
1961  011462  000207                          RTS     PC              ;RETURN TO PRINT STATUS TABLE
1962
1963
1964                                            ;*ROUTINE USED TO "AUTO SIZE" THE DZV11
1965                                            ;*CSR AND VECTOR.
1966                                            ;*NOTE:  THE CSR MAY BE ANY WHERE IN THE FLOATING
1967                                            ;*       ADDRESS RANGE (160000:163770)
1968                                            ;*       AND THE VECTOR MAY BE ANY WHERE IN THE
1969                                            ;*       FLOATING VECTOR RANGE (300:770)
1970                                            ;*
1971
1972  011464                          AUTO.SIZE:
1973  011464  000005                          RESET                   ;INSURE A BUS INIT.
1974  011466  105337  001422                  DECB    INIFLG          ;SHOW THAT I WAS HERE
1975  011472  012702  001500          CSRMAP: MOV     #DZV.MAP,R2     ;LOAD MAP POINTER.
1976  011476  012703  001204                  MOV     #$DDWD,R3       ;POINT TO ETABLE DEVICE DESCRIPTOR WORDS
1977  011502  005022                  1$:     CLR     (R2)+           ;ZERO ENTIRE MAP
1978  011504  022702  001740                  CMP     #DZV.END,R2     ;ALL DONE?
1979  011510  001374                          BNE     1$              ;BR IF NO
1980  011512  105037  001414                  CLRB    DZVNUM          ;SET OCTAL NUMBER OF DZV11'S TO 0
1981  011516  012702  001500                  MOV     #DZV.MAP,R2
1982  011522  012701  160000                  MOV     #160000,R1      ;SET FOR FIRST ADDRESS TO BE TESTED
1983  011526  012737  011772  000004          MOV     #6$,@#4         ;SET FOR NON-EXISTENT DEVICE TIME OUT
1984  011534  052711  000040          2$:     BIS     #BIT5,(R1)      ;TRY TO SET MASTER SCAN ENABLE
1985  011540  052761  000017  000004          BIS     #17,4(R1)       ;TRY TO TRANSMIT ON ANY LINE
1986  011546  005000                          CLR     R0              ;USE R0 AS A COUNTER
```

```
 1987  011550  005711                          7$:     TST     (R1)            ;HAS TRANSMITTER READY COME UP?
 1988  011552  100403                                  BMI     8$              ;IF SO, GO GET A FINAL CHECK
 1989  011554  005300                                  DEC     R0              ;REDUCE COUNT. TIME UP?
 1990  011556  001374                                  BNE     7$              ;IF NOT, KEEP WAITING
 1991  011560  000437                                  BR      3$              ;ASSUME IT'S NOT A DZV11
 1992  011562  032761  000017  000004          8$:     BIT     #17,4(R1)       ;ARE ANY TCR BITS  STILL SET? THEY SHOULD BE
 1993  011570  001433                                  BEQ     3$              ;IF IT'S NOT, ASSUME IT'S NOT A DZV11
 1994  011572  032711  000040                          BIT     #BIT5,(R1)      ;IS MASTER SCAN ENABLE STILL SET?
 1995  011576  001430                                  BEQ     3$              ;IF NOT, ASSUME IT'S NOT A DZV11
 1996  011600  052711  000020                          BIS     #20,(R1)        ;SET DEVICE CLEAR
 1997  011604  000240                                  NOP
 1998  011606  032711  000040                          BIT     #40,(R1)        ;DID SCANNER CLEAR
 1999  011612  001022                                  BNE     3$              ;IF NOT ASSUME IT IS NOT DZV
 2000  011614  005061  000004                          CLR     4(R1)           ;GET RID OF TCR BITS
 2001                                    ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A DZV11 CSR ADDRESS.
 2002  011620  010122                                  MOV     R1,(R2)+        ;STORE CSR IN CORE TABLE.
 2003  011622  005722                                  TST     (R2)+           ;POP OVER VECTOR STORE AREA
 2004  011624  012722  000017                          MOV     #17,(R2)+       ;SET THE DEFAULT LINE SELECTION PARAMETER
 2005  011630  012712  017470                          MOV     #17470,(R2)     ;SET THE DEFAULT PARAMETERS
 2006  011634  012223                                  MOV     (R2)+,(R3)+     ;COPY PARAMETERS INTO ETABLE DESCRIPTOR
 2007  011636  005022                                  CLR     (R2)+           ;SET THE DEFAULT MODE OF OPERATION
 2008  011640  012712  177777                          MOV     #-1,(R2)        ;TERMINATE LIST
 2009  011644  105237  001414                          INCB    DZVNUM          ;UPDATE DEVICE COUNTER
 2010  011650  122737  000020  001414                  CMPB    #20,DZVNUM      ;ARE MAX. NO. OF DEV FOUND?
 2011  011656  001405                                  BEQ     100$            ;YES DON'T LOOK FOR ANY MORE.
 2012  011660  062701  000010                  3$:     ADD     #10,R1          ;UPDATE CSR POINTER ADDRESS
 2013  011664  022701  164000                          CMP     #164000,R1
 2014  011670  001321                                  BNE     2$              ;BR IF MORE ADDRESS TO CHECK.
 2015  011672                                  100$:
 2016  011672  105737  001414                          TSTB    DZVNUM          ;WERE ANY DZV11'S FOUND AT ALL?
 2017  011676  001430                                  BEQ     5$              ;ERROR AUTO SIZER FOUND NO DZV11'S IN THIS SYS.
 2018  011700  113701  001414                          MOVB    DZVNUM,R1
 2019  011704  012737  000001  001410                  MOV     #1,SAVACTV      ;CREATE A BIT MAP OF THE ACTIVE
 2020  011712  005301                          4$:     DEC     R1              ;DEVICES IN THE SYSTEM
 2021  011714  001404                                  BEQ     98$
 2022  011716  000261                                  SEC
 2023  011720  006137  001410                          ROL     SAVACTV
 2024  011724  000772                                  BR      4$
 2025  011726  013737  001500  001174          98$:    MOV     DZCR0,$BASE     ;POINT TO THE ADDRESS OF FIRST DEVICE
 2026  011734  013737  001510  001202                  MOV     MANT0,$CDW2     ;INDICATE TO ETABLE WHAT MODE IS BEING USED
 2027  011742  012737  000006  000004          99$:    MOV     #6,@#4          ;RESTORE TRAP VECTOR
 2028  011750  013737  001410  001176                  MOV     SAVACTV,$DEVM   ;SAVE ACTIVE REGISTER
 2029  011756  000410                                  BR      VECMAP          ;GO FIND THE VECTOR NOW.
 2030  011760  104402  007513                  5$:     TYPE    ,MERR2          ;NOTIFY OPR THAT NO DZV11'S FOUND.
 2031  011764  005000                                  CLR     R0              ;MAKE DATA DISPLAY ZERO
 2032  011766  000000                                  HALT                    ;STOP THE SHOW
 2033  011770  000776                                  BR      .-2             ;DISABLE CONT. SW.
 2034  011772  012716  011660                  6$:     MOV     #3$,(SP)        ;ENTERED BY NON-EXISTENT TIME-OUT
 2035  011776  000002                                  RTI                     ;RETURN TO MAINSTREAM
 2036
 2037  012000  012737  000200  000022          VECMAP: MOV     #MASK,@#22      ;SET IOT TRAP PRIORITY
 2038  012006  012737  012122  000020                  MOV     #4$,@#20        ;SET IOT TRAP VECTOR
 2039  012014  012702  001500                          MOV     #DZV.MAP,R2     ;SET SOFTWARE POINTER
 2040  012020  012700  000300                          MOV     #300,R0         ;FLOATING VECTORS START HERE.
 2041  012024  012701  000302                          MOV     #302,R1         ;PC OF IOT INSTR.
 2042  012030  010120                          1$:     MOV     R1,(R0)+        ;START FILLING VECTOR AREA
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2043  012032  012721  000004                        MOV     #4,(R1)+        ;WITH .+2; IOT
2044  012036  022021                                CMP     (R0)+,(R1)+     ;ADD 2 TO R0 +R1
2045  012040  020127  001000                        CMP     R1,#1000        ;HAS THE VECTOR AREA BEEN EXCEEDED?
2046  012044  101771                                BLOS    1$              ;BR IF MORE TO FILL
2047  012046  013704  001410                        MOV     SAVACTV,R4      ;STORE TEMPORARILY
2048  012052  006004                     2$:        ROR     R4              ;BRING OUT A BIT
2049  012054  103036                                BCC     5$              ;BR IF ALL DONE
2050  012056  106427  000000                        MTPS    #0              ;ZERO CPU PRIO
2051  012062  012772  040040  000000                MOV     #BIT14+BIT5,2(R2)       ;SET TIE AND MAS SCAN
2052  012070  011201                                MOV     (R2),R1         ;GET CSR
2053  012072  112761  000017  000004                MOVB    #17,4(R1)       ;SET THE TCR BITS FOR ALL LINES
2054                                                                        ;ATTEMPT TO FORCE AN INTERRUPT
2055  012100  005200                                INC     R0              ;STALL
2056  012102  001376                                BNE     .-2             ;       FOR TIME TO INTERRUPT
2057  012104  012762  000300  000002                MOV     #300,2(R2)      ;NO INTERRUPT ASSUME 300 AND FIX DZV11 LATER
2058  012112  000005                                RESET                   ;INIT
2059  012114  062702  000012                3$:     ADD     #12,R2          ;POP SOFTWARE POINTER
2060  012120  000754                                BR      2$              ;KEEP GOING
2061  012122  011662  000002                4$:     MOV     (SP),2(R2)      ;GET VECTOR ADDRESS
2062  012126  162762  000010  000002                SUB     #10,2(R2)       ;POINT BACK TO THE CORRECT VECTOR
2063  012134  042762  000007  000002                BIC     #7,2(R2)        ;CLEAR JUNK
2064  012142  022626                                POP2SP                  ;POP IOT JUNK OFF STACK
2065  012144  012716  012114                        MOV     #3$,(SP)        ;SET FOR RETURN
2066  012150  000002                                RTI
2067  012152  013737  001502  001170        5$:     MOV     DZVC0,$VECT1    ;COPY VECTOR OF FIRST DEVICE INTO ETABLE
2068  012160  012737  004300  000020                MOV     #.SCOPE,IOTVEC  ;RESTORE THE SCOPE TRAP
2069  012166  000207                                RTS     PC              ;ALL DONE WITH "AUTO SIZING"
2070
```

```
                                                ;************************ TEST 1 *******************************
                                                ;*THIS TEST PROVES THE BUS REPLY RESPONSE
                                                ;*DURING A READ OR WRITE TO THE FOLLOWING ADDRESS:
                                                ;*      DZVCSR, DZVRBUF, DZVTCR, DZVMSR
                                        ;:*  TEST 1
                                        ;:*************************************************************************
012170  000004                          TST1:   SCOPE
012172  012737  000001  001246                  MOV     #1,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012200  012737  012360  001362                  MOV     #TST2,NEXT      ;POINT TO THE START OF THE NEXT TEST
012206  012737  012346  000004                  MOV     #5$,4           ;SET TRAP VECTOR
012214  012737  000200  000006                  MOV     #MASK,6         ;SET PRIORITY TO HIGH(MASK INTERRUPTS)
012222  012737  012230  001364                  MOV     #1$,LOCK        ;SET RETURN IF SW09=11
012230  013700  002010                  1$:     MOV     DZVCSR,R0       ;SET ADDRESS TO TEST
012234  011001                                  MOV     (R0),R1         ;READ THE ADDRESS
012236  000240                                  NOP                     ;WASTE TIME
012240  005010                                  CLR     (R0)            ;WRITE THE ADDRESS
012242  000240                                  NOP                     ;WASTE TIME
012244  012737  012252  001364                  MOV     #2$,LOCK        ;SET RETURN ADDRESS FOR SW09
012252  013700  002014                  2$:     MOV     DZVRBUF,R0      ;SET ADDRESS TO TEST
012256  011001                                  MOV     (R0),R1         ;READ THE ADDRESS
012260  000240                                  NOP                     ;
012262  005010                                  CLR     (R0)            ;WRITE THE ADDRESS
012264  000240                                  NOP                     ;WASTE TIME
012266  012737  012274  001364                  MOV     #3$,LOCK        ;SET RETURN ADDRESS FOR SW09
012274  013700  002024                  3$:     MOV     DZVTCR,R0       ;SET ADDRESS TO TEST
012300  011001                                  MOV     (R0),R1         ;READ THE ADDRESS
012302  000240                                  NOP
012304  005010                                  CLR     (R0)            ;WRITE THE ADDRESS
012306  000240                                  NOP
012310  012737  012316  001364                  MOV     #4$,LOCK        ;SET RETURN ADDRESS
012316  013700  002030                  4$:     MOV     DZVMSR,R0       ;SET ADDRESS TO TEST
012322  011001                                  MOV     (R0),R1         ;READ FROM ADDRESS
012324  000240                                  NOP
012326  005010                                  CLR     (R0)            ;WRITE THE ADDRESS
012330  000240                                  NOP                     ;
012332  012737  000006  000004                  MOV     #6,4            ;SET TRAP CATCHER BACK TO NORMAL
012340  005037  000006                          CLR     6               ;
012344  104400                                  ADVANCE                 ;SCOPE THIS TEST
012346  011601                          5$:     MOV     (SP),R1         ;SAVE PC OF TRAP
012350  022626                                  POP2SP                  ;POP TRAP OFF STACK
012352  104001                                  ERROR   1               ;*NO BUS REPLY RESPONSE.
012354  104401                                  SCOP1                   ;SW09=1?
012356  000111                                  JMP     (R1)            ;RTI
                                                ;************************ TEST 2 *******************************
                                                ;*THIS TEST PROVES THAT BIT "DCLR"
                                                ;*CAN BE SET AND THAT IT WILL CLEAR
                                                ;*BY ITSELF
                                        ;:*  TEST 2
                                        ;:*************************************************************************
012360  000004                          TST2:   SCOPE
012362  012737  000002  001246                  MOV     #2,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012370  012737  012424  001362                  MOV     #TST3,NEXT      ;POINT TO THE START OF THE NEXT TEST
012376  013700  002010                          MOV     DZVCSR,R0       ;SET POINTER
012402  012710  000020                          MOV     #DCLR,(R0)      ;SET DCLR
012406  005005                                  CLR     R5              ;SET EXPECTED TO 0
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2127  012410  005003                          CLR     R3              ;DUAL LOOP COUNTER
2128  012412  011004                  2$:     MOV     (R0),R4         ;IS DCLR CLEAR?
2129  012414  001403                          BEQ     3$              ;IF YES , GO TO THE NEXT TEST
2130  012416  105203                          INCB    R3              ;IF NO,COUNT 1 OF 256 TICKS
2131  012420  001374                          BNE     2$              ;HAS THE TIME EXPIRED? IF NO, GO TEST BIT AGAIN
2132  012422  104002                          ERROR   2               ;*DCLR FAILED TO CLEAR
2133  012424                          3$:
2134                                          ;********************** TEST 3 ******************************
2135                                          ;*TEST TO VERIFY THAT THE R/W BITS OF THE
2136                                          ;*DZVCSR REGISTER CAN BE SET. THEN VERIFY THAT
2137                                          ;*THESE BITS CAN BE CLEARED. AND FINALLY, VERIFY
2138                                          ;*THAT AFTER BEING SET AGAIN THEY CAN BE
2139                                          ;*CLEARED BY A "DEVICE CLEAR".
2140                                          ;*THE BITS TESTED ARE:  MAINT, MSENAB, SILOEN,
2141                                          ;*RIE, AND TIE.
2142                                  ;:*  TEST 3
2143                                  ;;*************************************************************
2144  012424  000004                  TST3:   SCOPE
2145  012426  012737  000003  001246          MOV     #3,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
2146  012434  012737  012602  001362          MOV     #TST4,NEXT      ;POINT TO THE START OF THE NEXT TEST
2147  012442  013700  002010                  MOV     DZVCSR,R0       ;GET BASE ADDRESS
2148  012446  012703  012562                  MOV     #5$,R3          ;SET R3 TO TOP OF TABLE
2149  012452  011305                  1$:     MOV     (R3),R5         ;SET BIT
2150  012454  012737  012462  001364          MOV     #11$,LOCK       ;SETUP FOR TIGHT SCOPE LOOP
2151  012462  010510                  11$:    MOV     R5,(R0)         ;SET BIT IN DEVICE
2152  012464  011004                          MOV     (R0),R4         ;READ THE BIT FROM DEVICE
2153  012466  020504                          CMP     R5,R4           ;WAS BIT SET?
2154  012470  001401                          BEQ     2$              ;BR IF YES
2155  012472  104002                          ERROR   2               ;*BIT R/W FAILURE
2156  012474  104401                  2$:     SCOP1                   ;IS SWITCH 9 SET?
2157  012476  012737  012504  001364          MOV     $12$,LOCK       ;SET FOR NEXT TIGHT SCOPE LOOP
2158  012504  040510                  12$:    BIC     R5,(R0)         ;CLEAR THE BIT.
2159  012506  011004                          MOV     (R0),R4         ;READ DEVICE
2160  012510  001403                          BEQ     3$              ;BR IF BITS WERE CLEARED.
2161  012512  005005                          CLR     R5              ;CLEAR FOR ERROR PRINTOUT
2162  012514  104002                          ERROR   2               ;*BIT FAILED TO CLEAR
2163  012516  011305                          MOV     (R3),R5         ;RESTORE THE BIT.
2164  012520  104401                  3$:     SCOP1                   ;SW09 SET?
2165  012522  012737  012530  001364          MOV     #13$,LOCK       ;SET UP FOR NEXT TIGHT SCOPE
2166  012530  010510                  13$:    MOV     R5,(R0)         ;SET THE BIT AGAIN
2167  012532  104413                          DEVICE.CLR              ;ISSUE DEVICE CLEAR
2168  012534  011004                          MOV     (R0),R4         ;READ THE BIT.
2169  012536  001403                          BEQ     4$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR)
2170  012540  005005                          CLR     R5              ;SET EXPECTED TO ZERO
2171  012542  104002                          ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
2172  012544  011305                          MOV     (R3),R5         ;RESTORE BIT AGAIN
2173  012546  104401                  4$:     SCOP1                   ;SW09 SET?
2174  012550  062703  000002                  ADD     #2,R3           ;POP R3
2175  012554  005713                          TST     (R3)            ;IS THIS THE END OF TABLE?
2176  012556  001407                          BEQ     6$              ;IF YES GET OUT
2177  012560  000734                          BR      1$              ;OTHERWISE TEST NEXT BIT
2178  012562  000010                  5$:     #MAINT                  ;CSR BIT: INTERNAL MAINTENANCE
2179  012564  000040                          #MSENAB                 ;CSR BIT: MASTER SCAN ENABLE
2180  012566  010000                          #SILOEN                 ;CSR BIT: SILO ENABLE
2181  012570  000100                          #RIE                    ;CSR BIT: RECEIVER INTER. ENABLE
2182  012572  040000                          #TIE                    ;CSR BIT: TRANS. INTER. ENABLE
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2183  012574  000000                          #0                      ;END OF TABLE
2184  012576  005037  001364          6$:     CLR     LOCK            ;ZERO LOCK INDICATOR
2185                                          ;************************ TEST 4 ******************************
2186                                          ;*THIS TESTS THAT ALL OF THE TCR BITS
2187                                          ;*CAN BE: SET, CLEARED, AND CLEARED BY A DEVICE CLEAR.
2188                                          ;*THIS TEST ALSO DETERMINES IF THE DTR BITS CAN
2189                                          ;*BE SET, CLEARED, AND CLEARED BY A RESET.
2190                                  ;:*  TEST 4
2191                                  ;;**************************************************************
2192  012602  000004                  TST4:   SCOPE
2193  012604  012737  000004  001246          MOV     #4,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
2194  012612  012737  013006  001362          MOV     #TST5,NEXT      ;POINT TO THE START OF THE NEXT TEST
2195  012620  013700  002024                  MOV     DZVTCR,R0       ;SET DEVICE ADDRESS
2196  012624  012703  012712                  MOV     #5$,R3          ;SET R3 POINTER TO TOP OF TABLE
2197  012630  012737  012640  001364  1$:     MOV     #11$,LOCK       ;SET LOCK FOR SW09 SCOPE LOOP
2198  012636  011305                          MOV     (R3),R5         ;SET EXPECTED RESULTS
2199  012640  010510                  11$:    MOV     R5,(R0)         ;SET THE BIT
2200  012642  011004                          MOV     (R0),R4         ;READ THE BIT FROM THE DEVICE
2201  012644  020504                          CMP     R5,R4           ;DID THE BIT SET?
2202  012646  001401                          BEQ     2$              ;BR IF YES
2203  012650  104002                          ERROR   2               ;*BIT FAILED TO SET.
2204  012652  104401                  2$:     SCOP1                   ;SW09 SET?
2205  012654  012737  012662  001364          MOV     #3$,LOCK        ;SET UP FOR NEXT TIGHT SCOPE LOOP
2206  012662  040510                  3$:     BIC     R5,(R0)         ;CLEAR THE BIT
2207  012664  011004                          MOV     (R0),R4         ;READ THE REGISTER
2208  012666  001403                          BEQ     4$              ;BR IF YES
2209  012670  005005                          CLR     R5              ;SET EXPECTED TO 0
2210  012672  104002                          ERROR   2               ;*REPORT BIT NOT CLEAR
2211  012674  011305                          MOV     (R3),R5         ;RESTORE R5
2212  012676  104401                  4$:     SCOP1                   ;SW09 SET?
2213  012700  062703  000002                  ADD     #2,R3           ;POP POINTER TO NEXT TABLE ENTRY
2214  012704  005713                          TST     (R3)            ;END OF TABLE?
2215  012706  001412                          BEQ     6$              ;IF YES JUMP OVER TABLE
2216  012710  000747                          BR      1$              ;START TESTING NEXT BIT
2217  012712  000001                  5$:     #TCR0                   ;TCR BIT FOR LINE 0
2218  012714  000002                          #TCR1                   ;TCR BIT FOR LINE 1
2219  012716  000004                          #TCR2                   ;TCR BIT FOR LINE 2
2220  012720  000010                          #TCR3                   ;TCR BIT FOR LINE 3
2221  012722  000400                          #DTR0                   ;DTR BIT FOR LINE 0
2222  012724  001000                          #DTR1                   ;DTR BIT FOR LINE 1
2223  012726  002000                          #DTR2                   ;DTR BIT FOR LINE 2
2224  012730  004000                          #DTR3                   ;DTR BIT FOR LINE 3
2225  012732  000000                          #0                      ;END OF TABLE
2226  012734  005037  001364          6$:     CLR     LOCK            ;CLEAR TIGHT SCOPE LOOP INDIC.
2227  012740  012710  177777                  MOV     #-1,(R0)        ;SET ALL BITS IN TCR REGISTER
2228  012744  012705  007400                  MOV     #007400,R5      ;SET EXPECTED
2229  012750  104413                          DEVICE.CLR              ;SET DCLR BIT IN CSR
2230  012752  011004                          MOV     (R0),R4         ;READ REGISTER
2231  012754  020504                          CMP     R5,R4           ;TCR BITS CLEARED?
2232  012756  001401                          BEQ     7$              ;IF YES BRANCH
2233  012760  104002                          ERROR   2               ;TCR BITS NOT CLEARED!
2234  012762  005005                  7$:     CLR     R5              ;SET EXPECTED TO ZERO
2235  012764  005227  000000          8$:     INC     #0              ;DELAY FOR ACT
2236  012770  001375                          BNE     8$              ;
2237  012772  012710  177777                  MOV     #-1,(R0)        ;SET ALL POSSIBLE BITS
2238  012776  000005                          RESET                   ;DO BUS INIT
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2239  013000  011004                        MOV     (R0),R4         ;DID REGISTER CLEAR?
2240  013002  001401                        BEQ     9$              ;IF YES GET OUT
2241  013004  104002                        ERROR   2               ;REGISTER DID NOT CLEAR!
2242  013006                          9$:
2243                                          ;************************ TEST 5 *******************************
2244                                          ;*THIS TEST VERIFIES THAT
2245                                          ;*BITS "RDONE,TRDY, BIT9, BIT8,
2246                                          ;*AND SILOAL" ARE READ ONLY AND THAT TRDY IS
2247                                          ;*ZERO UNTIL A LINE IS SELECTED AND MSENAB IS SET.
2248                                          ;*
2249                                    ;:*  TEST 5
2250                                    ;:*************************************************************************
2251  013006  000004                   TST5:   SCOPE
2252  013010  012737  000005  001246           MOV     #5,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
2253  013016  012737  013110  001362           MOV     #TST6,NEXT      ;POINT TO THE START OF THE NEXT TEST
2254  013024  013700  002010                   MOV     DZVCSR,R0       ;SET ADDRESS TO R0
2255  013030  104413                           DEVICE.CLR              ;DO A DEVICE CLEAR
2256  013032  005005                           CLR     R5              ;SET EXPECTED TO 0
2257  013034  012710  121600                   MOV     #RDONE+TRDY+BIT9+BIT8+SILOAL,(R0)
2258                                                                    ;WRITE THE BITS
2259  013040  011004                           MOV     (R0),R4         ;READ BACK THE BITS
2260  013042  001401                           BEQ     2$              ;BR IF NONE ARE SET.
2261  013044  104002                           ERROR   2               ;*BITS WERE SET.
2262  013046  012705  100040           2$:     MOV     #TRDY+MSENAB,R5 ;SET EXPECTED BIT
2263  013052  052777  000017  166744           BIS     #17,@DZVTCR     ;SET TCR BITS FOR ALL LINES
2264  013060  052710  000040                   BIS     #MSENAB,(R0)    ;SET SCAN ENABLE
2265  013064  005002                           CLR     R2              ;SET COUNTER TO ZERO
2266  013066  011004                   3$:     MOV     (R0),R4         ;READ THE REGISTER
2267  013070  042704  001400                   BIC     #BIT9!BIT8,R4   ;MASK OUT LINE NO.
2268  013074  020504                           CMP     R5,R4           ;BIT SET?
2269  013076  001404                           BEQ     4$              ;BR IF YES
2270  013100  104414                           DELAY                   ;STALL TIME
2271  013102  005202                           INC     R2              ;UPDATE COUNTER
2272  013104  001370                           BNE     3$              ;BR IF COUNTER NOT DONE.
2273  013106  104002                           ERROR   2               ;*TRDY NOT SET!
2274  013110                          4$:
2275                                          ;************************ TEST 6 *******************************
2276                                          ;*THIS TEST VERIFIES THAT:
2277                                          ;*TIE,SILOEN,RIE,MSENAB,AND MAINT ARE THE
2278                                          ;*ONLY R/W BITS IN THE DZVCSR AND THAT
2279                                          ;*SETTING "DCLR" IN THE CSR WILL CLEAR THESE BITS.
2280                                    ;:*  TEST 6
2281                                    ;:*************************************************************************
2282  013110  000004                   TST6:   SCOPE
2283  013112  012737  000006  001246           MOV     #6,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
2284  013120  012737  013240  001362           MOV     #TST7,NEXT      ;POINT TO THE START OF THE NEXT TEST
2285  013126  104413                           DEVICE.CLR              ;SET DCLR IN CSR
2286  013130  013700  002010                   MOV     DZVCSR,R0       ;SET UP FOR ERROR MESSAGE
2287  013134  012710  177757                   MOV     #^C<DCLR>,(R0)  ;TRY TO SET ALL BITS EXCEPT DCLR
2288  013140  012705  050150                   MOV     #TIE!SILOEN!RIE!MSENAB!MAINT,R5 ;MAKE EXPECTED
2289  013144  011004                           MOV     (R0),R4         ;ACTUAL
2290  013146  020405                           CMP     R4,R5           ;CMP EXPECTED VS ACTUAL
2291  013150  001401                           BEQ     1$              ;YES
2292  013152  104002                           ERROR   2               ;*NO
2293  013154  105010                   1$:     CLRB    (R0)            ;CLEAR LOW BYTE OF CSR
2294  013156  105005                           CLRB    R5              ;CLEAR LOW BYTE OF EXPECTED DATA
```

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2295  013160  011004                        MOV     (R0),R4         ;READ CSR
2296  013162  020405                        CMP     R4,R5           ;DOES CSR COMPARE WITH EXPECTED?
2297  013164  001401                        BEQ     3$              ;BRANCH IF YES
2298  013166  104002                        ERROR   2               ;IF NOT PRINT ERROR
2299  013170  012710  177757          3$:   MOV     #^C<DCLR>,(R0)  ;SET ALL CSR BITS POSSIBLE
2300  013174  105077  166612                CLRB    @#DZVCSR        ;CLEAR HIGH BYTE OF CSR
2301  013200  012705  000150                MOV     #RIE!MSENAB!MAINT,R5    ;SET EXPECTED IN R5
2302  013204  011004                        MOV     (R0),R4         ;READ CSR REGISTER
2303  013206  020405                        CMP     R4,R5           ;DOES ACTUAL=EXPECTED
2304  013210  001401                        BEQ     4$              ;IF YES CONTINUE
2305  013212  104002                        ERROR   2               ;IF NO PRINT ERROR
2306  013214  012710  177757          4$:   MOV     #^C<DCLR>,(R0)  ;SET ALL POSSIBLE CSR BITS
2307  013220  005005                        CLR     R5              ;SET R5 TO EXPECTED RESULTS
2308  013222  052710  000020                BIS     #DCLR,(R0)      ;DEVICE MASTER RESET
2309  013226  000240                        NOP
2310  013230  011004                        MOV     (R0),R4         ;ACTUAL
2311  013232  020405                        CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2312  013234  001401                        BEQ     2$              ;YES
2313  013236  104002                        ERROR   2               ;*NO
2314  013240                          2$:
2315                                        ;************************ TEST 7 ******************************
2316                                        ;*THIS TEST PERFORMS RESET TESTING AND
2317                                        ;*TESTING OF READ ONLY REGISTER DZVRBUF
2318                                        ;*AND TESTING OF WRITE ONLY REGISTER DZVLPR
2319                                  ;;*  TEST 7
2320                                  ;;*************************************************************
2321  013240  000004                  TST7:  SCOPE
2322  013242  012737  000007  001246         MOV     #7,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
2323  013250  012737  013324  001362         MOV     #TST10,NEXT     ;POINT TO THE START OF THE NEXT TEST
2324  013256  104413                        DEVICE.CLR              ;CLEAR DZV11
2325  013260  013700  002014                MOV     DZVRBUF,R0      ;SET UP FOR ERROR MESSAGE
2326  013264  011005                        MOV     (R0),R5         ;COPY PRESENT CONTENTS
2327  013266  042705  106000                BIC     #DVALID!BIT11!BIT10,R5 ;CLEAR ILLEGAL BITS
2328  013272  012777  177777  166520        MOV     #-1,@DZVLPR     ;TRY TO WRITE ALL 1'S
2329  013300  011004                        MOV     (R0),R4         ;ACTUAL
2330  013302  020405                        CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2331  013304  001401                        BEQ     1$              ;IF YES,GO CONTINUE PROCESSING
2332  013306  104002                        ERROR   2               ;*ERROR- BIT PATTERN NOT CORRECT
2333  013310  005077  166504          1$:   CLR     @DZVLPR ;TRY TO WRITE ALL ZEROES
2334  013314  011004                        MOV     (R0),R4         ;READ REGISTER
2335  013316  020405                        CMP     R4,R5           ;CMP ACTUAL VS. EXPECTED
2336  013320  001401                        BEQ     2$              ;BRANCH IF EQUAL
2337  013322  104002                        ERROR   2               ;VALUES DID NOT COMPARE
2338  013324                          2$:
2339                                        ;************************ TEST 10 *****************************
2340                                        ;*THIS TEST PERFORMS RESET TESTING AND
2341                                        ;*TESTING OF READ ONLY REGISTER DZVMSR
2342                                        ;*AND TESTING OF WRITE ONLY REGISTER DZVTDR
2343                                  ;;*  TEST 10
2344                                  ;;*************************************************************
2345  013324  000004                  TST10: SCOPE
2346  013326  012737  000010  001246         MOV     #10,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2347  013334  012737  013410  001362         MOV     #TST11,NEXT     ;POINT TO THE START OF THE NEXT TEST
2348  013342  104413                        DEVICE.CLR              ;CLEAR DZV11
2349  013344  013700  002030                MOV     DZVMSR,R0       ;SET UP FOR ERROR MESSAGE
2350  013350  011005                        MOV     (R0),R5         ;COPY PRESENT CONTENTS
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2351  013352  042705  170360                      BIC     #170360,R5      ;CLEAR ILLEGAL BITS
2352  013356  112777  177777  166450              MOVB    #-1,@DZVTDR     ;TRY TO WRITE ALL 1'S
2353  013364  011004                              MOV     (R0),R4         ;ACTUAL
2354  013366  020405                              CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2355  013370  001401                              BEQ     1$              ;IF YES,GO CONTINUE PROCESSING
2356  013372  104002                              ERROR   2               ;*ERROR- BIT PATTERN NOT CORRECT
2357  013374  005077  166434              1$:     CLR     @DZVTDR ;TRY TO WRITE ALL ZEROES
2358  013400  011004                              MOV     (R0),R4         ;READ REGISTER
2359  013402  020405                              CMP     R4,R5           ;CMP ACTUAL VS. EXPECTED
2360  013404  001401                              BEQ     2$              ;BRANCH IF EQUAL
2361  013406  104002                              ERROR   2               ;VALUES DID NOT COMPARE
2362  013410                              2$:
2363
2364                                              ;************************ TEST 11 *******************************
2365                                              ;*VERIFY THAT SETTING "DTR" FOR A LINE WILL
2366                                              ;*BRING UP "CO" AND "RING" FOR:
2367                                              ;*THE SAME LINE IF IN EXTERNAL MODE
2368                                              ;*THE STAGGERED LINE IF IN STAGGERED MODE.
2369                                              ;*LINES ARE STAGGERED AS FOLLOWS:
2370                                              ;*LINE0 WITH LINE1; LINE2 WITH LINE3.
2371                                              ;*THIS TEST IS ONLY RUN IF AN H325,OR H329
2372                                              ;*IS CONNECTED ON THE DZV UNDER TEST.
2373
2374                                      ;;*  TEST 11
2375                                      ;;*************************************************************************
2376  013410  000004                      TST11:  SCOPE
2377  013412  012737  000011  001246              MOV     #11,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2378  013420  012737  013604  001362              MOV     #TST12,NEXT     ;POINT TO THE START OF THE NEXT TEST
2379  013426  005737  001372                      TST     MODE            ;TEST TO SEE IF TESTING WITH
2380  013432  001001                              BNE     8$              ;CONNECTOR
2381  013434  104400                              ADVANCE                 ;IF NO, GO TO NEXT TEST
2382  013436  012737  013526  001364      8$:     MOV     #10$,LOCK       ;SET FOR TIGHT SCOPE LOOP
2383  013444  104413                              DEVICE.CLR              ;SET DCLR IN CSR TO ZERO DEVICE
2384  013446  013700  002030                      MOV     DZVMSR,R0       ;SET REGISTER
2385  013452  005003                              CLR     R3              ;ZERO LINE NUMBER
2386  013454  012702  000001                      MOV     #1,R2           ;SET POINTER
2387  013460  130237  001366              1$:     BITB    R2,LINE         ;TEST THIS LINE?
2388  013464  001003                              BNE     3$              ;YES
2389  013466  005203                      2$:     INC     R3              ;LINE #
2390  013470  104420                              SHIFT                   ;GET NEXT LINE
2391  013472  000772                              BR      1$              ;TEST NEXT LINE
2392  013474  010204                      3$:     MOV     R2,R4           ;SAVE BINARY BIT FOR LINE #
2393  013476  105737  001372                      TSTB    MODE            ;RUNNING IN EXTERNAL MODE?
2394  013502  100406                              BMI     5$              ;IF YES SKIP STAGGERED SETUP
2395  013504  032703  000001                      BIT     #BIT0,R3        ;IF EVEN LINE
2396  013510  001402                              BEQ     4$              ;GO GET ODD PARTNER
2397  013512  006204                              ASR     R4              ;OTHERWISE GET EVEN COMPANION
2398  013514  000401                              BR      5$              ;GO SETUP EXPECTED RESULTS
2399  013516  006304                      4$:     ASL     R4              ;FIND ODD PARTNER
2400  013520  010405                      5$:     MOV     R4,R5           ;LOAD R5 FOR EXPECTED
2401  013522  000305                              SWAB    R5              ;PLACE IN UPPER BYTE
2402  013524  150405                              BISB    R4,R5           ;SET FOR RING BITS
2403  013526  150277  166274              10$:    BISB    R2,@HDZVTCR     ;SET DTR BIT
2404  013532  104414                              DELAY                   ;DELAY FOR CABLE LAG
2405  013534  011004                              MOV     (R0),R4         ;MOVE RESULTS OF MSR REGISTER TO R4
2406  013536  020504                              CMP     R5,R4           ;RESULTS=EXPECTED?
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2407  013540  001401                          BEQ     6$              ;IF YES CONTINUE
2408  013542  104002                          ERROR   2               ;IF NOT PRINT ERROR RESULTS
2409  013544  104401                  6$:     SCOP1                   ;IS SW09 SET?
2410  013546  012737  013554  001364          MOV     #11$,LOCK       ;SET UP FOR NEXT TIGHT SCOPE
2411  013554  140277  166246          11$:    BICB    R2,@#DZVTCR     ;CLEAR  DTR BIT FOR LINE UNDER TEST
2412  013560  104414                          DELAY                   ;DELAY FOR CABLE LAG
2413  013562  011004                          MOV     (R0),R4         ;LOAD MSR REGISTER INTO R4
2414  013564  001402                          BEQ     7$              ;IF CO AND RING CLEARED CONTINUE
2415  013566  005005                          CLR     R5              ;OTHERWISE SET EXPECTED FOR ERROR
2416  013570  104002                          ERROR   2               ;PRINTOUT
2417  013572  104401                  7$:     SCOP1                   ;IS SW09 SET?
2418  013574  012737  013526  001364          MOV     #10$,LOCK       ;RESET TIGHT SCOPE LOOP
2419  013602  000731                          BR      2$              ;GET NEXT LINE
2420
2421                                          ;********************** TEST 12 ******************************
2422                                          ;* THIS TEST VERIFIES THAT TRDY IS SET WHEN A LINE
2423                                          ;* IS READY TO BE LOADED, AND THAT THE LINE SPECI-
2424                                          ;* FIED IN BITS 8-9 OF DZVCSR CORRESPOND
2425                                          ;* TO THE LINE SELECTED IN DZVTCR
2426                                  ;:*  TEST 12
2427                                  ;:************************************************************************
2428  013604  000004                  TST12:  SCOPE
2429  013606  012737  000012  001246          MOV     #12,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2430  013614  012737  013736  001362          MOV     #TST13,NEXT     ;POINT TO THE START OF THE NEXT TEST
2431  013622  104413                          DEVICE.CLR              ;ISSUE A "DEVICE CLEAR" (RESET)
2432  013624  012737  013660  001364          MOV     #2$,LOCK        ;SET UP FOR TIGHT SCOPE LOOP
2433  013632  005037  001374                  CLR     SAVLIN          ;INITIALIZE FOR ERROR PRINTOUT
2434  013636  013700  002010                  MOV     DZVCSR,R0       ;SET POINTER
2435  013642  012705  100040                  MOV     #MSENAB!TRDY,R5 ;START THE EXPECTED LINE NUMBER AT 0
2436  013646  012702  000001                  MOV      #1,R2          ;USING R2 AS A BIT POINTER, POINT TO LINE 0
2437  013652  130237  001366          1$:     BITB    R2,LINE         ;IS THIS LINE SELECTED?
2438  013656  001421                          BEQ     6$              ;IF NO, SKIP THE STARTUP
2439  013660  050277  166140          2$:     BIS     R2,@DZVTCR      ;SET THE GO BIT FOR THIS LINE
2440  013664  052710  000040                  BIS     #MSENAB,(R0)    ;START THE SCANNER
2441  013670  005004                          CLR     R4              ;SET FOR DELAY
2442  013672  005710                  3$:     TST     (R0)            ;TX READY?
2443  013674  100404                          BMI     4$              ;BR IF YES
2444  013676  104414                          DELAY                   ;DELAY
2445  013700  005204                          INC     R4              ;COUNTER
2446  013702  001373                          BNE     3$              ;BR IF <>0!
2447  013704  104003                          ERROR   3               ;*TX NOT READY!
2448  013706  011004                  4$:     MOV     (R0),R4         ;GET THE LINE POINTED TO BY THE SCANNER
2449  013710  020405                          CMP     R4,R5           ;IS THE LINE NUMBER WHAT IT SHOULD BE?
2450  013712  001401                          BEQ     5$              ;IF YES,GO WORK ON THE NEXT LINE
2451  013714  104002                          ERROR   2               ;*LINE NUMBER DID NOT MATCH TCR BIT
2452  013716  104401                  5$:     SCOP1                   ;IS SW09 SET?
2453  013720  104413                          DEVICE.CLR              ;SET DCLR IN CSR;SETUP FOR NEXT LINE
2454  013722  062705  000400          6$:     ADD     #400,R5         ;POINT TO THE NEXT EXPECTED LINE
2455  013726  104420                          SHIFT                   ;POINT TO THE NEXT LINE.ARE ALL LINES TESTED?
2456  013730  005237  001374                  INC     SAVLIN          ;ADJUST FOR ERROR PRINTOUT
2457  013734  000746                          BR      1$              ;IF NOT, GO DO THE NEXT LINE
2458                                          ;********************** TEST 13 ******************************
2459                                          ;*TEST TO TRANSMIT ONE CHAR AND
2460                                          ;*RECEIVE ONE CHAR ON ONE LINE
2461                                          ;*AT A TIME. THE CHAR IS "252" AND
2462                                          ;*ALL SELECTED LINES WILL BE TURNED ON .
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                                                ;*THIS IS THE FIRST TIME ANY
                                                ;*DATA IS CHECKED IN THE RECEIVER,
                                                ;*USING SWITCH NINE WITH THIS TEST CREATES A TIGHT SCOPE LOOP
                                                ;*WHICH TRANSMITS A STEADY STREAM OF CHARACTERS.
                                        ;:*  TEST 13
                                        ;:*****************************************************************
013736  000004                        TST13:  SCOPE
013740  012737  000013  001246                MOV     #13,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
013746  012737  014226  001362                MOV     #TST14,NEXT     ;POINT TO THE START OF THE NEXT TEST
013754  012737  014210  001364                MOV     #16$,LOCK       ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELEC
013762  104417                                DCLASM                  ;SET DCLR IN CSR AND SET MAINT MODE
013764  104421                                LPRSET                  ;LOAD LPR REGISTER FOR ALL LINES
013766  005037  001374                        CLR     SAVLIN          ;INIT. FOR ERROR PRINTOUT
013772  105037  001425                        CLRB    DONFLG          ;INIT FOR TCR BIT HANDLER
013776  012702  000001                        MOV     #1,R2           ;LINE POINTER
014002  012701  000252                        MOV     #252,R1         ;SAVE CHARACTER TO BE TRANSMITTED
014006  052777  000040  165774                BIS     #MSENAB,@DZVCSR ;START SCANNER
014014  030237  001366                3$:     BIT     R2,LINE         ;VALID LINE ?
014020  001467                                BEQ     15$             ;NO SET UP NEXT LINE
014022  010277  165776                        MOV     R2,@DZVTCR      ;SET TCR BIT
014026  005005                        5$:     CLR     R5              ;SET R5 FOR A DELAY LOOP
014030  105777  165754                        TSTB    @DZVCSR         ;IS REC DONE = 0 ?
014034  100001                                BPL     6$              ;IF YES, ALLOW TIME FOR TRDY TO SET
014036  104020                                ERROR   20              ;*REC DONE SHOULD = 0
014040  005777  165744                6$:     TST     @DZVCSR         ;TRDY SET?
014044  100404                                BMI     7$              ;IF YES BRANCH
014046  104414                                DELAY                   ;IF NO THEN WAIT FOR IT
014050  005205                                INC     R5              ;DELAY LOOP
014052  001372                                BNE     6$              ;BRANCH BACK AND TEST AGAIN
014054  104003                                ERROR   3               ;*TRDY FAILED TO SET!
014056  105737  001425                7$:     TSTB    DONFLG          ;HAVE WE ALREADY SENT CHARAC.
014062  001041                                BNE     13$             ;IF YES GO CLEAR TCR BIT
014064  105237  001425                        INCB    DONFLG          ;IF NOT INDICATE HAVING BEEN HERE
014070  110177  165740                        MOVB    R1,@DZVTDR      ;LOAD CHARACTER
014074  013705  001374                        MOV     SAVLIN,R5       ;MAKE EXPECTED LINE #
014100  005737  001372                        TST     MODE            ;IS THIS TEST IN STAGGERED MODE?
014104  100006                                BPL     10$             ;IF NOT, SKIP STAGGERED SETUP
                                        ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
014106  006205                                ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
014110  103402                                BCS     8$              ;IF IT IS SET, GO CLEAR IT
014112  000261                                SEC                     ;IF IT IS CLEAR SET IT HERE
014114  000401                                BR      9$              ;SKIP THE CLEARING
014116  000241                        8$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
014120  006105                        9$:     ROL     R5              ;GET THE NEW BIT BACK INTO R5
014122  000305                        10$:    SWAB    R5              ;MOVE THE LINE NUMBER TO THE UPPER BYTE
014124  150105                                BISB    R1,R5           ;ADD CHARACTER
014126  052705  100000                        BIS     #DVALID,R5      ;ADD DATA VALID
014132  005003                                CLR     R3
014134  105777  165650                11$:    TSTB    @DZVCSR         ;IS RDONE SET?
014140  100404                                BMI     12$             ;IF YES GO GET CHAR.
014142  104414                                DELAY                   ;IF NOT THEN WAIT
014144  005203                                INC     R3              ;DELAY LOOP
014146  001372                                BNE     11$             ;DELAY DONE?
014150  104004                                ERROR   4               ;*RDONE FAILED TO SET!
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2519  014152  017704  165636          12$:    MOV     @DZVRBUF,R4     ;LOAD THE VALUE ACTUALLY RECEIVED
2520  014156  020405                          CMP     R4,R5           ;COMPARE ACTUAL VS EXPECTED. ARE THEY THE SAME?
2521  014160  001722                          BEQ     5$              ;IF YES, GO DO THE NEXT LINE
2522  014162  104006                          ERROR   6               ;*NO DATA/CONTENTS DID NOT COMPARE
2523  014164  000720                          BR      5$              ;GO BACK AND WAIT TO CLEAR TCR BIT
2524  014166  104401                  13$:    SCOP1                   ;CHECK TO SEE IF SWITCH NINE IS SET
2525  014170  105037  001425                  CLRB    DONFLG          ;SET UP FOR NEXT LINE
2526  014174  005077  165624                  CLR     @DZVTCR         ;CLEAR PREVIOUS TCR BIT
2527  014200  005237  001374          15$:    INC     SAVLIN          ;SET LINE INDICATOR FOR NEXT LINE
2528  014204  104420                          SHIFT                   ;CALCULATE NEXT LINE
2529  014206  000702                          BR      3$              ;GET GET STARTED
2530
2531                                    ;TIGHT SCOPE LOOP FOR THIS TEST. LOOP TRANSMITS CHARACTERS ONLY
2532
2533  014210  005777  165574          16$:    TST     @DZVCSR         ;IS TRANSMITTER READY?
2534  014214  100375                          BPL     16$             ;IF NOT, WAIT FOR IT
2535  014216  110177  165612                  MOVB    R1,@DZVTDR      ;LOAD THE CHARACTER
2536  014222  104401                          SCOP1                   ;LOOP AGIN IF SW09=1
2537  014224  000760                          BR      13$             ;OTHERWISE, GO PICK UP THE TEST NORMALLY
2538
2539                                          ;********************** TEST 14 ****************************
2540                                          ;*THIS TEST VERIFIES THAT EACH RECEIVING LINE CAN BE
2541                                          ;*DISABLED BY SETTING RCVON (BIT12 IN THE LPR REGISTER)
2542                                          ;*TO ZERO FOR EACH LINE.
2543                                          ;*THIS TEST ALSO VERIFIES THAT THE SILO CAN BE
2544                                          ;*EMPTIED BY ISSUING A DEVICE MASTER CLEAR.
2545                                    ;:*  TEST 14
2546                                    ;:**************************************************************
2547  014226  000004                  TST14:  SCOPE
2548  014230  012737  000014  001246          MOV     #14,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2549  014236  012737  014550  001362          MOV     #TST15,NEXT     ;POINT TO THE START OF THE NEXT TEST
2550  014244  105037  001425                  CLRB    DONFLG          ;CLEAR TEST CONTROL FLAG
2551  014250  005037  001374                  CLR     SAVLIN          ;CLEAR LINE INDICATOR
2552  014254  104417                          DCLASM                  ;ISSUE A DEVICE MASTER CLEAR
2553                                                                  ;AND SET MAINT BIT IF NECESSARY
2554  014256  013701  001370                  MOV     PAR,R1          ;SAVE DEFAULT PARAMETERS
2555  014262  042737  010000  001370          BIC     #RCVON,PAR      ;DISABLE RECEIVER IN DEFAULT PAR.
2556  014270  104421                  100$:   LPRSET                  ;LOAD PARAMETERS IN LPR REGISTER
2557  014272  010137  001370                  MOV     R1,PAR          ;RESTORE DEFAULT PARAMETERS
2558  014276  012701  000252                  MOV     #252,R1         ;LOAD A CHARAC. INTO R1
2559  014302  013702  001366                  MOV     LINE,R2         ;COPY AN IMAGE OF THE ACTIVE LINES
2560  014306  010277  165512                  MOV     R2,@DZVTCR      ;SET TCR BITS FOR ALL ACTIVE LINES
2561  014312  052777  000040  165470          BIS     #MSENAB,@DZVCSR ;SET MASTER SCAN ENABLE
2562  014320  005005                  1$:     CLR     R5              ;INIT DELAY COUNTER
2563  014322  005777  165462          2$:     TST     @DZVCSR         ;IS TRANS READY SET?
2564  014326  100404                          BMI     3$              ;BRANCH IF YES
2565  014330  104414                          DELAY                   ;WAIT FOR TRDY TO SET
2566  014332  005205                          INC     R5              ;INCREMENT DELAY COUNTER
2567  014334  001372                          BNE     2$              ;RETURN TO CHECK TRDY
2568  014336  104003                          ERROR   3               ;TRDY FAILED TO SET!
2569  014340  117705  165446          3$:     MOVB    @HDZVCSR,R5     ;MOVE LINE NO. TO R5
2570  014344  012703  000001                  MOV     #1,R3           ;INIT TCR POINTER
2571  014350  042705  177774                  BIC     #^C<3>,R5       ;ISOLATE LINE NO.
2572  014354  001403                          BEQ     31$             ;IF LINE 0 BRANCH
2573  014356  106303                  30$:    ASLB    R3              ;SHIFT R3 POINTER TO NEXT LINE
2574  014360  005305                          DEC     R5              ;DECREMENT LINE NO.
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2575  014362  001375                        BNE     30$             ;WHEN R5=0, R3 POINTS TO LINE TCR
2576  014364  030302                31$:    BIT     R3,R2           ;HAS CHARACTER BEEN SENT?
2577  014366  001007                        BNE     4$              ;BRANCH IF NO
2578  014370  140377  165430                BICB    R3,@DZVTCR      ;IF YES THEN CLEAR TCR BIT
2579  014374  001351                        BNE     1$              ;IF ALL CHARAC. SENT DROP THROUGH
2580  014376  105737  001425                TSTB    DONFLG          ;IF NO MORE ACTIVE IS THIS SECOND
2581                                                                ;TIME HERE?
2582  014402  001037                        BNE     10$             ;IF YES SKIP TO SECOND PART OF TEST
2583  014404  000404                        BR      5$              ;IF FIRST TIME HERE GO ZERO TCR BITS
2584  014406  110177  165422          4$:   MOVB    R1,@DZVTDR      ;LOAD CHAR. INTO BUFFER
2585  014412  040302                        BIC     R3,R2           ;INDICATE CHARAC. SENT ON THIS LINE
2586  014414  000741                        BR      1$              ;GO BACK AND WAIT FOR TRDY TO SET
2587  014416  005077  165402          5$:   CLR     @DZVTCR         ;CLEAR OUT TCR BITS
2588  014422  005005                        CLR     R5              ;INIT DELAY COUNTER
2589  014424  105777  165360          6$:   TSTB    @DZVCSR         ;IS RECEIV. DONE SET?
2590  014430  100002                        BPL     7$              ;IF NOT THEN WAIT TO SEE IF IT WILL
2591  014432  104020                        ERROR   20              ;REC DONE SHOULD NOT SET!
2592  014434  000403                        BR      8$              ;GO FIND WHICH LINE RECEIVED
2593  014436  104414                7$:     DELAY                   ;STALL FOR RECEIVER
2594  014440  005205                        INC     R5              ;INCREMENT DELAY COUNTER
2595  014442  001370                        BNE     6$              ;IF NOT DONE GO RETEST REC DONE
2596  014444  017704  165344          8$:   MOV     @DZVRBUF,R4     ;READ REC. BUFFER
2597  014450  100007                        BPL     9$              ;IS DVALID SET?
2598  014452  000304                        SWAB    R4              ;IF YES GET LINE NO.
2599  014454  042704  177774                BIC     #^C<3>,R4       ;ISOLATE LINE NO.
2600  014460  010437  001374                MOV     R4,SAVLIN       ;SET UP LINE NO. FOR ERROR REPORT
2601  014464  104017                        ERROR   17              ;DVALID SHOULD NOT BE SET
2602  014466  000766                        BR      8$              ;GO CHECK FOR ANY OTHER CHAR. IN SILO
2603  014470  105237  001425          9$:   INCB    DONFLG          ;INDICATE THAT FIRST PART OF TEST IS DONE
2604  014474  013701  001370                MOV     PAR,R1          ;SAVE DEFAULT LINE PARAM.
2605  014500  000673                        BR      100$            ;NOW GO RELOAD LPR REGISTER TO
2606                                                                ;TURN RECEIVERS ON
2607  014502  005005                10$:    CLR     R5              ;ZERO DELAY COUNTER
2608  014504  104414                11$:    DELAY                   ;WAIT FOR ALL CHARAC. TO BE RECEIVED
2609  014506  005205                        INC     R5              ;INCREASE DELAY COUNT
2610  014510  001375                        BNE     11$             ;CONT. DELAY IF NOT FINISHED
2611  014512  104413                        DEVICE.CLR              ;ISSUE A MASTER CLEAR
2612  014514  000240                        NOP
2613  014516  000240                        NOP
2614  014520  105777  165264                TSTB    @DZVCSR         ;NOW IS RECEIV. DONE SET?
2615  014524  100003                        BPL     12$             ;BRANCH IF NO
2616  014526  005037  001374                CLR     SAVLIN          ;CLEAR LINE NO FOR ERROR REPORT
2617  014532  104020                        ERROR   20              ;REC. DONE SHOULD NOT BE SET!
2618  014534  017704  165254          12$:  MOV     @DZVRBUF,R4     ;READ REC. BUFFER
2619  014540  100003                        BPL     13$             ;IS DVALID SET? IT SHOULDN'T BE
2620  014542  005037  001374                CLR     SAVLIN          ;DEVICE. CLR DID NOT ZERO SILO
2621  014546  104017                        ERROR   17              ;PRINT OUT THE ERROR.(LINE NO. IS IRRELEVANT)
2622  014550                        13$:
2623
2624                                        ;********************** TEST 15 ****************************
2625                                        ;* THIS TEST PROVES THAT THE TRANSMITTER TRANSMITS
2626                                        ;*CHARACTERS (FLAG MODE)AND THE RECEIVER RECEIVES (FLAG MODE)
2627                                        ;*(ONE LINE AT A TIME   BASED UPON VALID LINES)
2628                                        ;*THIS IS THE FIRST TIME THAT ALL DATA IS CHECKED
2629                                ;:*  TEST 15
2630                                ;;*************************************************************
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2631  014550  000004                        TST15:  SCOPE
2632  014552  012737  000015  001246                MOV     #15,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2633  014560  012737  015040  001362                MOV     #TST16,NEXT     ;POINT TO THE START OF THE NEXT TEST
2634  014566  012737  014654  001364                MOV     #5$,LOCK        ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELEC
2635  014574  104417                               DCLASM                  ;SET DCLR AND SET MNTFLG
2636  014576  104421                               LPRSET                  ;LOAD LPR REGISTER FOR ALL LINES
2637  014600  005037  001374                       CLR     SAVLIN          ;INIT FOR FIRST LINE
2638  014604  104422                               BUFSET                  ;ZERO BUFFER AREA
2639  014606  105037  001425                       CLRB    DONFLG          ;ZERO TCR BIT HANDLER FLAG
2640  014612  012702  000001                       MOV     #1,R2           ;LINE POINTER
2641  014616  052777  000040  165164               BIS     #MSENAB,@DZVCSR ;START SCANNER
2642  014624  030237  001366              3$:      BIT     R2,LINE         ;VALID LINE ?
2643  014630  001477                               BEQ     15$             ;NO SET UP NEXT LINE
2644  014632  010277  165166                       MOV     R2,@DZVTCR      ;SET TCR BIT
2645  014636  013700  001374                       MOV     SAVLIN,R0       ;ADJUST BUFFER POINTER
2646  014642  006300                               ASL     R0              ;OFFSET
2647  014644  105777  165140              4$:      TSTB    @DZVCSR         ;IS REC DONE = 0 ?
2648  014650  100001                               BPL     5$              ;IF YES, ALLOW TIME FOR TRDY TO SET
2649  014652  104020                               ERROR   20              ;*REC DONE SHOULD = 0
2650  014654  005005                      5$:      CLR     R5              ;USE R5 AS TIMER WAITING FOR TRDY TO SET
2651  014656  005777  165126              6$:      TST     @DZVCSR         ;IS THE TRANSMITTER READY?
2652  014662  100404                               BMI     7$              ;IF SO, GO TRANSMIT A CHARACTER
2653  014664  104414                               DELAY                   ;WAIT A LITTLE BIT
2654  014666  005205                               INC     R5              ;UP THE LOCAL COUNTER.TIME EXCEEDED?
2655  014670  001372                               BNE     6$              ;IF NOT, GO TRY AGAIN
2656  014672  104003                               ERROR   3               ;*TRDY FAILED TO SET!
2657  014674  105737  001425              7$:      TSTB    DONFLG          ;ALL CHARAC. TRANS.?
2658  014700  001047                               BNE     14$             ;IF YES GO ZERO TCR BIT
2659  014702  116077  001426  165124               MOVB    TDO(R0),@DZVTDR ;LOAD CHARACTER
2660  014710  013705  001374                       MOV     SAVLIN,R5       ;MAKE EXPECTED LINE #
2661  014714  005737  001372                       TST     MODE            ;IS THIS TEST IN STAGGERED MODE?
2662  014720  100006                               BPL     10$             ;IF NOT, SKIP STAGGERED SETUP
2663
2664                                               ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
2665
2666  014722  006205                               ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
2667  014724  103402                               BCS     8$              ;IF IT IS SET, GO CLEAR IT
2668  014726  000261                               SEC                     ;IF IT IS CLEAR SET IT HERE
2669  014730  000401                               BR      9$              ;SKIP THE CLEARING
2670  014732  000241              8$:      CLC                             ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
2671  014734  006105              9$:      ROL     R5              ;GET THE NEW BIT BACK INTO R5
2672  014736  000305              10$:     SWAB    R5              ;MOVE THE LINE NUMBER TO THE UPPER BYTE
2673  014740  156005  001426               BISB    TDO(R0),R5      ;ADD CHARACTER
2674  014744  052705  100000               BIS     #DVALID,R5      ;ADD DATA VALID
2675  014750  005003                       CLR     R3
2676  014752  105777  165032              11$:     TSTB    @DZVCSR         ;REC DONE?
2677  014756  100404                               BMI     12$             ;IF YES GO CHECK CHAR.
2678  014760  104414                               DELAY                   ;IF NOT WAIT FOR REC.
2679  014762  005203                               INC     R3              ;DELAY LOOP TIMER
2680  014764  001372                               BNE     11$             ;DELAY FINISHED?
2681  014766  104004                               ERROR   4               ;*RDONE FAILED TO SET!
2682  014770  017704  165020              12$:     MOV     @DZVRBUF,R4     ;LOAD THE VALUE ACTUALLY RECEIVED
2683  014774  020405                               CMP     R4,R5           ;COMPARE ACTUAL VS EXPECTED. ARE THEY THE SAME?
2684  014776  001401                               BEQ     13$             ;IF YES, GO DO THE NEXT LINE
2685  015000  104006                               ERROR   6               ;*NO DATA/CONTENTS DID NOT COMPARE
2686  015002  104401              13$:     SCOP1                           ;CHECK TO SEE IF SWITCH NINE IS SET
```

```
                                        INCB    TDO(R0)         ;INCREMENT BINARY PATTERN FOR THIS LINE
                                        BNE     4$              ;GO 'ROUND AGAIN FOR NEXT CHARACTER
                                        INCB    DONFLG          ;INDICATE ALL CHAR. SENT
                                        BR      4$              ;BRANCH TO CLEAR TCR BIT
                                14$:    CLR     @DZVTCR         ;CLEAR TCR REGISTER
                                        CLRB    DONFLG          ;INIT FOR NEXT LINE
                                15$:    INC     SAVLIN          ;INC EXPECTED LINE
                                        SHIFT                   ;SHIFT THE LINE POINTER. ARE WE ALL DONE?
                                        BR      3$              ;IF NO, GO AROUND AGAIN FOR NEXT LINE


                                        ;************************ TEST 16 *******************************
                                        ;*THIS TEST WILL PROVE THAT:
                                        ;* 1) THE TRANSMITTER "BREAK BIT" WORKS
                                        ;* 2) THE RECEIVER CAN FLAG "FRAMING ERRORS"
                                        ;* 3) THE RECEIVER CAN FLAG "PARITY ERRORS"
                                        ;*ONLY ONE LINE AT A TIME WILL BE EXERCISED.
                                ;:*  TEST 16
                                ;:************************************************************************
                                TST16:  SCOPE
                                        MOV     #16,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
                                        MOV     #TST17,NEXT     ;POINT TO THE START OF THE NEXT TEST
                                        MOV     #5$,LOCK        ;SET FOR LOOP
                                        CLR     SAVLIN          ;INIT LINE INDIC. FOR ERROR PRINTOUT
                                        MOV     #1,R2           ;LINE POINTER
                                1$:     BIT     R2,LINE         ;VALID LINE?
                                        BEQ     9$              ;IF NOT SET FOR NEXT LINE
                                        DCLASM                  ;SET DCLR IN CSR AND SET MNTFLG
                                        MOV     PAR,R1          ;PICK UP PARAMETERS
                                        BIS     #ODDPAR!PARITY,PAR ;FORCE ODD PARITY
                                        LPRSET                  ;LOAD LPR REGISTER
                                        MOV     R1,PAR          ;RESET PAR TO ORIGINAL VALUE
                                        BIS     #MSENAB,@DZVCSR ;START SCANNER
                                        MOV     SAVLIN,R5       ;MAKE EXPECTED DATA
                                        TST     MODE            ;IS THIS TEST IN STAGGERED MODE?
                                        BPL     4$              ;IF NOT, SKIP STAGGERED SETUP

                                        ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER

                                        ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
                                        BCS     2$              ;IF IT IS SET, GO CLEAR IT
                                        SEC                     ;IF IT IS CLEAR SET IT HERE
                                        BR      3$              ;SKIP THE CLEARING
                                2$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
                                3$:     ROL     R5              ;GET THE NEW BIT BACK INTO R5
                                4$:     SWAB    R5              ;PUT LINE NUMBER IN UPPER BYTE
                                        BIS     #DVALID!PARER!FRMERR,R5 ;ADD EXPECTED
                                5$:     CLR     R3              ;INIT DELAY ACCUMULATOR
                                        MOVB    R2,@HDZVTDR     ;SET BREAK BIT
                                6$:     TSTB    @DZVCSR         ;RECEIVER DONE?
                                        BMI     7$              ;BRANCH IF YES
                                        DELAY                   ;WAIT FOR REC DONE TO SET
                                        INC     R3              ;INC DELAY LOOP
                                        BNE     6$              ;DELAY FINISHED?
                                        ERROR   4               ;*RDONE FAILED TO SET!
                                7$:     MOV     @DZVRBUF,R4     ;ACTUAL
```

```
2743  015216  020405                                    CMP     R4,R5           ;CMP ACTUAL VS EXPECTED. DO THEY MATCH?
2744  015220  001401                                    BEQ     8$              ;IF YES, GO CLEAN UP
2745  015222  104006                                    ERROR   6               ;*DATA/CONTENTS FAILED TO COMPARE
2746  015224  105077  164606                  8$:       CLRB    @#DZVTDR        ;CLEAR BREAK BITS
2747  015230  104401                                    SCOP1                   ;LOOP?
2748  015232  005237  001374                  9$:       INC     SAVLIN          ;INC LINE #
2749  015236  104420                                    SHIFT                   ;SET R2 TO NEXT LINE
2750  015240  000715                                    BR      1$              ;GO BACK AND TEST NEXT LINE
2751                                                    ;********************** TEST 17 ******************************
2752                                                    ;* THIS TEST VERIFIES THAT THE DEVICE DOES NOT INTERRUPT
2753                                                    ;*WHILE THE PROCESSOR STATUS DOES NOT ALLOW INTERRUPTS
2754                                                    ;*BUT WILL INTERRUPT IF THE PROCESSOR STATUS
2755                                                    ;*ALLOWS INTERRUPTS.
2756                                                ;:*  TEST 17
2757                                                ;:************************************************************************
2758  015242  000004                                TST17:  SCOPE
2759  015244  012737  000017  001246                        MOV     #17,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2760  015252  012737  015636  001362                        MOV     #TST20,NEXT     ;POINT TO THE START OF THE NEXT TEST
2761  015260  104417                                        DCLASM                  ;SET DCLR IN CSR AND SET MAINT BIT
2762                                                                                ;IF NECESSARY (INTERNAL MODE)
2763  015262  104421                                        LPRSET                  ;SET UP LPR REGISTER
2764  015264  005037  001374                                CLR     SAVLIN          ;INIT LINE INDIC. FOR ERROR
2765  015270  105037  001425                                CLRB    DONFLG          ;INIT TCR BIT HANDLER FLAG
2766  015274  113777  001366  164522                        MOVB    LINE,@DZVTCR    ;SET ALL VALID TCR BITS
2767  015302  106427  000200                              1$:MTPS    #MASK           ;SET CPU STATUS TO DZV11 PRIO,
2768  015306  012777  000200  164526                        MOV     #MASK,@DZVRIS   ;SET RECEIVER STATUS
2769  015314  012777  000200  164524                        MOV     #MASK,@DZVTIS   ;SET TRANSMITTER STATUS
2770  015322
2771  015322  012777  015410  164514                        MOV     #6$,@DZVTIV     ;SET UP THE TRANSMITTER INTERRUPT VECTOR
2772  015330  012777  015432  164502                        MOV     #7$,@DZVRIV     ;SET UP THE RECEIVER INTERRUPT VECTOR
2773  015336  012777  000200  164476                        MOV     #MASK,@DZVRIS   ;SET THE INTERRUPT VECTOR STATUS
2774  015344  012777  000200  164474                        MOV     #MASK,@DZVTIS   ;SET TRANSMITTER INTERRUPT PRIORITY
2775  015352  052777  040040  164430                        BIS     #TIE!MSENAB,@DZVCSR ;ENABLE THE DEVICE
2776  015360  005005                                        CLR     R5              ;INIT DELAY COUNTER
2777  015362  005777  164422                  4$:       TST     @DZVCSR         ;TRDY SET?
2778  015366  100003                                    BPL     5$              ;IF NOT GO DO DELAY
2779  015370  000240                                    NOP                     ;WAIT FOR INTERRUPT
2780  015372  000240                                    NOP
2781  015374  000420                                    BR      8$              ;GO CLEAR TIE BIT
2782  015376  104414                  5$:       DELAY                           ;DELAY ROUTINE CALL
2783  015400  005205                                    INC     R5              ;INC DELAY COUNTER
2784  015402  001367                                    BNE     4$              ;DELAY FINISHED?
2785  015404  104003                                    ERROR   3               ;*TRDY NOT SET!
2786  015406  000413                                    BR      8$              ;GO CLEAR TIE
2787  015410  022626                  6$:       POP2SP                          ;REMOVE THE INTERRUPT FROM THE STACK
2788  015412  042777  040000  164370                    BIC     #TIE,@DZVCSR    ;DON'T LET ANY MORE INTERRUPTS OCCUR
2789  015420  105737  001425                            TSTB    DONFLG          ;PROCESSOR ALLOWING INTER?
2790  015424  001013                                    BNE     10$             ;IF YES NO ERROR
2791  015426  104010                                    ERROR   10              ;IF NOT PRINT ERROR
2792  015430  000413                                    BR      9$              ;RETURN TO THE NORMAL FLOW
2793  015432  104012                  7$:       ERROR   12                      ;*RECEIVER SHOULD NOT INTERRUPT
2794  015434  022626                                    POP2SP                  ;POP FOR FAKE RTI
2795  015436  042777  040000  164344  8$:       BIC     #TIE,@DZVCSR    ;RESET TRANSMITTER INTERRUPT ENABLE
2796  015444  105737  001425                            TSTB    DONFLG          ;INTERRUPTS ENABLED?
2797  015450  001403                                    BEQ     9$              ;IF NOT GET OUT
2798  015452  104007                                    ERROR   7               ;IF YES TRANS FAILED TO INTER.
```

```
2799  015454  106427  000000                  10$:    MTPS    #CLEAR          ;ALLOW INTERRUPTS
2800  015460                                  9$:
2801  015460  012777  015564  164356                  MOV     #11$,@DZVTIV    ;SET UP THE TRANSMITTER INTERRUPT VECTOR
2802  015466  012777  015570  164344                  MOV     #12$,@DZVRIV    ;SET UP THE RECEIVER INTERRUPT VECTOR
2803  015474  012777  001200  164340                  MOV     #MASK,@DZVRIS   ;SET THE INTERRUPT VECTOR STATUS
2804  015502  012777  000200  164336                  MOV     #MASK,@DZVTIS   ;SET TRANSMITTER INTERRUPT PRIORITY
2805  015510  052777  000140  164272                  BIS     #RIE!MSENAB,@DZVCSR ;ENABLE THE DEVICE
2806  015516  113777  001426  164310                  MOVB    TDO,@DZVTDR     ;LOAD BUFFER WITH ANY CHAR.
2807  015524  005005                                  CLR     R5              ;INIT DELAY ACCUMULATOR
2808  015526  105777  164256                  13$:    TSTB    @DZVCSR         ;REC. DONE?
2809  015532  100003                                  BPL     14$             ;IF NOT DELAY
2810  015534  000240                                  NOP                     ;WAIT FOR INTERRUPT
2811  015536  000240                                  NOP
2812  015540  000404                                  BR      18$
2813  015542  104414                  14$:    DELAY                           ;DELAY FOR INTERRUPT
2814  015544  005205                                  INC     R5              ;INCREMENT DELAY COUNTER
2815  015546  001367                                  BNE     13$             ;DELAY FINISHED?
2816  015550  104004                                  ERROR   4               ;*NO RX DONE! (NOT SET)
2817  015552  105737  001425                  18$:    TSTB    DONFLG          ;PROCESSOR ALLOWING INTERRUPTS?
2818  015556  001411                                  BEQ     15$             ;IF NOT DON'T PRINT ERROR
2819  015560  104011                                  ERROR   11              ;RECEIVER FAILED TO INTERRUPT
2820  015562  000407                                  BR      15$             ;CONTINUE TEST
2821  015564  104010                  11$:    ERROR   10              ;TRANSMITTER SHOULD NOT INTER.
2822  015566  000404                                  BR      16$             ;CONT TEST
2823  015570  105737  001425                  12$:    TSTB    DONFLG          ;PROCESSOR ALLOWING INTERRUPTS?
2824  015574  001001                                  BNE     16$             ;IF YES DON'T PRINT ERROR
2825  015576  104012                                  ERROR   12              ;*RECEIVER SHOULD NOT INTERRUPT
2826  015600  022626                  16$:    POP2SP                          ;POP FOR FAKE RTI
2827  015602  042777  040100  164200        15$:    BIC     #RIE!TIE,@DZVCSR        ;CLEAR INTERRUPTS
2828  015610  105737  001425                          TSTB    DONFLG          ;SECOND TIME THROUGH?
2829  015614  001005                                  BNE     17$             ;IF YES LEAVE TEST
2830  015616  105237  001425                          INCB    DONFLG          ;IF NO INDICATE SECOND TEST PASS
2831  015622  106427  000000                          MTPS    #CLEAR          ;ALLOW INTERRUPTS
2832  015626  000635                                  BR      1$              ;RESTART TEST
2833  015630  106427  000200                  17$:    MTPS    #MASK           ;DON'T ALLOW INTERRUPTS
2834  015634  104413                                  DEVICE.CLR              ;CLEAR DEVICE, LEAVE TEST
2835
2836                                                  ;********************** TEST 20 ******************************
2837                                                  ;*THIS TEST VERIFIES THAT THE RECEIVER WILL
2838                                                  ;*INTERRUPT BEFORE THE TRANSMITTER EVEN
2839                                                  ;*THOUGH THE TRANSMITTER WAS ENABLED
2840                                                  ;*FIRST.  SET PS TO HIGH (MASK INTERRUPTS);
2841                                                  ;*GET RDONE AND TRDY TO SET;
2842                                                  ;*SET TX IE AND RX IE;
2843                                                  ;*CLEAR PS AND EXPECT RX TO INTERRUPT FIRST
2844                                          ;:*  TEST 20
2845                                          ;:*************************************************************
2846  015636  000004                          †ST20:  SCOPE
2847  015640  012737  000020  001246                  MOV     #20,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2848  015646  012737  004064  001362                  MOV     #$EOP,NEXT      ;POINT TO THE END-OF-PASS HANDLER
2849  015654  104417                                  DCLASM                  ;SET DCLR IN CSR AND MNTFLG
2850  015656  104421                                  LPRSET                  ;LOAD PAR REGISTER FOR ALL LINES
2851  015660  005037  001374                          CLR     SAVLIN          ;INIT. ERROR LINE INDIC.
2852  015664  012777  016074  164146                  MOV     #8$,@DZVRIV     ;SETUP INTERRUPT STUFF
2853  015672  012777  000200  164142                  MOV     #MASK,@DZVRIS   ;
2854  015700  012777  016162  164136                  MOV     #12$,@DZVTIV    ;
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2855  015706  012777  000200  164132          MOV     #MASK,@DZVTIS   ;
2856  015714  052777  000040  164066          BIS     #MSENAB,@DZVCSR
2857  015722  012702  000001                  MOV     #1,R2           ;LINE POINTER
2858  015726  030237  001366          3$:     BIT     R2,LINE         ;VALID LINE ?
2859  015732  001515                          BEQ     14$             ;IF NOT GO TO NEXT LINE
2860  015734  106427  000200          4$:     MTPS    #MASK
2861  015740  110277  164060                  MOVB    R2,@DZVTCR      ;SET TCR BIT
2862  015744  005777  164044                  TST     @DZVRBUF        ;VALID DATA?
2863  015750  100001                          BPL     .+4             ;IT BETTER NOT BE SET
2864  015752  104017                          ERROR   17              ;DATA VALID SHOULD NOT BE SET
2865  015754  105777  164030          5$:     TSTB    @DZVCSR         ;RECEIVER DONE ?
2866  015760  100001                          BPL     .+4
2867  015762  104020                          ERROR   20              ;RECEIVER DONE BIT SHOULD NOT BE SET
2868  015764  005005                          CLR     R5
2869  015766  005004                          CLR     R4
2870  015770  005777  164014          99$:    TST     @DZVCSR         ;WAIT FOR TRDY
2871  015774  100404                          BMI     100$            ;BR IF READY
2872  015776  104414                          DELAY                   ;STALL TIME
2873  016000  005204                          INC     R4              ;
2874  016002  001372                          BNE     99$
2875  016004  104003                          ERROR   3               ;TRDY FAILED TO SET
2876  016006  105077  164022          100$:   CLRB    @DZVTDR         ;SEND A ZERO CHARACTER
2877  016012  005004                          CLR     R4
2878  016014  105777  163770          6$:     TSTB    @DZVCSR         ;IS RDONE SET?
2879  016020  100404                          BMI     7$
2880  016022  104414                          DELAY
2881  016024  005204                          INC     R4
2882  016026  001372                          BNE     6$
2883  016030  104004                          ERROR   4               ;*RDONE FAILED TO SET!
2884  016032  005777  163752          7$:     TST     @DZVCSR         ;TRANS DONE BIT = 1 ?
2885  016036  100401                          BMI     .+4             ;YES
2886  016040  104003                          ERROR   3               ;*NO   TRANS DONE FAILED TO SET
2887                                          ;NOW THAT BOTH TRANSMITTER AND RECEIVER DONE BIT =1
2888                                          ;SET INTERRUPT ENABLES
2889  016042  052777  040000  163740          BIS     #TIE,@DZVCSR
2890  016050  052777  000100  163732          BIS     #RIE,@DZVCSR
2891  016056  106427  000000                  MTPS    #CLEAR          ;ALLOW THE INTERRUPTS
2892  016062  000240                          NOP
2893  016064  000240                          NOP
2894  016066  104007                          ERROR   7               ;*TRANSMITTER FAILED TO INTERRUPT
2895  016070  104011                          ERROR   11              ;*RECEIVER FAILED TO INTERRUPT
2896  016072  000435                          BR      14$             ;GET OUT
2897
2898                                          ;RECEIVER INTERRUPT ROUTINE
2899  016074  017704  163714          8$:     MOV     @DZVRBUF,R4     ;ACTUAL
2900  016100  010403                          MOV     R4,R3
2901  016102  000303                          SWAB    R3
2902  016104  042703  177770                  BIC     #^C<7>,R3       ;STRIP JUNK
2903  016110  005737  001372                  TST     MODE            ;IS THIS TEST IN STAGGERED MODE?
2904  016114  100006                          BPL     11$             ;IF NOT, SKIP STAGGERED SETUP
2905
2906                                          ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
2907
2908  016116  006203                          ASR     R3              ;GET THE LAST BIT INTO THE CARRY BIT
2909  016120  103402                          BCS     9$              ;IF IT IS SET, GO CLEAR IT
2910  016122  000261                          SEC                     ;IF IT IS CLEAR SET IT HERE
```

```
2911  016124  000401                        BR      10$             ;SKIP THE CLEARING
2912  016126  000241                9$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
2913  016130  006103                10$:    ROL     R3              ;GET THE NEW BIT BACK INTO R3
2914  016132  020337  001374        11$:    CMP     R3,SAVLIN       ;IS THIS A VALID LINE
2915  016136  001401                        BEQ     .+4             ;YES
2916  016140  104015                        ERROR   15              ;*INVALID LINE
2917  016142  042704  177400                BIC     #^C<377>,R4     ;STRIP JUNK
2918  016146  120504                        CMPB    R5,R4           ;DATA COMPARE ?
2919  016150  001401                        BEQ     .+4             ;YES
2920  016152  104005                        ERROR   5               ;*DATA DOES NOT COMPARE
2921  016154  040277  163644                BIC     R2,@DZVTCR      ;CLEAR TCR BIT
2922  016160  000401                        BR      13$             ;GO GET OUT OF INTERRUPT MODE
2923                                        ;TRANSMITTER INTERRUPT SVC ROUTINE
2924  016162  104011                12$:    ERROR   11              ;THE RECEIVER INTERRUPT FAILED
2925                                                                ;TO OVERRIDE THE TRANSMITTER
2926  016164  022626                13$:    POP2SP                  ;REMOVE THE INTERRUPT VECTOR FROM THE STACK
2927  016166  005237  001374        14$:    INC     SAVLIN          ;ADJUST FOR NEXT LINE
2928  016172  104420                        SHIFT                   ;GET THE NEXT POINTER. IF DONE, ADVANCE
2929  016174  000137  015726                JMP     3$              ;OTHERWISE GO DO THE NEXT LINE
```

```
2930                                                    ;ERROR TABLE
2931  016200  000000                              .ERRTAB:  0         ;ERROR 0
2932  016202  000000                                        0
2933  016204  000000                                        0
2934
2935  016206  016346                                    EM1     ;ERROR
2936  016210  017164                                    DH1
2937  016212  017304                                    DT1
2938
2939  016214  016421                                    EM2     ;ERROR 2
2940  016216  017210                                    DH2
2941  016220  017316                                    DT2
2942
2943  016222  016447                                    EM3     ;ERROR 3
2944  016224  017243                                    DH3
2945  016226  017334                                    DT3
2946
2947  016230  016506                                    EM4     ;ERROR 4
2948  016232  017243                                    DH3
2949  016234  017334                                    DT3
2950
2951  016236  016535                                    EM5     ;ERROR 5
2952  016240  017255                                    DH4
2953  016242  017342                                    DT4
2954
2955  016244  016564                                    EM6     ;ERROR 6
2956  016246  017255                                    DH4
2957  016250  017342                                    DT4
2958
2959  016252  016623                                    EM7     ;ERROR 7
2960  016254  017243                                    DH3
2961  016256  017334                                    DT3
2962
2963  016260  016664                                    EM10    ;ERROR 10
2964  016262  017243                                    DH3
2965  016264  017334                                    DT3
2966
2967  016266  016726                                    EM11    ;ERROR 11
2968  016270  017243                                    DH3
2969  016272  017334                                    DT3
2970
2971  016274  016764                                    EM12    ;ERROR 12
2972  016276  017243                                    DH3
2973  016300  017334                                    DT3
2974
2975  016302  000000                                    0
2976  016304  000000                                    0
2977  016306  000000                                    0
2978
2979  016310  000000                                    0
2980  016312  000000                                    0
2981  016314  000000                                    0
2982
2983  016316  017023                                    EM15    ;ERROR 15
2984  016320  000000                                    0
2985  016322  000000                                    0
```

```
2986
2987  016324  000000                          0
2988  016326  000000                          0
2989  016330  000000                          0
2990
2991  016332  017065                          EM17    ;ERROR 17
2992  016334  017243                          DH3
2993  016336  017334                          DT3
2994
2995  016340  017123                          EM20
2996  016342  017243                          DH3
2997  016344  017334                          DT3
```

```
2998                                                    ;ERROR MESSAGES
2999  016346 047200 020117 052502       EM1:   .ASCIZ  <200>/NO BUS REPLY RESPONSE FROM DZV11 REGISTER/
      016421    200 042522 044507       EM2:   .ASCIZ  <200>?REGISTER R/W FAILURE?
      016447    200 051124 047101       EM3:   .ASCIZ  <200>/TRANSMIT READY (TRDY) NOT SET/
      016506 051200 041505 044505       EM4:   .ASCIZ  <200>/RECEIVER DONE NOT SET/
      016535    200 040504 040524       EM5:   .ASCIZ  <200>/DATA COMPARISON ERROR/
      016564 042200 053132 030461       EM6:   .ASCIZ  <200>/DZV11 #RECEIVER BUFFER# ERROR/
      016623    200 051124 047101       EM7:   .ASCIZ  <200>/TRANSMITTER FAILED TO INTERRUPT/
      016664 052600 042516 050130       EM10:  .ASCIZ  <200>/UNEXPECTED TRANSMITTER INTERRUPT/
      016726 051200 041505 044505       EM11:  .ASCIZ  <200>/RECEIVER FAILED TO INTERRUPT/
      016764 052600 042516 050130       EM12:  .ASCIZ  <200>/UNEXPECTED RECEIVER INTERRUPT/
      017023    200 041501 044524       EM15:  .ASCIZ  <200>/ACTION DETECTED ON INVALID LINE./
      017065    200 040504 040524       EM17:  .ASCIZ  <200>/DATA VALID SHOULD NOT BE SET/
      017123    200 042522 042503       EM20:  .ASCIZ  <200>/RECEIVER DONE SHOULD NOT BE SET/

      017164 052200 040522 020120       DH1:   .ASCIZ  <200>/TRAP PC  DZV11 REG/
      017210 042600 050130 041505       DH2:   .ASCIZ  <200>/EXPECTED  FOUND  REGISTER/
      017243    200 044514 042516       DH3:   .ASCIZ  <200>/LINE NO./
      017255    200 054105 042520       DH4:   .ASCIZ  <200>/EXPECTED  FOUND  LINE/

                                                .EVEN
                                                ;DATA TABLES FOR ERROR MESSAGES
3000  017304 000002                     DT1:   2
3001  017306    006 003                        .BYTE   6,3
3002  017310 001330                            $REG1
3003  017312    006 001                        .BYTE   6,1
3004  017314 001326                            $REG0
3005
3006  017316 000003                     DT2:   3
3007  017320    006 004                        .BYTE   6,4
3008  017322 001340                            $REG5
3009  017324    006 001                        .BYTE   6,1
3010  017326 001336                            $REG4
3011  017330    006 001                        .BYTE   6,1
3012  017332 001326                            $REG0
3013
3014  017334 000001                     DT3:   1
3015  017336    003 001                        .BYTE   3,1
3016  017340 001374                            SAVLIN
3017
3018  017342 000003                     DT4:   3
3019  017344    006 004                        .BYTE   6,4
3020  017346 001340                            $REG5
3021  017350    006 001                        .BYTE   6,1
3022  017352 001336                            $REG4
3023  017354    003 001                        .BYTE   3,1
3024  017356 001374                            SAVLIN
3025
3026                                            ;TABLE OF DELAY TIMES FOR INDIVIDUAL BAUD RATES
3027                                            ;----------------------------------------------
3028
3029  017360 002450                     DLYTBL: 2450            ;TIME FOR   50 BAUD
3030  017362 001560                             1560            ;TIME FOR   75 BAUD
3031  017364 001120                             1120            ;TIME FOR  110 BAUD
3032  017366 000750                              750            ;TIME FOR  134 BAUD
3033  017370 000660                              660            ;TIME FOR  150 BAUD
```

```
3034  017372  000330                                  330                 ;TIME FOR  300 BAUD
3035  017374  000150                                  150                 ;TIME FOR  600 BAUD
3036  017376  000060                                   60                 ;TIME FOR 1200 BAUD
3037  017400  000040                                   40                 ;TIME FOR 1800 BAUD
3038  017402  000030                                   30                 ;TIME FOR 2000 BAUD
3039  017404  000020                                   20                 ;TIME FOR 2400 BAUD
3040  017406  000010                                   10                 ;TIME FOR 3600 BAUD
3041  017410  000001                                    1                 ;TIME FOR 4800 BAUD
3042  017412  000001                                    1                 ;TIME FOR 7200 BAUD
3043  017414  000001                                    1                 ;TIME FOR 9600 BAUD
3044  017416  000001                                    1                 ;TIME OF DELAY FOR 19200 BAUD
3045
3046                                                                      ;DELAYS WERE COMPUTED TO ALLOW MAXIMUM TIME AT EACH BAUD RATE
3047                                                                      ;FOR ALL TESTS TO FUNCTION CORRECTLY ON A LSI11.
3048
3049  017420                                  CORMAX:
3050          000001                          .END
```

```
ABASE = 160010            1#    342     383
ACDW1 = 000017            1#    342     385
ACDW2 = 000000          342     386
ACPUOP= 000000          342     357
ACTIVE  001420          500#    756*   1789*   1790    1792*   1796    1797*   1798    1801*
ADDW0 = 017470            1#    342     387
ADDW1 = 017470            1#    342     388
ADDW10= 017470            1#    342     397
ADDW11= 017470            1#    342     398
ADDW12= 017470            1#    342     399
ADDW13= 017470            1#    342     400
ADDW14= 017470            1#    342     401
ADDW15= 017470            1#    342     402
ADDW2 = 017470            1#    342     389
ADDW3 = 017470            1#    342     390
ADDW4 = 017470            1#    342     391
ADDW5 = 017470            1#    342     392
ADDW6 = 017470            1#    342     393
ADDW7 = 017470            1#    342     394
ADDW8 = 017470            1#    342     395
ADDW9 = 017470            1#    342     396
ADEVCT= 000000          342     348
ADEVM = 000001            1#    342     384
ADRCNT  005661         1323*   1360*   1370#
ADVANC= 104400          652#   1500    2109    2381
AENV  = 000000          342     353
AENVM = 000000          342     354
AFATAL= 000000          342     345
AMADR1= 000000          342     370
AMADR2= 000000          342     374
AMADR3= 000000          342     377
AMADR4= 000000          342     380
AMAMS1= 000000          342     364
AMAMS2= 000000          342     372
AMAMS3= 000000          342     375
AMAMS4= 000000          342     378
AMSGAD= 000000          342     350
AMSGLG= 000000          342     351
AMSGTY= 000000          342     344
AMTYP1= 000000          342     365
AMTYP2= 000000          342     373
AMTYP3= 000000          342     376
AMTYP4= 000000          342     379
APASS = 000000          342     347
APRIOR= 000000          342
APTCSU= 000040         1174    1279#
APTENV= 000001         1167    1235    1277#   1587
APTSIZ= 000200         1276#
APTSPO= 000100         1169    1237    1278#
ASWREG= 000000          342     355
ATESTN= 000000          342     346
AUNIT = 000000          342     349
AUSWR = 000000          342     356
AUTO.S  011464          931    1972#
AVECT1= 000300            1#    342     381
AVECT2= 000000          342     382
```

```
BINWRD  006134          1446#
BIT0   = 000001          139#  211   213   250   261   2395
BIT00  = 000001          129#  139
BIT01  = 000002          128#  138
BIT02  = 000004          127#  137
BIT03  = 000010          126#  136
BIT04  = 000020          125#  135
BIT05  = 000040          124#  134
BIT06  = 000100          123#  133
BIT07  = 000200          122#  132
BIT08  = 000400          121#  131
BIT09  = 001000          120#  130
BIT1   = 000002          138#  212   213   251   262
BIT10  = 002000          119#  235   236   237   238   243   244   245   246   256   267   275   2327
BIT11  = 004000          118#  239   240   241   242   243   244   245   246   257   268   276   1107
                        2327
BIT12  = 010000          117#  178   194   229
BIT13  = 020000          116#  179   195
BIT14  = 040000          115#  180   196   1089  2051
BIT15  = 100000          114#  181   197
BIT2   = 000004          137#  252   263   992
BIT3   = 000010          136#  173   216   218   220   222   253   264
BIT4   = 000020          135#  174   217   218   221   222   1497  1512
BIT5   = 000040          134#  175   219   220   221   222   227   1984  1994  2051
BIT6   = 000100          133#  176   224
BIT7   = 000200          132#  165   177   225   929   1616  1630
BIT8   = 000400          131#  186   188   203   205   232   234   236   238   240   242   244   246
                         254   265   273   2257  2267
BIT9   = 001000          130#  187   188   204   205   233   234   237   238   241   242   245   246
                         255   266   274   2257  2267
BPTVEC= 000014           146#
BRK0   = 000400          273#
BRK1   = 001000          274#
BRK2   = 002000          275#
BRK3   = 004000          276#
BRW     004540           997   1127#
BUFSET= 104422           688#  2638
CHRCNT  006132          1412*  1425*  1443#
CLEAR  = 000000          166#  2799*  2831*  2891*
CNVRT  = 104412          672#  1020   1022   1025   1028   1566   1568   1570   1623
CONVRT= 104411           670#   941   1584
CORMAX  017420          3049#  3050
COO    = 000400          265#
CO1    = 001000          266#
CO2    = 002000          267#
CO3    = 004000          268#
CR     = 000015           54#  1213   1223
CRLF   = 000200           55#  1184   1223
CSRMAP  011472          1975#
CYCLE   010436           998   1051   1779#
DATABP  006626          1555*  1558   1582   1585#
DATAHD  006614          1554*  1578   1581#
DCLASM= 104417           682#  2473   2552   2635   2714   2761   2849
DCLR   = 000020          174#  1466   1467   2125   2287   2299   2306   2308
DDISP  = 177570           61#   434
DELAY  = 104414          676#  2270   2404   2412   2444   2489   2515   2565   2593   2608   2653   2678   2738
```

```
                    2782    2813    2872    2880
DEVADR  005656      1321#   1357    1368#
DEVICE= 104413       674#   1473    2167    2229    2255    2285    2324    2348    2383    2431    2453    2611    2834
DH1     017164      2936    2999#
DH2     017210      2940    2999#
DH3     017243      2944    2948    2960    2964    2968    2972    2992    2996    2999#
DH4     017255      2952    2956    2999#
DISPLA  001306       434#    765*   1119*   1597*
DISPRE  000174       329#    765
DLYCNT  006230       916*    974    1479    1484#
DLYTBL  017360       916    3029#
DONFLG  001425       508#   2476*   2493    2495*   2525*   2550*   2580    2603*   2639*   2657    2689*   2692*   2765*
                    2789    2796    2817    2823    2828    2830*
DSWR   = 177570       60#    433
DTR0   = 000400      254#   2221
DTR1   = 001000      255#   2222
DTR2   = 002000      256#   2223
DTR3   = 004000      257#   2224
DT1     017304      2937    3000#
DT2     017316      2941    3006#
DT3     017334      2945    2949    2961    2965    2969    2973    2993    2997    3014#
DT4     017342      2953    2957    3018#
DVALID= 100000       197#   2327    2511    2674    2733
DZCR0   001500       548#    796     799     844    2025
DZCR1   001512       554#    845
DZCR10  001620       596#
DZCR11  001632       602#
DZCR12  001644       608#
DZCR13  001656       614#
DZCR14  001670       620#
DZCR15  001702       626#
DZCR16  001714       632#
DZCR17  001726       638#
DZCR2   001524       560#
DZCR3   001536       566#
DZCR4   001550       572#
DZCR5   001562       578#
DZCR6   001574       584#
DZCR7   001606       590#
DZVACT  001406       493#    944#    954     957     962    1779    1785
DZVCSR  002010       696#   1055    1466#   1467    1474#   1858#   2084    2124    2147    2254    2286    2434    2479#
                    2484    2487    2513    2533    2561#   2563    2589    2614    2641#   2647    2651    2676    2719#
                    2736    2775#   2777    2788#   2795#   2805#   2808    2827#   2856#   2865    2870    2878    2884
                    2889#   2890#
DZVC0   001502       549#    808     811    2067
DZVC1   001514       555#
DZVC10  001622       597#
DZVC11  001634       603#
DZVC12  001646       609#
DZVC13  001660       615#
DZVC14  001672       621#
DZVC15  001704       627#
DZVC16  001716       633#
DZVC17  001730       639#
DZVC2   001526       561#
DZVC3   001540       567#
```

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DZVC4   001552            573#
DZVC5   001564            579#
DZVC6   001576            585#
DZVC7   001610            591#
DZVLEV  011002           1811   1847#
DZVLPR  002020            700#  1509*  1863*  2328*  2333*
DZVMSR  002030            704#  1872*  2102   2349   2384
DZVNUM  001414            496#   837*   945   1942*  1952*  1980*  2009*  2010  2016  2018
DZVRBU  002014            698#  1862*  2090   2325   2519   2596   2618   2682  2742  2862  2899
DZVRIS  002042            712#  1849*  2768*  2773*  2803*  2853*
DZVRIV  002040            711#  1058   1803*  1847   2772*  2802*  2852*
DZVTCR  002024            702#  1868*  2096   2195   2263*  2439*  2482*  2526*  2560*  2578*  2587*  2644*  2691*
                         2766*  2861*  2921*
DZVTDR  002034            706#  1873*  2352*  2357*  2496*  2535*  2584*  2659*  2806*  2876*
DZVTIS  002046            714#  1853*  2769*  2774*  2804*  2855*
DZVTIV  002044            713#  1851*  2771*  2801*  2054*
DZV.EN  001740            644#   782   1790   1798   1978
DZV.MA  001500            500    546#   756    779    936   1792   1801   1935  1975  1981  2039
EIGHT =  000030            218#
EIGHTS=  000070            222#
EMTVEC=  000030            149#
EM1     016346           2935   2999#
EM10    016664           2963   2999#
EM11    016726           2967   2999#
EM12    016764           2971   2999#
EM15    017023           2983   2999#
EM17    017065           2991   2999#
EM2     016421           2939   2999#
EM20    017123           2995   2999#
EM3     016447           2943   2999#
EM4     016506           2947   2999#
EM5     016535           2951   2999#
EM6     016564           2955   2999#
EM7     016623           2959   2999#
ERRMSG  006602           1553*  1573   1576#
ERRVEC=  000004            142#  1094   1095*  1097*  1100*
ERTABO  006756           1568   1609#
EVEPAR=  000000            228#
EXITER  006706           1596   1599#
FIVE  =  000000            215#
FIVES =  000040            219#
FRMERR=  020000            195#  2733
HALTS   006632           1538   1587#
HDRFLG  001423            506#   780*   879*   932    934*
HDZVCS  002012            697#  1860*  2300*  2569
HDZVLP  002022            701#  1866*
HDZVMS  002032            705#  1875*
HDZVRB  002016            699#  1865*
HDZVTC  002026            703#  1870*  2403*  2411*
HDZVTD  002036            707#  1876*  2735*  2746*
HILIM   005654           1320*  1348   1367#
HT    =  000011             52#  1182   1223
INBUF   010270           1290   1326   1719*  1720   1725   1730   1748*  1749  1753  1763#  1887
INIFLG  001422            505#   766    771*   784*   865*   927   1974*
INSTER=  104404            660#  1342   1736   1758   1906
INSTR =  104403            658#   791    803    814    821    871    904   949   969  1817
```

```
INSTR2  005454          1297  1309#
IOTVEC= 000020           147#  2068*
LF    = 000012            53#  1217  1223
LIMITS  005602          1336  1348#
LINE    001366           485#  1804*  2387  2437  2480  2559  2642  2712  2766  2858
LINE0   001504           550#   830*   876   886   912
LINE1   001516           556#
LINE10  001624           598#
LINE11  001636           604#
LINE12  001650           610#
LINE13  001662           616#
LINE14  001674           622#
LINE15  001706           628#
LINE16  001720           634#
LINE17  001732           640#
LINE2   001530           562#
LINE3   001542           568#
LINE4   001554           574#
LINE5   001566           580#
LINE6   001600           586#
LINE7   001612           592#
LOBITS  005660          1322*  1352  1369#
LOCK    001364           480#  1135  1137  1490*  1562  2083*  2089*  2095*  2101*  2150*  2157*  2165*  2184*
                        2197*  2205*  2226*  2382*  2410*  2418*  2432*  2472*  2634*  2709*
LOLIM   005652          1319*  1350  1366#
LPRSET= 104421           686#  2474  2556  2636  2717  2763  2850
LP0   = 000000           210#
LP1   = 000001           211#
LP2   = 000002           212#
LP3   = 000003           213#
MAINT = 000010           173#  1125  1728  1810  2178  2288  2301
MANT0   001510           552#   817   884  2026
MANT1   001522           558#
MANT10  001630           600#
MANT11  001642           606#
MANT12  001654           612#
MANT13  001666           618#
MANT14  001700           624#
MANT15  001712           630#
MANT16  001724           636#
MANT17  001736           642#
MANT2   001534           564#
MANT3   001546           570#
MANT4   001560           576#
MANT5   001572           582#
MANT6   001604           588#
MANT7   001616           594#
MASK  = 000200           165#   310   752*   989*  2037  2082  2767*  2768  2769  2773  2774  2803  2804
                        2833*  2853  2855  2860*
MASTEK  007705          1564  1707#
MBADLN  010020           893  1707#
MCSRX   007635          1019  1569  1707#
MDATA   010374          1423  1433  1767#
MEPASS  007453          1018  1707#
MERRPC  007765          1567  1707#
MERRX   007662          1027  1707#
```

```
MERR2    007513            1707#  1781   2030
MERR3    007562             959   1707#
MLOCK    007606             994   1707#
MNEW     007710             950   1707#
MNTFLG   001424             507#  1122#  1125#  1474   1723#  1728#  1733#  1807#  1810#
MODE     001372             487#  1123   1806#  1808   2379   2393   2498   2661   2721   2903
MPASSX   007651            1024   1707#
MPFAIL   007410            1700   1707#
MR       007477            1000   1707#
MSENAB=  000040             175#  2179   2262   2264   2288   2301   2435   2440   2479   2561   2641   2719   2775
                           2805   2856
MTITLE   001000             336#   770
MTSTN    007673            1565   1707#  1818
MVECX    007643            1021   1707#
NEXT     001362             479#  1489   1605   2080#  2123#  2146#  2194#  2253#  2284#  2323#  2347#  2378#  2430#
                           2471#  2549#  2633#  2708#  2760#  2848#
NOLIST=  ****** U             1
ODDPAR=  000200             225#  2716
ONESTO=  000000             226#
OVRRUN=  040000             196#
PAR      001370             486#  1507   1805#  2554   2555#  2557#  2604   2715   2716#  2718#
PARAM =  104405             662#   793    805    823    873    906    951    971   1819
PARAM1   005522            1325#  1343
PARER =  010000             194#  2733
PARERR   005576            1328   1330   1332   1342#  1349   1351   1353
PARITY=  000100             224#  2716
PARMD =  104415             678#
PARO     001506             551#   831#   909    913
PAR1     001520             557#
PAR10    001626             599#
PAR11    001640             605#
PAR12    001652             611#
PAR13    001664             617#
PAR14    001676             623#
PAR15    001710             629#
PAR16    001722             635#
PAR17    001734             641#   923
PAR2     001532             563#
PAR3     001544             569#
PAR4     001556             575#
PAR5     001570             581#
PAR6     001602             587#
PAR7     001614             593#
PAWCH =  104416             680#
PIRQ  =  177772              59#
PIRQVE=  000240             153#
POPRO =  012600             162#
POP1SP=  005726             160#
POP2SP=  022626             164#  1499   2064   2111   2787   2794   2826   2926
PRO   =  000000              76#
PR1   =  000040              77#
PR2   =  000100              78#
PR3   =  000140              79#
PR4   =  000200              80#
PR5   =  000240              81#
PR6   =  000300              82#
```

```
PR7    = 000340              83#
PS     = 177776              56#     57
PSW    = 177776              57#
PUSHR0= 010046              161#
PUSH1S= 005746              159#
PUSH2S= 024646              163#
PWRVEC= 000024              148#   1669*   1670*   1679*   1685*   1697*   1698*
RCVON  = 010000              229#   2555
RDONE  = 000200              177#   2257
REGIST  001402               491#
RESREG  006630              1583    1586#
RESTAR  010776              1702    1843#
RESVEC= 000010              143#
RESOS  = 104410              668#   1586
RIE    = 000100              176#   2181    2288    2301    2805    2827    2890
RING0  = 000001              261#
RING1  = 000002              262#
RING2  = 000004              263#
RING3  = 000010              264#
RL0    = 000000              202#
RL1    = 000400              203#
RL2    = 001000              204#
RL3    = 001400              205#
RUN     001412               495#    757*   1785    1787*   1788*   1794*   1795*
SAVACT  001410               494#    836*    841*    843     944     957    1943*   1951*   2019*   2023*   2028    2047
SAVLIN  001374               488#   2433*   2456*   2475*   2497    2527*   2551*   2600*   2616*   2620*   2637*   2645    2660
                            2693*   2710*   2720    2748*   2764*   2851*   2914    2927*   3016    3024
SAVNO   001416               498#    945*    961*    965*    999    1032
SAVNUM  001415               497#    999*   1030*   1032*
SAVPC   001404               492#   1375*   1611
SAVOS  = 104407              666#   1543
SCOPI  = 104401              654#   2113    2156    2164    2173    2204    2212    2409    2417    2452    2524    2536    2686
                            2747
SERV.G  006772              1121    1531    1600    1615#   1620
SETAPT  011336               774    1935#
SETFLG= 104406               664#    816
SEVEN  = 000020              217#
SEVENS= 000060               221#
SHIFT  = 104420              684#   2390    2455    2528    2694    2749    2928
SILOAL= 020000               179#   2257
SILOEN= 010000               178#   2180    2288
SIX    = 000010              216#
SIXS   = 000050              220#
SPACNT  006133              1444#
STACK  = 001120               47#    751     988    1606
STKLMT= 177774                58#
STOP    001446               519#   1523
SVOS    005670              1379#
SWR     001304               433#    764*    776     833     861     929     946     967     992    1089    1107    1133    1140
                            1532    1537    1595    1601    1603    1621   1626*   1638*   1639*   1640*   1647*   1651*   1677
                            1690*   1814    1960*
SWREG   000176               330#    764
SWO    = 000001              111#
SWOO   = 000001              101#    111     776
SWO1   = 000002              100#    110    1814
SWO2   = 000004               99#    109
```

```
SW03  = 000010              98#    108     833     861
SW04  = 000020              97#    107     967
SW05  = 000040              96#    106
SW06  = 000100              95#    105     946
SW07  = 000200              94#    104
SW08  = 000400              93#    103    1601
SW09  = 001000              92#    102    1133
SW1   = 000002             110#
SW10  = 002000              91#   1603
SW11  = 004000              90#
SW12  = 010000              89#   1140    1532
SW13  = 020000              88#   1537
SW14  = 040000              87#
SW15  = 100000              86#
SW2   = 000004             109#
SW3   = 000010             108#
SW4   = 000020             107#
SW5   = 000040             106#
SW6   = 000100             105#
SW7   = 000200             104#
SW8   = 000400             103#
SW9   = 001000             102#
S110  = 001000             233#
S1200 = 003400             238#
S134  = 001400             234#
S150  = 002000             235#
S1800 = 004000             239#
S19200= 007400             246#
S2000 = 004400             240#
S2400 = 005000             241#
S300  = 002400             236#
S3600 = 005400             242#
S4800 = 006000             243#
S50   = 000000             231#
S600  = 003000             237#
S7200 = 006400             244#
S75   = 000400             232#
S9600 = 007000             245#
TBITVE= 000014             144#
TCR0  = 000001             250#   2217
TCR1  = 000002             251#   2218
TCR2  = 000004             252#   2219
TCR3  = 000010             253#   2220
TDO     001426             511#   1521    2659    2673    2687*   2806
TD1     001430             512#
TD2     001432             513#
TD3     001434             514#
TEIGHT  002106             737#
TEMP    010332            1765#
TFIVE   002114             740#
TIE   = 040000             180#   2182    2288    2775    2788    2795    2827    2889
TKVEC = 000060             151#
TLAST = 015636            1837    3026#
TLO   = 000000             185#
TL1   = 000400             186#
TL2   = 001000             187#
```

```
TL3    = 001400            188#
TMTBL    002050            721#
TPVEC  = 000064            152#
TRAPVE= 000034             150#
TRDY   = 100000            181#   2257    2262    2435
TRTVEC= 000014             145#
TR0      001436            515#
TR1      001440            516#
TR2      001442            517#
TR3      001444            518#
TSEVEN   002110            738#
TSIX     002112            739#
TST1     012170           1083     1825    1841    2078#
TST10    013324           2323     2345#
TST11    013410           2347     2376#
TST12    013604           2378     2428#
TST13    013736           2430     2469#
TST14    014226           2471     2547#
TST15    014550           2549     2631#
TST16    015040           2633     2706#
TST17    015242           2708     2758#
TST2     012360           2080     2121#
TST20    015636           2760     2846#   3026
TST21  = ****** U         2848
TST3     012424           2123     2144#
TST4     012602           2146     2192#
TST5     013006           2194     2251#
TST6     013110           2253     2282#
TST7     013240           2284     2321#
TTST     004312            995*     997*   1085#
TWOSTO= 000040             227#
TYPDAT   006616           1559     1579    1582#
TYPE   = 104402            656#     770     892   893   935   959   994  1000  1018  1019  1021  1024  1027
                          1187     1288    1307  1400  1433  1560  1561  1564  1565  1567  1569  1571  1575
                          1580     1622    1624  1652  1699  1781  1816  1834  1839  2030
TYPMSG   006506           1557     1560#
T110     002054            724#
T1200    002066            729#
T134     002056            725#
T150     002060            726#
T1800    002070            730#
T2000    002072            731#
T2400    002074            732#
T300     002062            727#
T3600    002076            733#
T4800    002100            734#
T50      002050            722#
T600     002064            728#
T7200    002102            735#
T75      002052            723#
T9600    002104            736#
VECMAP   012000           2029     2037#
WRDCNT   006130           1408*    1434*   1442#
WTBS.F   006604           1574     1577#
XBX      006374           1533     1535    1537#
XCSR     004250           1020     1053#   1570
```

```
XERR    004272          1028    1062#
XHEAD   007772           935    1707#
XMTCNT  001400           490#
XMTLIN  001376           489#
XPASS   004264          1025    1059#
XSTATQ  010062           942    1707#
XTSTN   006764          1566    1612#
XVEC    004256          1022    1056#
XX    = 160210           547#    553#    559#    565#    571#    577#    583#    589#    595#    601#    607#    613#    619#
                         625#    631#    637#    643#
YY    = 000500           547#    553#    559#    565#    571#    577#    583#    589#    595#    601#    607#    613#    619#
                         625#    631#    637#    643#
ZZ    = 000020           547#    553#    559#    565#    571#    577#    583#    589#    595#    601#    607#    613#    619#
                         625#    631#    637#    643#
$APTHD  001446           529     535#
$ASTAT= ****** U        1257    1272
$ATYC   005114          1228    1230#
$ATY1   005070          1226#
$ATY3   005076          1172    1227#
$ATY4   005106          1229#   1590
$AUTOB  001300           430#
$BASE   001174           383#    799*   1802*   1857    1936    2025*
$BDADR  001266           425#
$BDDAT  001272           427#
$CDW1   001200           385#   1955
$CDW2   001202           386#   1957    2026*
$CHARC  005064          1189*   1199*   1206    1215*   1220#
$CMTAG  001244           413#
$CM1  = 000006           445#    446#    447#    448#    449#    450#    451#
$CM2  = 000014           445#    446#    447#    448#    449#    450#    451#
$CM3  = 000006           443#    445
$CM4  = 000005           451#    452#    453#    454#    455#    456#
$CPUOP  001146           357#
$CRLF   001357           458#   1188    1223    1400    1560    1561    1571    1652    1816    1834
$DDW0   001204           387#    846    1940    1976
$DDW1   001206           388#
$DDW10  001230           397#
$DDW11  001232           398#
$DDW12  001234           399#
$DDW13  001236           400#
$DDW14  001240           401#
$DDW15  001242           402#
$DDW2   001210           389#
$DDW3   001212           390#
$DDW4   001214           391#
$DDW5   001216           392#
$DDW6   001220           393#
$DDW7   001222           394#
$DDW8   001224           395#
$DDW9   001226           396#
$DEVCT  001130           348#   1029*
$DEVM   001176           384#   1941    2028*
$DOAGN  004244          1031    1038    1043    1049#
$E    = 000022             1#   2080    2081#   2123    2124#   2146    2147#   2194    2195#   2253    2254#   2284    2285#
                        2323    2324#   2347    2348#   2378    2379#   2430    2431#   2471    2473#   2549    2550#   2633
                        2635#   2708    2709#   2760    2761#   2848    2849#
```

```
SENDAD  004234          323    768   1045#  1593
SENDCT  004220         1040#
SENV    001140          353#  1167   1235   1259   1587
SENVM   001141          354#   772   1169   1174   1237
SEOP    004064         1014#  2848
SEOPCT  004212         1037#  1041
SERFLG  001247          416#   755*  1017*  1074   1103   1105*  1129   1542*  1556   1572*
SERMAX  001261          422#  1129
SERROR  006344          313   1531#
SERRPC  001262          423#   759*  1016*  1082*  1539   1541*
SERRTB  001362          474#
SERTTL  001256          420#   758*  1064   1599*
SETABL  001140          352#
SETEND  001244          405#   541
SFATAL  001122          345#  1263*
SFFLG   005334         1226*  1229*  1257   1266*  1274#
SFILLC  001322          441#  1192   1223
SFILLS  001321          440#  1223
SFLIP = 177777            1#  2072#  2076#  2115#  2119#  2134#  2142#  2185#  2190#  2243#  2249#  2275#  2280#
                       2315#  2319#  2339#  2343#  2364#  2373#  2421#  2426#  2458#  2467#  2539#  2545#  2624#
                       2629#  2698#  2704#  2751#  2756#  2836#  2844#
SGDADR  001264          424#
SGDDAT  001270          426#
SGET42  004224         1042#
SHD   = 000001           10     11
SHIBTS  001446          536#
SICNT   001250          417#  1111*  1112   1114*  1128
SILLUP  007402         1669   1685   1704#
SINTAG  001301          431#
SITEMB  001260          421#  1547*  1589
SLF     001360          459#  1223
SLFLG   005333         1267*  1273#
SLPADR  001252          418#   761*   998*  1001   1118*  1120   1128   1605*  1607   1832*  1833*  1841*  1843
SLPERR  001254          419#
SMADR1  001152          370#
SMADR2  001156          374#
SMADR3  001162          377#
SMADR4  001166          380#
SMAIL   001120          343#   537    541   1117   1167
SMAMS1  001150          364#
SMAMS2  001154          372#
SMAMS3  001160          375#
SMAMS4  001164          378#
SMBADR  001450          537#
SMFLG   005332         1227*  1233   1268*  1272#
SMSGAD  001134          350#  1243*  1246
SMSGLG  001136          351#  1248*
SMSGTY  001120          344#  1241   1249*  1261   1265*
SMTYP1  001151          365#
SMTYP2  001155          373#
SMTYP3  001161          376#
SMTYP4  001165          379#
SMXCNT  004542         1115   1128#  1784
SN    = 000020            1#  2072   2076   2081#  2115   2119   2124#  2134   2142   2147#  2185   2190   2195#
                       2243   2249   2254#  2275   2280   2285#  2315   2319   2324#  2339   2343   2348#  2364
                       2374   2379#  2421   2426   2431#  2458   2467   2473#  2539   2545   2550#  2624   2629
```

```
                    2635#  2698   2704   2709#  2751   2756   2761#  2836   2844   2849#  3026#
$NULL   001320       439#  1194   1223
$NWTST= 000000      2077#  2120#  2143#  2191#  2250#  2281#  2320#  2344#  2375#  2427#  2468#  2546#  2630#
                    2705#  2757#  2845#
$OVER   004500      1087   1090   1101   1113   1119#
$PASS   001126       347#   754*  1023*  1026*  1034*  1035*  1052   1061   1109   1129
$PASTM  001454       539#
$PWRAD  007376      1702#
$PWRDN  007236       311    753   1669#  1697
$PWRMG  007372      1700#
$PWRUP  007310      1679   1685#
$QUES   001356       457#   892   1223   1307   1839
$REGAD  001324       443#
$REG0   001326       445#  1384*  1389   3004   3012
$REG1   001330       446#  1383*  1390   3002
$REG2   001332       447#  1382*  1391
$REG3   001334       448#  1381*  1392
$REG4   001336       449#  1380*  1393   3010   3022
$REG5   001340       450#  1379*  1394   3008   3020
$RTNAD  004246      1051#
$SAVR6  007406      1678*  1686   1687*  1688*  1706#
$SCOPE  004300      1081#
$SETUP= 000000      1033   1082
$SVLAD  004462      1098   1116#
$SVPC = 000040       321#   326
$SWR  = 164000         1#    10    456    457   1011   1033   1044   1050   1052   1075   1076   1077   1078
                    1089   1101   1103   1104   1105   1106   1107   1119   1128   1703   2079   2122   2145
                    2193   2252   2283   2322   2346   2377   2429   2470   2548   2632   2707   2759   2847
$SWREG  001142       355#  1960
$SWRMK= 000000      1078
$TESTN  001124       346#  1117*
$TIMES  001354       456#  1033*  1106*  1112   1115*  1128   1784*
$TKB    001312       436#  1088   1294   1300   1615   1629
$TKS    001310       435#  1086   1292   1619   1627
$TMP0   001342       451#
$TMP1   001344       452#   826    837    838*   937*   962*   963*  1709
$TMP2   001346       453#   843*   848*   849*   938*   939   1711
$TMP3   001350       454#
$TMP4   001352       455#
$TN   = 000021        10#  2077   2079#  2120   2122#  2143   2145#  2191   2193#  2250   2252#  2281   2283#
                    2320   2322#  2344   2346#  2375   2377#  2427   2429#  2468   2470#  2546   2548#  2630
                    2632#  2705   2707#  2757   2759#  2845   2847#
$TPB    001316       438#  1212*  1223   1300*  1536*  1636*
$TPFLG  001323       442#  1161   1223
$TPS    001314       437#  1210   1223   1298   1534   1633
$TSTM   001452       538#
$TSTNM  001246       415#   760*  1074   1116*  1117   1119   1129   1614   1822   1830   2079*  2122*  2145*
                    2193*  2252*  2283*  2322*  2346*  2377*  2429*  2470*  2548*  2632*  2707*  2759*  2847*
$TYPE   004606      1141   1161#  1254
$TYPEC  005020      1191   1198   1205   1210#  1211
$TYPEX  005066      1216   1218   1221#
$UNIT   001132       349#
$UNITM  001456       540#
$USWR   001144       356#
$VECT1  001170       381#   811*  1937   2067*
$VECT2  001172       382#
```

```
$XTSTR  004340          1084    1092#
$Y    = 000023           645#     652     654#    656#    658#    660#    662#    664#    666#    668#    670#    672#    674#
                         676#     678#    680#    682#    684#    686#    688#    690#
$$GET4= 000000          1044#
$4OCAT= ****** U        1089
.     = 017420           304#     305     308#    321     322#    324#    326#    328#    331#    335#    337#    460     493#
                         494#     496#    498#    499#    525     526#    528#    530#    545#    548#    549#    550#    551#
                         552#     554#    555#    556#    557#    558#    560#    561#    562#    563#    564#    566#    567#
                         568#     569#    570#    572#    573#    574#    575#    576#    578#    579#    580#    581#    582#
                         584#     585#    586#    587#    588#    590#    591#    592#    593#    594#    596#    597#    598#
                         599#     600#    602#    603#    604#    605#    606#    608#    609#    610#    611#    612#    614#
                         615#     616#    617#    618#    620#    621#    622#    623#    624#    626#    627#    628#    629#
                         630#     632#    633#    634#    635#    63F*    638#    639#    640#    641#    642#    926#   1052
                        1128     1129    1223    1275#   1664#   168.    1705    1764#   1766#   1768#   1783    2033    2056
                        2863     2866    2885    2915    2919
.ADVAN  006232           653     1489#
.BEGIN  003770           988#
.BUFSE  006322           689     1520#
.CNVRT  005760           673     1401#
.CONVR  005754           671     1400#
.DCLAS  006200           683     1473#
.DELAY  006212           677     1477#
.DEVIC  006160           675     1465#
.ERRTA  016200          1552     2931#
.INSTE  005442           661     1305#
.INSTR  005336           659     1284#
.INST1  005356          1288#    1308
.LPRSE  006262           687     1505#
.MSG    005360          1286*    1289#
.PARAM  005462           663     1316#
.PARMD  011142           679     1879#
.PAWCH  010214           681     1747#   1759
.RESOS  005722           669     1389#
.SAVOS  005662           667     1375#
.SCOPE  004300           309     1082#   2068
.SCOP1  004544           655     1133#
.SETFL  010074           665     1718#   1737
.SHIFT  006244           685     1496#
.START  002116           332      749#    761
.TRPSR  006136           315     1454#
.TRPTA  001742           651#    1459
.TYPE   004570           657     1140#
.$ASTA= ****** U        1227     1230
.$X   = 001446           525#     530
```

F08


```
COMMEN    154#
ENDCOM    154#
ERROR      48#  2112  2132  2155  2162  2171  2203  2210  2233  2241  2261  2273  2292  2298  2305
              2313  2332  2337  2356  2361  2408  2416  2447  2451  2486  2492  2518  2522  2568  2591
              2601  2617  2621  2649  2656  2681  2685  2741  2745  2785  2791  2793  2798  2816  2819
              2821  2825  2864  2867  2875  2883  2886  2894  2895  2916  2920  2924
ESCAPE    154#
GETPRI    154#
GETSWR    154#
MULT      154#
NEWTST    154#  2077  2120  2143  2191  2250  2281  2320  2344  2375  2427  2468  2546  2630  2705
              2757  2845
PASEND      1#  1015
POP       154#  1269  1270  1690  1691
PRGEND      1#  1002
PRGFRT      1#
PUSH      154#  1230  1232  1253  1671  1677
REPORT      1#   154#
SC          1#  1082
SCOPE      49#  1015  2078  2121  2144  2192  2251  2282  2321  2345  2376  2428  2469  2547  2631
              2706  2758  2846
SC1         1#  1121
SETPRI    154#
SETUP     154#
SKIP      154#
SLASH     154#
SPACE     154#
STARS     154#   319   338   341   409   522   524   531  1009  1071  1146  1225  1667  1683  2077
             2120  2143  2191  2250  2281  2320  2344  2375  2427  2468  2546  2630  2705  2757  2845
SWRSU     154#
TYPBIN    154#
TYPDEC    154#
TYPNAM    154#
TYPNUM    154#
TYPOCS    154#
TYPOCT    154#
TYPTXT    154#
$BUFFE      1#  1760
$CYCLE      1#  1770
$EOP        1#  1002
$GETFL      1#   814
$GETPA      1#   791   803   821   870   903   949   969  1817
$HEADE      1#    11
$INTSE      1#  2770  2800
$JUNK       1#   547   553   559   565   571   577   583   589   595   601   607   613   619   625
             631   637
$LINEU      1#
$LVLTS      1#  2751
$MRESE      1#
$MRR        1#  2243
$MRRW       1#  2134
$MRWD       1#  2315  2339
$MSG        1#  1707
$SCOPE      1#  1065
$SETFL      1#  1713
$STAG       1#  2498  2661  2721  2903
```

```
$STAGF          1#
$TCR            1#  2185
$TLINE          1#  2421
$TRPDE          1#   652   654   656   658   660   662   664   666   668   670   672   674   676   678
                680   682   684   686   688
$TSTN           1#  2076  2119  2142  2190  2249  2280  2319  2343  2374  2426  2467  2545  2629  2704
               2756  2844
$UNIBU          1#  2072
$VARIA          1#   334
$XZ             1#  2072  2076  2115  2119  2134  2142  2185  2190  2243  2249  2275  2280  2315  2319
               2339  2343  2364  2373  2421  2426  2458  2467  2539  2545  2624  2629  2698  2704  2751
               2756  2836  2844
$SCMRE        337#   445   446   447   448   449   450
$SCMTM        337#   451   452   453   454   455
$SESCA        154#
$SNEWT        154#  2077  2120  2143  2191  2250  2281  2320  2344  2375  2427  2468  2546  2630  2705
               2757  2845
$SSKIP        154#
.EQUAT          1#    44
.HEADE          1#
.SETUP          1#
.$ACT1          1#   317
.$APTB          1#   339#
.$APTH          1#   520
.$APTY          1#  1223
.$CATC          1#
.$CMTA        337#
.$EOP           1#  1007
.$ERRO          1#
.$POWE          1#  1665
.$SCOP          1#  1069
.$TRAP          1#
.$TYPE          1#  1144

. ABS.  017420     000

 ERRORS DETECTED:  0

 DVDZAA,DVDZAA.SEQ=DVDZAA.P11
 RUN-TIME: 22 13 1 SECONDS
 RUN-TIME RATIO: 218/36=5.9
 CORE USED:  36K  (71 PAGES)
```