DZ11

8 LINE ASYNCH MUX TESTS

MD-11-DZDZA-C

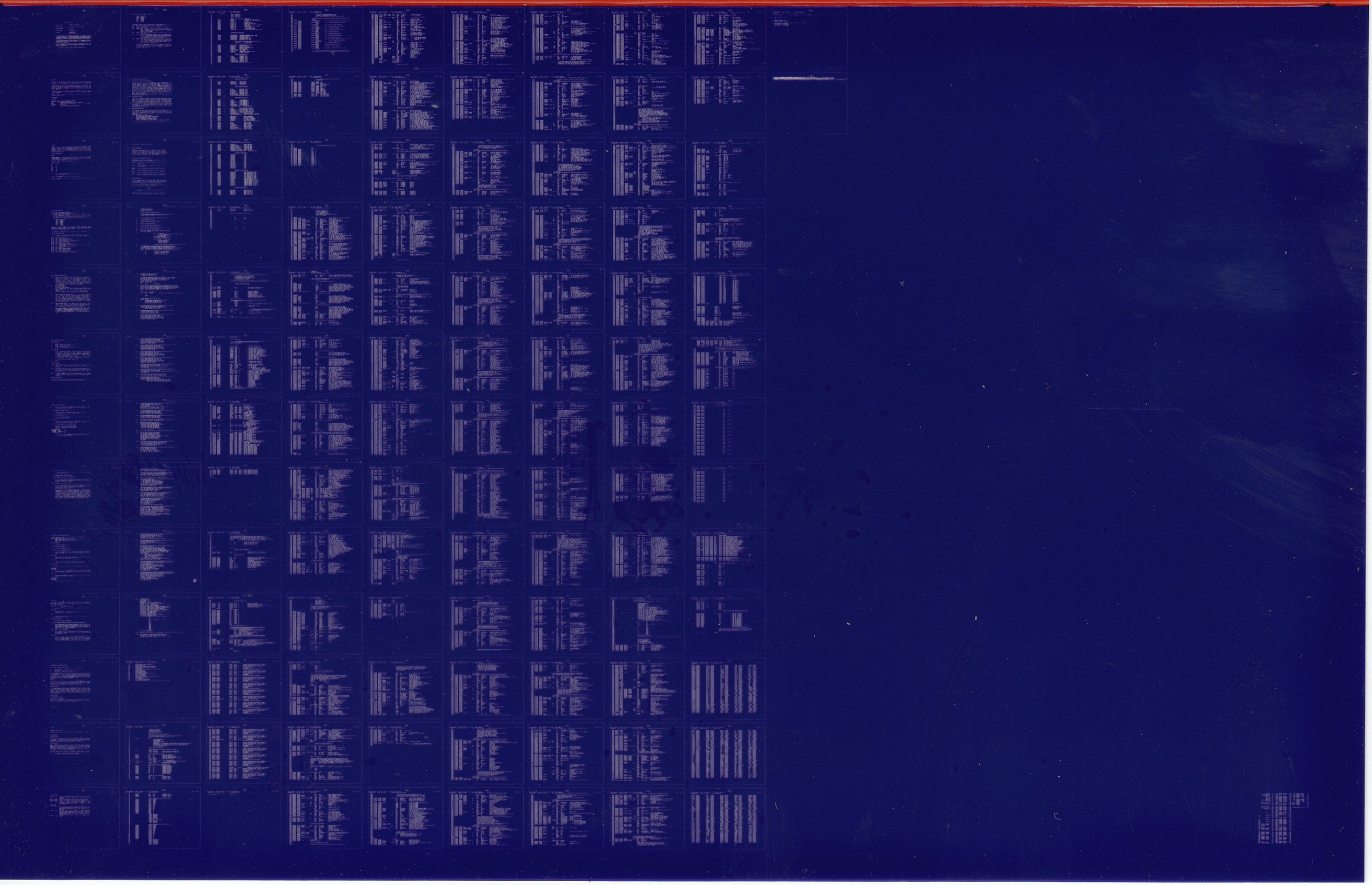
EP-DZDZA-C-DL-B

FICHE 1 OF 1

DEC 1976

digital

MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZDZA-C-D

PRODUCT NAME: DZ11 8 LINE ASYNC MUX TESTS

DATE RELEASED: DEC 1976

MAINTAINER: DIAGNOSTICS

AUTHORS: JOHN EGOLF
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1. ABSTRACT

The function of the DZ11 diagnostics is to verify the option operates according to specifications. The diagnostics also verify that the DZ11 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. Console input may be done at any start time if SW00=1.

Currently there is one standalone diagnostic (DZDZA), one system module for DEC X/11 (DZAA), and there are plans for an online overlay for DZITA (ITEP) - DZDZB.

DZDZA will test all parts of the DZ11 such as cables, dist pnl., and the interface module itself.

2. REQUIREMENTS

2.1 EQUIPMENT

Any PDP11 family CPU (WITH MINIMUM 8K MEMORY)
ASR 33 (or equilivalent for console)
DZ11 INTERFACE MODULE (M7819(EIA), M7814(20MA))
H327 Staggered turnaround connector. (if *B PARITY
and BREAK are to be tested.
H325 Cable turnarcund and dist pnl testing.
H21E This may be substituted for H325.

2.2 STORAGE

Program will use all 8k of memory except where ABL and BOOTSTRAP LOADER reside. Location 1500 thru 2000 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 Place address of ABS loader into switch register.
(also place 'HALT' SW up)

3.1.2 Depress 'LOAD ADDRESS' key on console and release.

3.1.3 Depress 'START KEY' on console and release (program should now be loading into CPU)

4. STARTING PROCEEDURE

A. Set switch register to 000200
B. Depress 'LOAD ADDRESS' key and release
C. Set SWR to zero for 'AUTO SIZING' or leave or set SW00=1 for user
 ↑B input from console terminal.
D. Depress 'START KEY' and release, the program will type Maindec Name and program name (if this was the first start up of the program or parameters were changed by SW00=1) and also the following:

```
'MAP OF DZ11 STATUS'
1500    160010
1502    000300
1504    000005
1506    000377
1510    017470
1512    000000
```

The above is only an example! This would indicate the status table starting at add. 1500 in the program. ↑BTHE 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: If there is no real SWR (177570); SWR may be modified at Loc:176 or by hitting Control "G" (↑G) on console terminal.

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; CLR-do AUTO SIZE. If 1st start of program after loading.
SW 06	Set:	Reselect DZ11's desired active
SW 05	Set:	Reserved
SW 04	Set:	SELECT DELAY PARAMETER
SW 03	Set:	Extra parameter input
SW 02	Set:	Lock on selected test
SW 01	Set:	Restart program at selected test
SW 00	Set:	Get users parameters from console

4.1.2 SWITCH REGISTER RESTRICTIONS

SW 06 RESELECT DZ11'S DESIRED ACTIVE. p'ease note that a message is typed out for setting the switch register equal to DZ11's active. this means if the system has four DZ11s; bits 00,01,02,03 will be set in loc 'DZACTV' from the switch register. Using this switch(SW06) alters that location;therefore if four DZ11s are in the system ***DO NOT*** ↑B set switches greater than SW 03 in the up position. This would be a fatal error. do not select more active DZ11s than has been given information about in parameter input (SW00=1)

METHOD: A: Load address 200
B: Start with SW 06=1
C: Program will type message
D: Set the BINARY number of DZ11s desired active EXAMPLE: 1=1 DZ11; 3=2 DZ11; 7=3 DZ11; 17=4 DZ11 37=5 DZ11 etc/aa PRESS CONTINUE.
E: Number (IF VALID) will be in data lights (excluding 11/05)
F: Set with any other switch settings desired. PRESS CONTINUE.

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 DZ11's; the DZ11 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 fi↑Brst DZ11 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 'SCOPI' 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 cann't be singled out.

SW 04 SELECT DELAY PARAMETER: THIS SWITCH SHOULD BE USED WITH CARE AS TOO SHORT A DELAY WILL CAUSE VALID TESTS TO FAIL ON CERTAIN PROCESSORS. IT IS RECCOMMENDED THAT THIS SWITCH ONLY BE IN CONJUNCTION W↑BITH SCOPE LOOPS, E.G. SW 14,9,4,1 SET; SW 9,4, 2,1 SET. THE SHORTEST PARAMETER IS 1; THE LONGEST ACCEPTED IS 17777E.

4.1.3 SWITCH REGISTER PRIORITYS

ERROR SWITCHES

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

SCOPE SWITCHES

1. SW 09 (if enabled by 'SCOP1') on an error; If an '*' is printed in front of the test no. (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 SW09 is not enabled; and there is a *HARD* error (constant); SW08 is best.
   (SW14=1,0, SW10=0, SW09=0, SW08=1). for intermittent errors; SW14=1 will loop on test reguardless of error or not error.
   (SW14=1, SW10=0, SW09=0, SW08=1,↑B0)
2. SW 14
3. SW 11

4.2 STARTING ADDRESS

SA 200 - Address 200 is for normal execution of the diagnostic. This will do the major testing necessary for verification of hardware.

SA 210 - CABLE/ECHO - Terminal Tests. Starting at address 210 will give the user the option to verify the EIA cables at the dist pnl or verify a true link to any DEC supported EIA terminal supported by the DZ11.

NOTE: If address 000042 is non-zero the program assumes it is under
↑B ACT11 or XXDP control and will act accordingly after *ALL* available DZ11's are tested the program will return to 'XXDP' or 'ACT-11'.

5. OPERATING PROCEDURE

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

5.1 NORMAL START OF DIAGNOSTIC

On the first start of the diagnostic at address 200; if auto sizing is not used or whenever SW00=1; the following questions are asked and must be answered.

"1ST CSR ADDRESS (160000:163700): "

You must type in the first DZ11 CSR in the system you wish testing to begin at. RANGE: 160000:163700

"1ST VECTOR ADDRESS (300:770): "

You must type in the vector of the first DZ11 in the system under test. RANGE 300:770

"BR LEVEL (4:6): "

type in the priority level of the DZ11 that the above information has been given about. RANGE 4 or 5 or 6.†B

"TYPE "A" FOR EIA MODULE OR "B" FOR 20MA (A:B): "

Type "A" if running a DZ11-A,B,E (EIA).
Type "B" if running a DZ11-C,D,F (20MA).
Typing a <CR> defaults to EIA MODULES.

"MAINTAINCE MODE
[EXTERNAL <H325> (E)]
[INTERNAL <DZCSR03=1>(I)]
[STAGGERED <H327> (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 a H325 test connector.

"# OF DZ11'S (IN OCTAL) (1:20): "

Type total number of DZ11's to be tested in the system. RANGE is 1 thru 20 in octal.

********* IF SW03=1 THEN *********
If SW03=1 the following will be printed.

"LINES ACTIVE BY BIT (IN OCTAL) (001:377):"

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, 4-5, 6-7)).

"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. Normal operation is a "17" (19.2k) or "16" (9.6k). "00"(50 baud)- Not advised.
****

It is important to note that all DZ11'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 DZ11's in the system. If not all DZ11's are same priority or if
!B the mode of operation is different for each DZ11; 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 DZ11 under test and INDICATE ONLY 1 DZ11 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 HOW TO RUN THE "CABLE/ECHO" TESTS.

↑B Normal starting for the first time would be: LOAD ADDRESS 210; START WITH THE SWR EQUAL TO 213.
NOTE: SW00=1 ASKS FOR "VECTOR" AND "CSR"
SW01=1 ASKS FOR "WHICH TEST ECHO OR CABLE", "BAUD RATE", "LINE" UNDER TEST. Program will print out:

"VECTOR ADDRESS-"

You type vector with a <CR>.

"CONTROL REGISTER ADDRESS-"

You type in DZCSR under test.

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

Lets do the CABLE TEST first. **THIS TEST IS ONLY TO BE DONE ON THE EIA VERSION OF THE DZ11 NOT THE 20MA VERSION". Type "C" <CR>

"BAUD RATE- "

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

"LINE: "

You type the line which has the H325 test connector. (Type either 0, 1, 2, 3, 4, 5, 6, 7) Program will then print:

"CABLE TEST"

and if everything is working; the following will be printed:

"PASS DONE."
"PASS DONE."
etc.

to change lines; HIT ANY PRINTING KEY↑B ON YOUR CONSOLE TERMINAL WHILE THE PROGRAM IS RUNNING and the following will be printed:

"LINE: "

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

"CABLE TEST"
"PASS DONE."
"PASS DONE."

Continue this operation until all lines are tested.

5.3 ECHO TEST

If program has already been started at 210 and the vector and address have been typed ↑Bin; just load address 210 and start with SWR equal to 212. program will print:

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

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

"BAUD RATE-"

Type BAUD RATE at which the terminal is set that is connected to the DZ11 dist pnl. program will print:

LINE: "

Type the line the terminal is connected to at the dist pnl then the program will print:

"TERMINAL ECHO TEST"

*** AT THIS POINT THE MESSAGE:

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

SHOULD BE PRINTED ON THE TERMINAL CONNECTED TO THE DZ11. IF THIS MESSAGE IS DESIRED TO BE CONTINIOUSLY OUTPUT; SET THE SWR TO 377 (SWR=377) WHILE IT IS BEING OUTPUT OR WHEN PROGRAM IS STARTED AT 210. WHEN THIS MESSAGE IS DONE AND THE SWR IS NOT EQUAL TO 377; THE CONSOLE WILL PRINT:

"TYPE A CHAR. ON DZ11 TERMINAL"

any printable char hit on DZ11 terminal should be echoed back on the terminal. **IF YOU HIT CNTRL C <↑C> ON THE DZ11↑B TERMINAL THE PROGRAM WILL PRINT:

"PASS DONE."

on the console terminal and the "QUICK BROWN FOX" will be printed on DZ11 terminal again and the echo test will be running. TO CHANGE LINES; do like cable test. HIT PRINTABLE KEY ON CONSOLE TERMINAL. And change the line on which the terminal is connected. And enter the new line to the program.

5.4 PROGRAM AND/OR OPERATOR ACTION

↑B The typical approach should be

1. Halt on error (via SW 15=1) when ever an error occurs.
2. Clear SW 15.
3. Set SW 14: (loop on this test)
4. Set SW 13: (inhibit error print out)

The TEST NUMBER and PC will be typed out and possibly an error message (this depends on the test) to give the operator an idea as to the source of the problem. If it is necessary to know more information concerning the error report; LOOK IN THE LISTING for that TEST NUMBER which was typed out and then NOTE THE PC of the ERROR REPORT this way the EXACT FUNCTIONING of the test CAN BE INTERPETED.

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.

6.2 ERROR RECOVERY

If for some reason the DZ11 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 contfBrol of cpu. If this should happen; look in location 'TSTNO' (address 1216)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 DZ11 was doing at the time of the error.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

See section 4. (PLEASE)
Status table should be verified regardless of how program was started.
Also it is important to use this listing along with the information printed on the TTY to completly 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 DZ11 device diagnostics will give an 'END PASS' message (providing no errors and sw12=0) within 2 min. This is assuming SW11=2 (DELETE ITERATIONS) is set to give the fastest possible execution. The actual execution time depends greatly on the PDP11 CPU configuration.

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 DZ11'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 DZDZA-C CSR: 160010 VEC: 300 PASSES: 000001 ERRORS: 000000

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

8.4 KEY LOCATIONS

SLPADR (1126)	Contains the address where program will return when iteration count is reached or if loop on test is asserted.
NEXT (1360)	Contains the address of the next test to be peformed.
STSTNM (1122)	Contains the number of the test now being peformed.
RUN (1406)	The bit in 'RUN' always points one past the DZ11 currently being tested†B. EXAMPLE: (RUN) 1304/0000000001000000 Means that DZ11 no.05 is the DZ11 now running.
STATUS MAP (1500)-(2000)	These locations contain the information needed to test up to 16 (decimal) DZ11s sequentialy. they contain the CSR,VECTOR and STATUS concerning the configuration of each DZ11.
DZACTV (1404)	Each bit set in this location indicates that the associated DZ11 will be tested in turn. EXAMPLE: (DZACTV) 1300/0000000000011111 means that DZ11 no. 00,01,02,03,04 will be tested. EXAMPLE: (DZACTV) 1300/0000000000010001 Means that DZ11 no. 00,04 will be tested.
SBASE (1310)	Contains the receiver csr of the current DZ11 under test.

8.4A MORE ON THAT 'STATUS TABLE' (1500-2000)

```
'MAP OF D. 1 STATUS'
1500    160010
1502  †B  000300
1504    000005
1506    000377
1510    017470
1512    000000
```

The above information will be repeated for each of up to 8 DZ11's in the system(these will follow under this table). EXPLANATION:

1500	160010	This is the system control register for the 1st DZ11 in the system.
1502	000300	This is vector 'A' for the first DZ11 in the system.
1504	000005	This represents the bus interrupt priority level of the DZ11. BIT15 of this location indicates either EIA or 20MA. if BIT15=0 module should be eia; if bit15=1 module should be 20ma.
1506	000377	This is the binary representation of what lines are to be tested.
1510	017470	This is the parameter location used is most of the tests. It indicated 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.
1512	000000	This location will contain either all zeros indicating that internal loop was selected as mode of operation or it will contain 10000 indicating that "staggered mode" was selected or it will contain 000200 indicating that "external" was the mode selected.

The above is repeated for each DZ11 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 (toggled in) 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 'REFERENCEING' 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 163700 is reached. If a 'SLAVE SYNC RESPONSE'↑B was issued by the DZ11 (or any other device) (no nxm trap), "MASTER SCAN ENABLE" is attempted to be set and the "TCR" bit for line 7 is set. "TRDY" is then tested to be set and both "TCR07" AND "MASTER SCAN ENABLE" are tested to be still set. If all of this worked; then a "DEVICE CLEAR" is issued testing that the bit can be read back and that after some time it self clears. If all of the above worked; this device is assumed to be a DZ11. 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 DZ11; 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 DZCSR. "TCR07" is then set. a delay is made and if no interupt occures (because of a bad DZ11) the program assumes vector address 300 and the problem should be fixed in the diagnostic. Once the problem is fixed; the program should be re-setup again to get
↑B correct vector. If an interupt occurred; the address to which the DZ11 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 (toggle in) if desired. In this way 95% of the parameter setup was↑B done by the program and 5% by you.
THEREFORE:
1) BUS PRIORITY IS SET TO LEVEL5.
2) ALL EIGHT LINES ARE ASSUMED TO BE TESTED.
3) DEFAULT BAUD RATE IS SET TO 17 (19.2 K).
4) MODE OF OPERATION IS "INTERNAL MODE".
5) MODULE IS ASSUMED TO BE "EIA" VERSION.
SET BIT IS IN PRIORITY ENTRY OF MAP IF YOU HAVE A 20MA MODULE.

In all adjustments please refer to section 8.4a for greater detail.

9.0 RUNNING THE DZ11 DIAGNOSTIC UNDER APT

9.1.1 THE APT INTERFACE

DZDZA has been redesigned to be compatible with the APT-Automated Product Test system. It can be run as a standalone diagnostic or in either of the APT modes. Certain variables in the original APT module were reassigned to the areas set aside for APT interfacing. These new variables generally begin with a dollar sign ($), e.g., $DEVM, $BASE.

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 - used if a software switch register is desired while under18 apt

$VECT1 - used to specify the interrupt level and the first vector address

$BASE - used to indicate bottom address of DZ11 under test

$DEVM - a bit map representing which DZ11's will be tested

$CDW1 - used to indicate which lines to run on all DZ11's

$DDW0 - each of the $DDW words describes the parameters (LPR) for a particular DZ11, going up to 16 DZ11's

9.1.3 RUNNING UNDER APT

The user should be familiar with the APT system. The APT timing parameters for the DZ11 diagnostic were bfBased on an 11/40 processor. It may be necessary to add a few more seconds if the diagnostic is out on an 11/05 processor.

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 DZ11 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.

```
                2       COPYRIGHT (C) 1976
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                        MAYNARD, MASS. 01754

                        PROGRAM BY JERRYL PAYNE,JOHN EGOLF

                        THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        PACKAGE (MAINDEC-11-DZQAC-C2), SEPT 14, 1976.


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

               28       MISCELLANEOUS DEFINITIONS

               40       GENERAL PURPOSE REGISTER DEFINITIONS

               52       PRIORITY LEVEL DEFINITIONS

               62       "SWITCH REGISTER" SWITCH DEFINITIONS

               90       DATA BIT DEFINITIONS (BIT00 TO BIT15)

              118       BASIC "CPU" TRAP VECTOR ADDRESSES

              354       THIS TABLE CONTAINS VARIOUS COMMON STORAGE L↑BOCATIONS
                        USED IN THE PROGRAM.

              424                               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

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

              437                                 MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE

              475       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 I↑BN 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:

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

```
1088    INCREMENT THE PASS NUMBER ($PASS)
        IF THERES A MONITOR GO TO IT
        IF THERE ISN'T JUMP TO CYCLE

1149    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

1225    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


1927    ROUTINE USED TO "AUTO SIZE" THE DZ11
        CSR AND VECTOR.
        NOTE:   THE CSR MAY BE ANY WHERE IN THE FLOATING
                ADDRESS RANGE (160000:163700)
                AND THE VECTOR MAY BE ANY WHERE IN THE
                FLOATING VECTOR RANGE (300:770)


2044    ********************** TEST 1 ********************************
        THIS TEST PROVES THE SLAVE SYNC RESPONSE
        DURING A READ OR WRITE TO THE FOLLOWING ADDRESS:
                DZCSR, DZRBUF, DZTCR, DZMSR

2087    ********************** TEST 2 ********************************
!2      THIS TEST PROVES THAT BIT "DCLR"
        CAN BE SET AND THAT IT WILL CLEAR
        BY ITSELF AFTER A PERIOD OF TIME.

2117    ********************** TEST 3 ********************************
        TEST TO VERIFY THAT BIT "MAINT" CAN
        BE SET. THEN VERIFY THAT BIT "MAINT" CAN
        BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
        VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
        CLEARED BY A "DEVICE CLEAR"
```

```
                2149    ********************** TEST 4 ******************************
                        TEST TO VERIFY THAT BIT "MSENAB" CAN
                        BE SET. THEN VERIFY THAT BIT "MSENAB" CAN
                        BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                        VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                        CLEARED BY A "DEVICE CLEAR"

                2181    ********************** TEST 5 ******************************
                        TEST TO VERIFY THAT BIT "SILOEN" CAN
                        BE SET. THEN VERIFY THAT BIT "SILOEN" CAN
                        BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                        VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                        CLEARED BY A "DEVICE CLEAR"

                2213    ********************** TEST 6 ******************************
                        TEST TO VERIFY THAT BIT "RIE" CAN
                        BE SET. THEN VERIFY THAT BIT "RIE" CAN
                        BE CLEARED (WR↑BITTEN TO A ZERO). AND FINALLY
                        VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                        CLEARED BY A "DEVICE CLEAR"

                2245    ********************** TEST 7 ******************************
                        TEST TO VERIFY THAT BIT "TIE" CAN
                        BE SET. THEN VERIFY THAT BIT "TIE" CAN
                        BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                        VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                        CLEARED BY A "DEVICE CLEAR"

                2277    ********************** TEST 10 *****************************
                        THIS TESTS THAT ALL OF THE FOLLOWING
                        BITS CAN BE: SET, CLEARED, CLEARED BY "DEVICE CLEAR "
                        BITS TESTED ARE:
                         TCR0, TCR1, TCR2, TCR3, TCR4, TCR5, TCR6, TCR7

↑B              2319    ********************** TEST 11 *****************************
                        THIS TESTS THAT ALL OF THE FOLLOWING
                        BITS CAN BE: SET, CLEARED, CLEARED BY "RESET INSTR *NOT* DEVICE CLEAR "
                        BITS TESTED ARE:

                2323     DTR0, DTR1, DTR2, DTR3, DTR4, DTR5, DTR6, DTR7
                        THIS TEST IS NOT DONE IF MODULE IS 20MA VERSION

                2371    ********************** TEST 12 *****************************
                        THIS TEST PERFORMS RESET TESTING &
                        TESTING OF WRITE ONLY OR READ ONLY BIT
                         TEST BITS "RDONE, BIT11, BIT10, BIT9, BIT8, BIT2, BIT1
                                    BIT0, SILOAL" ARE READ ONLY AND THAT TRDY IS
                                    ZERO UNTIL A LINE IS SELECTED AND MSENAB IS SET.
```

```
2438    ********************** TEST 13 ********************************
        THIS TEST PERFORMS RESET TESTING AND
        TESTING OF READ ONLY AND WRITE ONLY BITS
         IN REGISTER DZCSR
        VERIFY THAT "TIE", "SILOEN", "RIE", "MSENAB", "MAINT"
        ARE THE ONLY R/W BITS IN THE DZCSR.
        THEN SET "DCLR" AND VERIFY THEY ARE CLEARED

2437    ********************** TEST 14 ********************************
        THIS TEST PERFORMS RESET TESTING AND
        TESTING OF READ ONLY REGISTER DZR↑BBUF
        AND TESTING OF WRITE ONLY REGISTER DZLPR

2463    ********************** TEST 15 ********************************
        THIS TEST PERFORMS RESET TESTING AND
        TESTING OF READ ONLY REGISTER DZMSR
        AND TESTING OF WRITE ONLY REGISTER DZTDR

2489    ********************** TEST 16 ********************************
        VERIFY THAT IF WE ARE IN "STAGGERED" MODE

2491    THAT SETTING "DTR" FOR A LINE WILL
        BRING UP "RING" AND "CARRIER" FOR THE
        ASSOCIATED LINE IN WHICH WE ARE STAGGERED!
         LINE0 DTR= LINE1 RING AND CARRIER
         LINE1 DTR= LINE0 RING AND CARRIER
         LINE2 DTR= LINE3 RING AND CARRIER
         LINE3 DTR= LINE 4↑B RING AND CARRIER
                        ETC...

2546    ********************** TEST 17 ********************************

2547    TEST TO VERIFY THAT IF IN "EXTERNAL"
        MODE; SETTING DTR FOR SELECTED LINES
        WILL BRING UP "CARRIER" AND "RING"
        FOR THAT SAME LINE. NOTE: IF YOU HAVE
        SELECTED MODE AS "EXTERNAL"; THE H325 TEST CONNECTER
        MUST BE USED ON ALL SPECIFIED LINES.
        LINES MAY BE SPECIFIED BY SWR03=1
        AND SWR00=1 AT START TIME OR ALTERING
        STATUS MAP.

2593    ********************** TEST 20 ********************************
         THIS TEST VERIFIES THAT TRDY IS SET WHEN A LINE
         IS READY TO BE LOADED, AND THAT THE LINE SPECI-
         FIED IN BITS 8-10 OF DZCSR CORRESPOND
         TO THE LINE SELECTED IN DZTCR

2627    ********************** TEST 21 ********************************
        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
        ONE AT A TIME. 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.

↑B

2711 ********** TEST 22 **********
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)

2715 THIS IS THE FIRST TIME THAT ALL DATA IS CHECKED

2792 ********** TEST 23 **********
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.
THIS TEST WILL NOT BE EXERCISED UNLESS
CONNECTE↑BD BY EXTERNAL PLUG.

2859 ********** TEST 24 **********
THIS TEST VERIFIES THAT THE DEVICE DOES NOT INTERRUPT
WHILE THE PROCESSOR STATUS IS SET EXACTLY
TO WHAT THE DZ11 PRIORITY IS SET TO.
DEFAULT PRIORITY IS AT 5 (240).

2927 ********** TEST 25 **********
THIS TEST VERIFIES THAT THE DEVICE DOES INTERRUPT
WHILE THE PROCESSOR STATUS IS SET TO EXACTLY
ONE LEVEL LOWER THAN THE DZ11. DZ11 PRIORITY
DEFAULT TO LEVEL 5 MINUS ONE LEVEL IS LEVEL 4.

3001 ********** TEST 26 **********
THIS TEST VERIFIES THAT THE RECEIVER WILL
INTERRUPT BEFORE THE TRANSMITTER EVEN
THOUGH THE TRANSMITTER WAS ENABLED
FIRST. SET PS TO LEVEL 7;
GET RDONE AND TRDY TO SET;
SET TX IE AND RX IE;
CLEAR PS AND EXPECT RX TO INTERRUPT FIRST

3111 ********** TEST 27 **********
THIS TEST VERIFIES OVERRUN AND SILO ALARM
ONE LINE AT A TIME - BASED UPON VALID LINES
AS EACH OF THE FIRST 16 CHARS ARE SENT; SILO ALARM IS
TESTED TO BE CLEARED. ON THE 16TH CHAR THE PROGRAM THEN
EXPECTS SILO ALARM TO SET. THEN THE ENTIRE
SILO IS FILLED AND AN OVERRUN IS EXPECTED ON THE 65TH
↑B CHAR PULLED OUT OUT THE SILO.
USING SWITCH NINE FOR THIS TEST SENDS 20. CHARACTERS
ON DZ LINE PREVIOUSLY SELECTED CONTINUOUSLY WHILE SW09=1.
USED TO SCOPE SILO ALARM PULSES, ETC.

```
3246    ********************** TEST 30 ********************************
        THIS TEST THAT "SILO ENABLE" WILL INHIBIT
        RECEIVER INTERRUPTS AND THAT ON THE
        16TH CHAR THAT "SILO ALARM" WILL CAUSE AN
        INTERRUPT WITH "RIE" SET.
        THIS WILL DO ALL SELECTED LINES ONE AT A TIME.

3331    **********↑B********** TEST 31 ********************************
        THIS TEST RUNS ALL LINES FULL BORE
        BASED UPON QUALIFIED LINES
        ..THIS IS AN INTERRUPT TEST ON THE RECEIVER AND
        TRANSMITTER

3475    ********************** TEST 32 ********************************
        DZ11 RELATIVE TIMING TEST.
        EACH SELECTED LINE WILL IN TURN RUN 16. CHARS
        AT ALL BAUD RATES AND THEN THE HIGHEST BAUD
        WITH ALL CHAR LENGTHS. EACH NEW PARAMETER SHOULD
        DECREASE IN TIME FROM THE PREVIOUS PARAMETERS SELECTED.
        THE TIME IS CHECKED AGAINST THE LAST PARAMETER USED
         AND A LOWER TIME IS EXPECTED ON THE CURRENT PARAMETER.
        PARAMETERS ARE:
          EIGHT BITS/PER/CHAR - TWO STOP BITS AT
                50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000
                2400, 3600, 4800, 7200, 9600 BAUD.
          19.2 K BAUD - TWO STOP BITS AT
                SEVEN, SIX, FIVE BITS/PER/CHAR.
        AFTER EACH LINE HAS FINISHED ALL THE ABOVE PARAMETERS
        THE NEXT SELECTED LINE IS THE TESTED.

3572    *******↑********** TEST 33 ********************************
         THIS TEST VERIFIES THAT EVEN PARITY WORKS
         FOR ALL ODD LINES SELECTED AND THAT ODD PARITY WORKS FOR ALL
         EVEN LINES SELECTED.
        THE MAIN FUNCTION OF THIS TEST IS TO VERIFY
        THAT "PE" (PARITY ERROR) CAN BE FLAGGED BY
        THE UARTS. THI↑BS TEST WILL NOT BE DONE UNLESS
        YOU ARE IN "STAGGEPED" MODE.
        40(8) CHARS ARE USED FOR THIS TEST.
        ALL SELECTED LINES WILL BE ENABLED
        AT THE SAME TIME!

3671    ********************** TEST 34 ********************************
        THIS TEST VERIFIES THAT ODD PARITY WORKS FOR ALL ODD LINES
         SELECTED AND THAT EVEN PARITY WORKS FOR ALL EVEN LINES SELECTED
        THE MAIN FUNCTION OF THIS TEST IS TO VERIFY
        THAT "PE" (PARITY ERROR) CAN BE FLAGGED BY
        THE UARTS. THIS TEST WILL NOT BE DONE UNLESS
        YOU ARE IN "STAGGERED" MODE.
        40(8) CHARS ARE USED FOR THIS TEST.
        ALL SELECTED LINES WILL BE ENABLED
        AT THE SAM↑BE TIME!
```

```
3855    STARTING PROCEDURE
        LOAD PROGRAM
        LOAD ADDRESS 000210
        PRESS START
        PROGRAM WILL TYPE DZ11 ECHO/CABLE TEST
        PROGRAM WILL TYPE  WHICH TEST- ECHO OR CABLE
        TYPE IN  E  OR  C   RESPECTIVELY
        PROGRAM WILL TYPE "VECTOR ADDRESS-"
        TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
        FOR THE DZ11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
        PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
        TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
        FOR THE DZ11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
        PROGRAM WILL TYPE "LINE NUMBER-"
        TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)
        ,FOLLOWED BY <CARRIAGE RETURN>
        PROGRAM WILL TYPE "BAUD RATE-"
        TYPE IN THE BAUD RATE OF THE DZ11 TERMINAL
        ,FOLLOWED BY <CARRIAGE RETURN>
        THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL
                        50
                        75
                        110
                        135     (ROUNDED OFF   134.5)
                        150
                        300
                        600
                        1200
                        1800
                        2000
                        2400
                        3600
                        4800
                        7200
                        9600
        ALL OTHERS ARE REJECTED

3892    PROGRAM WILL TYPE "ECHO"  OR  "CABLE TEST" TO INDICATE THAT TESTING HAS STARTE

4001872 TEST TO VERIFY THAT SETTING DTR FOR A GIVEN LINE
        WILL BRING UP "CO" AND "RING" FOR THE SAME LINE
        THE DIST PNL MUST HAVE JUMPER FROM DTR TO RQST TO SEND
        IN ORDER FOR THIS TEST TO WORK!
```

```
                                .TITLE  MD-11-DZDZA-C
                                ;*COPYRIGHT (C) 1976
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY JERRYL PAYNE,JOHN EGOLF
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C2), SEPT 14, 1976.
                                ;*
000001                          $TN=1
                                        ;STARTING PROCEDURE
                                        ;LOAD PROGRAM
                                        ;LOAD ADDRESS 000200
                                        ;PRESS START
                                        ;PROGRAM WILL TYPE "MAINDEC-11-DZDZAC/<200>/EIGHT LINE ASYNC MUX TESTS"
                                        ;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

                                .SBTTL  BASIC DEF↑BINITIONS

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

                                ;*MISCELLANEOUS DEFINITIONS
000011                          AT=     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
↑B  36          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
```

```
                        PR4=    200             ;;PRIORITY LEVEL 4
                        PR5=    240             ;;PRIORITY LEVEL 5
                        PR6=    300             ;;PRIORITY LEVEL 6
                        PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIO↑BNS
                        SW15=   100000
                        SW14=   40000
                        SW13=   20000
                        SW12=   10000
                        SW11=   4000
                        SW10=   2000
                        SW09=   1000
                        SW08=   400
                        SW07=   200
                        SW06=   100
                        SW05=   40
                        SW04=   20
                        SW03=   10
                        SW02=   4
                        SW01=   2
                        SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV↑B        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!BB  ;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

                        ;DZ11 CONTROL AND STATUS REGISTER DEFINITIONS
                        ;(DZCSR)        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

                        ;DZCSR 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
002000                  TL4=BIT10       ;TRANSMIT LINE 4
002400                  TL5=BIT10!BIT8  ;TRANSMIT LINE 5
003000                  TL6=BIT10!BIT9  ;TRANSMIT LINE 6
003400                  TL7!B=BIT10!BIT9!BIT8 ;TRANSMIT LINE 7
```

```
                                ;DZRBUF BIT DEFINITIONS
                                ;----------------------

010000                  PARER=BIT12     ;PARITY ERROR
020000                  FRMERR=BIT13    ;FRAME ERROR
040000                  OVRRUN=BIT14    ;OVERRUN ERROR
100000                  DVALID=BIT15    ;DATA VALID

                                ;DZRBUF 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
002000                  RL4=BIT10       ;RECEIVER LINE 4
002400                  RL5=BIT10!BIT8  ;RECEIVER LINE 5
003000                  RL6=BIT10!BIT9  ;RECEIVER LINE 6
003400                  RL7=BIT10!BIT9!BIT8 ;RECEIVER LINE 7

                                ;DZLPR 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
000004                  LP4=BIT2        ;LINE PARAMETER 4
000005                  LP5=BIT2!BIT0   ;LINE PARAMETER 5
000006                  LP6=BIT2!BIT1   ;LINE PARAMETER 6
000007                  LP7=BIT2!BIT1!BIT0      ;LINE PARAMETER 7

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 ENABLE↑BD
000200                  ODDPAR=BIT7             ;ODD PARITY ENABLED
000000                  ONESTOP=0               ;ONE STOP BIT ENABLED
000040                  TWOSTOP=BIT5            ;TWO STOP BITS ENABLED
000000                  EVEPAR=0                ;EVEN PARITY ENABLED
010000                  RCVON=BIT12             ;ENABLE RECEIVER (RECEIVER ON)

000000                  S50=0                   ;SPEED 50 BAUD
000400                  S75=BIT8                ;SPEED 75 BAUD
001000                  S110=BIT9               ;SPEED 110 BAUD
001400                  S134=BIT9!BIT8          ;SPEED 134.5 BAUD
002000                  S150=BIT10              ;SPEED 150 BAUD
002400                  S300=BIT10!BIT8         ;SPEED 300 BAUD
003000                  S600=BIT10!BIT9         ;SPEED 600 BAUD
003400                  S1200=BIT10!BIT↑89!BIT8 ;SPEED 1200 BAUD
```

```
                000400          S1800=BIT11             ;SPEED 1800 BAUD
                004400          S2000=BIT11!BIT8        ;SPEED 2000 BAUD
                005000          S2400=BIT11!BIT9        ;SPEED 2400 BAUD
                005400          S3600=BIT11!BIT9!BIT8   ;SPEED 3600 BAUD
                006000          S4800=BIT11!BIT10       ;SPEED 4800 BAUD
                006400          S7200=BIT11!BIT10!BIT8  ;SPEED 7200 BAUD
                007000          S9600=BIT11!BIT10!BIT9  ;SPEED 9600 BAUD
                007400          S19200=BIT11!BIT10!BIT9!BIT8    ;SPEED 19200 BAUD

                                ;DZTCR BIT DEFINITIONS
                                ;---------------------

                000001          TCR0=BIT0               ;TCR0
                000002          TCR1=BIT1               ;TCR1
                000004          TCR2=BIT2               ;TCR2
                000010          TCR3=BIT3               ;TCR3
                000020          TCR4=BIT4               ;TCR4
                000040          TCR5=BIT5               ;TCR5
                000100          TCR6=BIT6               ;TCR6
                000200          TCR7=BIT7               ;TCR7
                000400          DTR0=BIT8               ;DTR0
                001000          DTR1=BIT9               ;DTR1
                002000          DTR2=BIT10              ;DTR2
                004000          DTR3=BIT11              ;DTR3
                010000          DTR4=BIT12              ;DTR4
                020000          DTR5=BIT13              ;DTR5
                040000          DTR6=BIT14              ;DTR6
                100000          DTR7=BIT15              ;DTR7

                                ;DZMSR 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
                000020          RING4=BIT4              ;RING INDICATED ON LINE 4
                000040          RING5=BIT5              ;RING INDICATED ON LINE 5
                000100          RING6=BIT6              ;RING INDICATED ON LINE 6
                000200          RING7=BIT7              ;RING INDICATED ON LINE 7
                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
                010000          CO4=BIT12               ;CARRIER PRESENT ON LINE 4
                020000          CO5=BIT13               ;CARRIER PRESENT ON LINE 5
                040000          CO6=BIT14               ;CARRIER PRESENT ON LINE 6
                100000          CO7=BIT15               ;CARRIER PRESENT ON LINE 7

                                ;DZTDR 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
                010000          BRK4=BIT12              ;BREAK FOR LINE 4
                020000          BRK5=BIT13              ;BREAK FOR LINE 5
```

```
281          040000                  BRK6=BIT14              ;BREAK FOR LINE 6
282          100000                  BRK7=BIT15              ;BREAK FOR LINE 7
283
284
285                                  ;TABLE OF LOOP AROUND FUNCTIONS (H325)
286                                  ;
287                                  ;       -----------------
288                                  ;       I               ↑
289                                  ;       V               ↑
290                                  ;       REC             TRANS
291                                  ;       DATA            DATA
292                                  ;
293                                  ;       -----------------
294                                  ;       I               ↑
295                                  ;       V               ↑
296                                  ;       CO              RTS
297                                  ;
298                                  ;
299                                  ;       -----------------
300                                  ;       I               ↑↑B
301                                  ;       V               ↑
302                                  ;       RING            DTR
```

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

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

            000010              .=10
 000010  010650                         SET.PS                  ;FAKE "MTPS" INSTRUCTION TRAP
 000012  000340                         PR7                     ;MAKE SURE PS IS PRIORITY 7

            000020              .=20
 000020  004654                         .SCOPE                  ;SCOPE LOOP HANDLER
 000022  000340                         PR7                     ;HANDLE AT PRIORITY 7
 000024  007530                         $PWRDN                  ;POWER FAIL HANDLER
 000026  000340                         340                     ;SERVICE AT PRIORITY LEVEL 7
 000030  006620                         $ERROR                  ;ERROR HANDLER
 000032  000340                         340                     ;SERVICE AT PRIORITY LEVEL 7
 000034  006512                         .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  004610                         $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  000001B00                      DISPREG:0                       ;SOFTWARE DISPLAY REGISTER FOR SWITCHLESS 11S
 000176  000000             SWREG:   0                       ;SOFTARE SWITCH REGISTER FOR SWITCHLESS 11S
            000200              .=200
 000200  000137  002150                 JMP     .START          ;GO TO START OF PROGRAM
            000210              .=210
 000210  000137  023142                 JMP     XSTART          ;GOTO CABLE TEST/ECHO TEST

            001000              .=1000
 001000  005200  040515  047111 MTITLE: .ASCIZ  <200><12>/MAINDEC-11-DZDZAC/<20C>/EIGHT LINE ASYNC MUX TESTS/<200>
```

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

                        001120          .=1120
001120                  $CMTAG:                         ;;START OF COMMON TAGS
001120  000000          .WORD   0
001122  000            $TSTNM: .BYTE   0                ;;CONTAINS THE TEST NUMBER
001123  000            $ERFLG: .BYTE   0                ;;CONTAINS ERROR FLAG
001124  000000         $ICNT:  .WORD   0                ;;CONTAINS SUBTEST ITERATION COUNT
001126  000000         $LPADR: .WORD   0                ;;CONTAINS SCOPE LOOP ADDRESS
001130  000000         $LPERR: .WORD   0                ;;CONTAINS SCOPE RETURN FOR ERRORS
001132  000000         $ERTTL: .WORD   0                ;;CONTAINS TOTAL ERRORS DETECTED
001134  000            $ITEMB: .BYTE   0                ;;CONTAINS ITEM CONTROL BYTE
001135  001            $ERMAX: .BYTE   1                ;;CONTAINS MAX. ERRORS PER TEST
001136  000000         $ERRPC: .WORD   0                ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001140  000000         $GDADR: .WORD   0                ;;CONTAINS ADDRESS OF 'GOOD' DATA
001142  000000         $BDADR: .WORD   0                ;;CONTAINS ADDRESS OF 'BAD' DATA
001144  000000         $GDDAT: .WORD   0                ;;CONTAINS 'GOOD' DATA
001146  000000         $BDDAT: .WORD   0                ;;CONTAINS 'BAD' DATA
001150  000000                 .WORD   0                ;;RESERVED--NOT TO BE USED
001152  000000                 .WORD   0
001154  000            $AUTOB: .BYTE   0                ;;AUTOMATIC MODE INDICATOR
001155  000            $INTAG: .BYTE   0                ;;INTERRUPT MODE INDICATOR
001156  000000                 .WORD   0
001160  177570         SWR:    .WORD   DSWR             ;;ADDRESS OF SWITCH REGISTER
001162  177570         DISPLAY: .WORD  DDISP            ;;ADDRESS OF DISPLAY REGISTER
001164  177560         $TKS:   177560                   ;;TTY KBD STATUS
001166  177562         $TKB:   177562                   ;;TTY KBD BUFFER
001170  177564         $TPS:   177564                   ;;TTY PRINTER STATUS REG. ADDRESS
001172  177566         $TPB:   177566                   ;;TTY PRINTER BUFFER REG. ADDRESS
001174  000            $NULL:: .BYTE   0                ;;CONTAINS NULL CHARACTER FOR FILLS
001175  002            $FILLS: .BYTE   2                ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001176  012            $FILLC: .BYTE   12               ;;"INSERT FILL CHARS. AFTER A "LINE FEED"
001177  000            $TPFLG: .BYTE   0                ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001200  000000         $REGAD: .WORD   0                ;;CONTAINS THE ADDRESS FROM
                                                        ;;WHICH  ($REG0) WAS OBTAINED
001202  000000         $REG0:  .WORD   0                ;;CONTAINS (($REGAD)+0)
001204  000000         $REG1:  .WORD   0                ;;CONTAINS (($REGAD)+2)
001206  000000         $REG2:  .WORD   0                ;;CONTAINS (($REGAD)+4)
001210  000000         $REG3:  .WORD   0                ;;CONTAINS (($REGAD)+6)
001212  000000         $REG4:  .WORD   0                ;;CONTAINS (($REGAD)+10)
001214  000000         $REG5:  .WORD   0                ;;CONTAINS (($REGAD)+12)
001216  000000         $TMP0:  .WORD   0                ;;USER DEFINED
001220  000000         $TMP1:  .WORD   0                ;;USER DEFINED
001222  000000         $TMP2:  .WORD   0                ;;USER DEFINED
001224  000000         $TMP3:  .WORD   0                ;;USER DEFINED
001226  000000         $TIMES: 0                        ;;MAX. NUMBER OF ITERATIONS
001230  077            $QUES:  .ASCII  /?/              ;;QUESTION MARK
001231  015            $CRLF:  .ASCII  <15>             ;;CARRIAGE RETURN
001232  000012         $LF:    .ASCIZ  <12>             ;;LINE FEED
                                ;;********!B*************************************************
                                .SBTTL  APT MAILBOX-ETABLE
```

```
                                ;;*****************************************************************
                                .EVEN
001234                          $MAIL:                  ;;APT MAILBOX
001234  000000                  $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
001236  000000                  $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
001240  000000                  $TESTN: .WORD   ATESTN  ;;TEST NUMBER
001242  000000                  $PASS:  .WORD   APASS   ;;PASS COUNT
001244  000000                  $DEVCT: .WORD   ADEVCT!BT       ;;DEVICE COUNT
001246  000000                  $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
001250  000000                  $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
001252  000000                  $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
001254                          $ETABLE:                ;;APT ENVIRONMENT TABLE
001254     000                  $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
001255     000                  $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
001256  000000                  $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
001260  000000                  $USWR:  .WORD   AUSWR   ;;USER SWITCHES
001262  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
001264     000                  $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
001265     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
001266  000000                  $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                                :*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001270     000                          $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
001271     000                  $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
001272  000000                  $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
001274     000                  $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
001275     000                  $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
001276  000000                  $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
001300     000                  $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
001301     000                  $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
001302  000000                  $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
001304  000000                  $VECT1: .WORD   AVECT!BT1       ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001306  000000                  $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001310  160010                  $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001312  000000                  $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
001314  000000                  $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
001316  000000                  $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
001320  000000                  $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
001322  000000                  $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
001324  000000                  $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
001326  000000                  $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
001330  000000                  $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
001332  000000                  $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
001334  000000                  $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
001336  000000                  $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
001340  000000                  $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
001342  000000                  $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
```

```
    463  001344  000000          $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
    464  001346  000000          $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
    465  001350  000000          $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
    466  001352  000000          $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
    467  001354  000000          $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
    468  001356  000000          $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
    469
    470
    471  001360                  $ETEND:
    472
```

```
                                .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


001360                          $ERRTB:

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

001360  000000                  NEXT:   0                       ;ADDRESS OF NEXT TEST TO BE EXECUTED
001362  000000                  LOCK:   0                       ;ADDRESS FOR LOCK ON CURRENT DATA

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

001364  000377                  LINE:   377                     ;DEFAULT ALL EIGHT LINES RUNNING
001366  017470                  PAR:    17470                   ;PARAMETERS: 8 BITS/CHAR,2 STOP BITS,19200 BAUD,NO PARIT
001370  000000                  MODE:   0                       ;DEFAULT MAINTENANCE MODE
001372  000000                  SAVLIN: 0                       ;LINE NUMBER
001374  000000                  XMTLIN: 0                       ;TRANSMISSION LINE NUMBER
001376  000000                  XMTCNT: 0                       ;COUNT OF WORDS IN A TRANSMISSION PATTERN
001400  000000                  REGIST: 0                       ;DEVICE ADDRESS STORAGE LOCATION
001402  000000                  SAVPC:  0                       ;PROGRAM COUNTER STORAGE
001404  000001                  DZACTV: .BLKW   1               ;*DZ11'S SELECTED ACTIVE.
001406  000001                  RUN:    1                       ;*POINTER ONE PAST RUNNING DEVICE.
001410  000001                  DZNUM:  .BLKB 1                 ;*OCTAL NUMBER OF DZ11'S.
001411     001                  SAVNUM: .BYTE 1                 ;*WORKABLE NUMBER.
                                .EVEN
001412  001500                  ACTIVE: DZ.MAP                  ;TABLE POINTER.
```

```
                                        ;↑BPROGRAM CONTROL FLAGS
                                        ;---------------------
                                        
001414  000     EIAFLG: .BYTE   0               ;0=EIA  100000=20MA
001415  000     INIFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG
001416  000     HDRFLG: .BYTE   0               ;PROGRAM INITIALIZATION FLAG FOR HEADER MAP
001417  000     MNTFLG: .BYTE   0               ;MAINTENANCE BIT SET FLAG
001420  000     DONFLG: .BYTE   0               ;TRANSMISSION COMPLETION FLAG
        001422  .EVEN
                ;DATA VARIABLES
001422  000000  TD0:    .WORD   0
001424  000000  TD1:    .WORD   0
001426  000000  TD2:    .WORD   0
001430  000000  TD3:    .WORD   0
001432  000000  TD4:    .WORD   0
001434  000000  TD5:    .WORD   0
001436  000000  TD6:    .WORD   0
001440  000000  TD7:    .WORD   0
001442  000000  TR0:    .WORD   0
001444  000000  TR1:    .WORD   0
001446  000000  TR2:    .WORD   0
001450  000000  TR3:    .WORD   0
001452  000000  TR4:    .WORD   0
001454  000000  TR5:    .WORD   0
001456  000000  TR6:    .WORD   0
001460  000000  TR7:    .WORD   0
001462          STOP:
                .SBTTL  APT PARAMETER BLOCK

                ;;*****************************************************************
                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
        ↑B      ;;*****************************************************************
        001462          .$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  001462          $APTHDR ;;POINT TO APT HEADER BLOCK
        001462          .=.$X   ;;RESET LOCATION COUNTER
                ;;*****************************************************************
                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                ;INTERFACE SPEC.

001462          $APTHD:
001462↑B2       000000          $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001464  001234  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001466  000132  $TSTM:  .WORD   90.      ;;RUN TIM OF LONGEST TEST
001470  000137  $PASTM: .WORD   95.      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001472  000137  $UNITM: .WORD   95.      ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001474  000052          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                        ;DZ11 STATUS TABLE AND ADDRESS ASSIGNMENTS
                        ;----------------------------------------

        001500  .=1500
001500          DZ.MAP:
```

```
   568  001500  000001                DZCR0:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 0
   569  001502  000001                DZVC0:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 0
   570  001504  000001                DZLV0:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   571  001506  000001                LINE0:  .BLKW   1       ;ALL LINES SELECTED
   572  001510  000001                PAR0:   .BLKW   1       ;PARAMETERS
   573  001512  000001                MANT0:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   574
   575  001514  000001                DZCR1:  .BLKW   1       ;CONTROL STATUS REG↑BISTER FOR DZ11 NUMBER 1
   576  001516  000001                DZVC1:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 1
   577  001520  000001                DZLV1:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   578  001522  000001                LINE1:  .BLKW   1       ;ALL LINES SELECTED
   579  001524  000001                PAR1:   .BLKW   1       ;PARAMETERS
   580  001526  000001                MANT1:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   581
   582  001530  000001                DZCR2:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 2
   583  001532  000001                DZVC2:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 2
   584  001534  000001                DZLV2:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   585  001536  000001  ↑B            LINE2:  .BLKW   1       ;ALL LINES SELECTED
   586  001540  000001                PAR2:   .BLKW   1       ;PARAMETERS
   587  001542  000001                MANT2:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   588
   589  001544  000001                DZCR3:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 3
   590  001546  000001                DZVC3:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 3
   591  001550  000001                DZLV3:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   592  001552  000001                LINE3:  .BLKW   1       ;ALL LINES SELECTED
   593  001554  000001                PAR3:   .BLKW   1       ;PARAMETERS
   594  001556  000001                MANT3:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   595
   596  001560  000001                DZCR4:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 4
   597  001562  000001                DZVC4:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 4
   598  001564  000001                DZLV4:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   599  001566  000001                LINE4:  .BLKW   1       ;ALL LINES SELECTED
   600  001570  000001                PAR4:   .BLKW   1       ;PARAMETERS
   601  001572  000001                MANT4:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   602
   603  001574  000001                DZCR5:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 5
   604  001576  000001                DZVC5:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 5
   605  001600  000001                DZLV5:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
↑B 606          001602  000001                LINE5:  .BLKW   1       ;ALL LINES SELECTED
   607  001604  000001                PAR5:   .BLKW   1       ;PARAMETERS
   608  001606  000001                MANT5:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   609
   610  001610  000001                DZCR6:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 6
   611  001612  000001                DZVC6:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 6
   612  001614  000001                DZLV6:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   613  001616  000001                LINE6:  .BLKW   1       ;ALL LINES SELECTED
   614  001620  000001                PAR6:   .BLKW   1       ;PARAMETERS
   615  001622  000001                MANT6:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   616
   617  001624  00000↑B1                      DZCR7:  .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 7
   618  001626  000001                DZVC7:  .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 7
   619  001630  000001                DZLV7:  .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
   620  001632  000001                LINE7:  .BLKW   1       ;ALL LINES SELECTED
   621  001634  000001                PAR7:   .BLKW   1       ;PARAMETERS
   622  001636  000001                MANT7:  .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
   623
```

```
                                DZCR10: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 10
                                DZVC10: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 10
                                DZLV10: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE10: .BLKW   1       ;ALL LINES SELECTED
                                PAR10:  .BLKW   1       ;PARAMETERS
                                MANT10: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR11: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 11
                                DZVC11: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 11
                                DZLV11: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE11: .BLKW   1       ;ALL LINES SELECTED
001664  000001                  PAR11:  .BLKW   1       ;PARAMETERS
                                MANT11: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR12: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 12
                                DZVC12: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 12
                                DZLV12: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE12: .BLKW   1       ;ALL LINES SELECTED
                                PAR12:  .BLKW   1       ;PARAMETERS
                                MANT12: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR13: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ↑B11 NUMBER 13
                                DZVC13: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 13
                                DZLV13: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE13: .BLKW   1       ;ALL LINES SELECTED
                                PAR13:  .BLKW   1       ;PARAMETERS
                                MANT13: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR14: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 14
                                DZVC14: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 14
                                DZLV14: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE14: .BLKW   1       ;ALL LINES SELECTED
                                PAR14:  .BLKW   1       ;PARAMETERS
                                MANT14: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR15: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 15
                                DZVC15: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 15
                                DZLV15: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE15: .BLKW   1       ;ALL LINES SELECTED
                                PAR15:  .BLKW   1       ;PARAMETERS
                                MANT15: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR↑B16:       .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 16
                                DZVC16: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 16
                                DZLV16: .BLKW   1       ;PRIORITY LEVEL AND EIA FLAG SELECTOR
                                LINE16: .BLKW   1       ;ALL LINES SELECTED
                                PAR16:  .BLKW   1       ;PARAMETERS
                                MANT16: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE

                                DZCR17: .BLKW   1       ;CONTROL STATUS REGISTER FOR DZ11 NUMBER 17
                                DZVC17: .BLKW   1       ;RECEIVER AND BASE VECTOR  FOR DZ11 NUMBER 17
                                DZLV17: .BLKW   1       ;PRIORITY LEVEL A↑BND EIA FLAG SELECTOR
                                LINE17: .BLKW   1       ;ALL LINES SELECTED
                                PAR17:  .BLKW   1       ;PARAMETERS
                                MANT17: .BLKW   1       ;MAINTENANCE MODE FOR THIS DEVICE
```

```
   680  002000  177777                DZ.END: 177777
```

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

                                        ;;*************************************************************************
                                        ;-------------------------------------------------------------------------
002002                                  .TRPTAB:
        104400                          ADVANCE=TRAP+0          ;CALL TO ADVANCE TO NEXT TEST( OR SCOPE THIS ONE)
002002  006606                                  .ADVANCE
        104401                          SCOP1=TRAP+1            ;CALL TO LOOP ON CURRENT DATA HANDLER
002004  005120                                  .SCOP1
        104402                          TYPE=TRAP+2             ;CALL TO TELETYPE OUTPUT ROUTINE
002006  005144                                  .TYPE
        104403                          INSTR=TRAP+3            ;CALL TO ASCII STRING INPUT ROUTINE
002010  005712                                  .INSTR
        104404                          $BINSTER=TRAP+4         ;CALL TO INPUT ERROR HANDLER
002012  006016                                  .INSTER
        104405                          PARAM=TRAP+5            ;CALL TO NUMERICAL DATA INPUT ROUTINE
002014  006036                                  .PARAM
        104406                          SETFLG=TRAP+6           ;CALL TO  SET FLAG ROUTINE
002016  010362                                  .SETFLG
        104407                          SAVOS=TRAP+7            ;CALL TO REGISTER SAVE ROUTINE
002020  006236                                  .SAVOS
        104410                          RESOS=TRAP+10           ;CALL TO REGISTER RESTORE ROUTINE
002022  006276                                  .RESOS
        104411                          CONVRT=TRAP+11          ;CALL TO DATA OUTPUT ROUTINE
002024  006330                                  .CONVRT
        104412                          CNVRT=TRAP+12           ;CALL TO DATA OUTPUT ROUNTINE WITHOUT CR/LF.
002026  006334                                  .CNVRT
        104413                          DEVICE.CLR=TRAP+13              ;CALL TO ISSUE A DEVICE CLEAR
002030  006534                                  .DEVICE.CLR
        104414                          DELAY=TRAP+14           ;CALL TO DELAY FOR FAST CPU'S
002032  006566                                  .DELAY
        104415                          PARMD=TRAP+15           ;CONVERT DECIMAL STRING TO OCTAL
002034  024654                                  .PARMD
        104416                          PAWCH=TRAP+16           ;SET FLAG    ECHO OR  CABLE
002036  025050                                  .PAWCH
        104417                          DCLASM=TRAP+17          ;CLEAR DEVICE, SET MAINT. BIT IF I MODE
002040  006554                                  .DCLASM

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

```
                                        ;DZ11 VECTOR AND REGISTER INDIRECT POINTERS
                                        ;WORKING AREA

002042  160040                  DZCSR:  160040  ;R/W
002044  160041                  HDZCSR: 160041  ;R/W
002046  160042                  DZRBUF: 160042  ;READ ONLY
002050  160043                  HDZRBUF:        160043  ;READ ONLY
002052  160042                  DZLPR:  160042  ;WRITE ONLY
002054  160043                  HDZLPR: 160043  ;WRITE ONLY
002056  160044                  DZTCR:  160044  ;R/W
002060  160045                  HDZTCR: 160045  ;↑BR/W
002062  160046                  DZMSR:  160046  ;READ ONLY
002064  160047                  HDZMSR: 160047  ;READ ONLY
002066  160046                  DZTDR:  160046  ;WRITE ONLY
002070  160047                  HDZTDR: 160047  ;WRITE ONLY
                                        ;DEFAULT DZ VECTORS
002072  000300                  DZRIV:  300     ;REC INTR VECTOR
002074  000302                  DZRIS:  302     ;REC INTR STATUS
002076  000304                  DZTIV:  304     ;XMIT INTR VECTOR
002100  000306                  DZTIS:  306     ;XMIT INTR STATUS
```

```
745
746                                     ;TIME TABLE FOR RELATIVE TIMING TESTS
7!847                                     ;---------------------------------
748
749  002102                             TMTBL:
750  002102  000000                     T50:    0
751  002104  000000                     T75:    0
752  002106  000000                     T110:   0
753  002110  000000                     T134:   0
754  002112  000000                     T150:   0
755  002114  000000                     T300:   0
756  002116  000000                     T600:   0
757  002120  000000                     T1200:  0
758  002122  000000                     T1800:  0
759  002124  000000                     T2000:  0
760  002126  000000                     T2400:  0
761  002130  000000                     T3600:  0
762  002132  000000                     T4800:  0
763  002134  000000                     T7200:  0
764  002136  000000                     T9600:  0
765  002140  000000                     TEIGHT:0
766  002142  000000                     TSEVEN: 0
767  002144  000000                     TSIX:   0
768  002146  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

002150                          .START:
002150  000005                  RESET                   ;CLEAR THE WORLD. START NEW ENVIRONMENT
002152  012706  001120          MOV     #STACK,SP       ;SET UP STACK
002156  136427  000340          MTPS    #PR7            ;LOCKBK OUT INTERRUPTS
002162  012737  007530  000024  MOV     #$PWRDN,@#24    ;SET UP POWER FAIL VECTOR
002170  113737  001410  001411  MOVB    DZNUM,SAVNUM    ;SAVE NUMBER OF DEVICES IN SYSTEM.
002176  005037  001242          CLR     $PASS           ;CLEAR PASS COUNT
002202  105037  001123          CLRB    $ERFLG          ;CLEAR ERROR FLAG
002206  012737  001500  001412  MOV     #DZ.MAP,ACTIVE  ;GET MAP POINTER.
002214  012737  000001  001406  MOV     #1,RUN          ;POINT POINTER TO FIRST DEVICE.
002222  005037  001132          CLR     $ERTTL          ;CLEAR ERROR COUNT
002226  005037  001136          CLR     $ERRPC          ;CLEAR LAST ERROR POINTER
002232  005037  001122          CLR     $TSTNM          ;SETBET UP FOR TEST 1
002236  012737  002150  001126  MOV     #.START,$LPADR  ;SET UP FOR POWER FAIL BEFORE
                                                        ;TESTING STARTS
                                ;SET UP FOR SMALL 11 SWITCH REGISTER COMPATIBILITY
002244  013746  000006          MOV     6,-(SP)         ;SAVE BUS ERROR PS
002250  013746  000004          MOV     4,-(SP)         ;SAVE BUS ERROR PC
002254  012737  002274  000004  MOV     #20$,4          ;SET UP TO TRAP TO THIS ROUTINE
002262  022777  177777  176670  CMP     #-1,@SWR        ;CAN 177570 BE REFERENCED?
002270  001402                  BEQ     22$             ;IF SO AND IT IS -1, TREAT LIKE SWITCHLESS
002272  000407                  BR      21$             ;IF YES,SKIP AROUND THE SETUP
002274  022626                  POP2SP  20$:            ;REMOVE THE TRAP FROM THE STACK
002276  012737  000176  001160  MOV     #SWREG,SWR      ;IF NO,TRAP COMES HERE.POINT TO SOFTWARE SWR
002304  012737  000174  001162  MOV     #DISPREG,DISPLAY;POINT TO SOFTWARE DISPLAY REGISTER
002312  012637  000004          MOV     (SP)+,4         ;RESTORE THE BUS ERROR VECTOR
002316  012637  000006          MOV     (SP)+,6
002322  005737  000042          TST     42              ;WORKING UNDER A MONITOR ?
002326  001402                  BEQ     31$             ;NO
002330  000137  004126          JMP     63$             ;IF YES,SKIP THE TERMINAL INTERROGATION
002334  105737  001415  31$:    TSTB    INIFLG          ;HAVE WE ALREADY BEEN HERE TODAY?
8+808           002340  001004          BNE     29$             ;IF SO, SKIP PRINTING THE TITLE
002342  104402  001000          TYPE    ,MTITLE         ;PRINT THE DIAGNOSTIC'S TITLE
002346  105337  001415          DECB    INIFLG          ;SET THE ONCE ONLY FLAG
002352  105737  001255  29$:    TSTB    $ENVM           ;DETERMINE WHETHER APT SIZING SHOULD BE DONE
002356  100004                  BPL     30$             ;IF NOT, GO CHECK FOR AUTO-SIZING
002360  004737  011310          JSR     PC,SETAPT       ;OTHERWISE, GO DO APT SIZING FROM ETABLE
002364  000137  004152          JMP     16$             ;GO PRINT DZ STATUS TABLE
002370  032777  000001  176562  30$:    BIT     #SW00,@SWR      ;RESELECT ?
002376  001011                  BNE     32$             ;IF YES, GO SET UP THEBB INFORMATION
002400  122737  000377  001415  CMPB    #377,INIFLG     ;ON 1ST START; MUST ANSWER QUESTION
002406  001003                  BNE     .+10            ;IF NOT ANSWERING QUESTIONS
002410  105777  176544          TSTB    @SWR            ;ARE U AUTO SIZING?
002414  100402                  BMI     32$             ;NO AUTO SIZE! NO SW00=1 ON 1ST START!
002416  000137  003104          JMP     73$             ;IF NO, SKIP THE INTERROGATION
002422  012700  001500  32$:    MOV     #DZ.MAP,R0      ;POINT TO THE BEGINNING OF THE MAP TABLE
002426  105037  001416          CLRB    HDRFLG          ;MAKE SURE A MAP GETS PRINTED
002432  005020          65$:    CLR     (R0)+           ;CLEAR A TABLE LOCATION
```

```
                                        CMP     R0,#DZ.END      ;HAVE THE TABLE BOUNDARIES BEEN EXCEEDED?
002440  001374                          BNE     65$             ;IF NOT ,CLEAR THE NEXT LOCATION IN THE TABLE
002442  105337  001415                  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 DZ11'S

002446                          33$:
002446  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
002450  003318#824                              66$             ;POINTER TO MESSAGE TO BE PRINTED
002452  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
002454  160000                          160000                  ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002456  163770                          163770                  ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002460  001500                          DZCR0                   ;POINTER TO MAP LOCATION TO BE FILLED
002462     007                          .BYTE   7               ;MASK OF INVALID BITS FOR THIS PARAMETER
002463     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
002464  013737  001500  001310          MOV     DZCR0,$BASE     ;COPY BASE ADDRESS TO ETABLE

                                        ;GET THE BASE VECTOR ADDRESS

                                34$:
002472  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
002474  003370                          67$                     ;POINTER TO MESSAGE TO BE PRINTED
002476  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
002500  000300                          300                     ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002502  000776                          776                     ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002504  001502                          DZVC0                   ;POINTER TO MAP LOCATION TO BE FILLED
002506     003                          .BYTE   3               ;MASK OF INVALID BITS FOR THIS PARAMETER
002507     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
002510  013737  001502  001304          MOV     DZVC0,$VECT1    ;COPY VECTOR TO ETABLE

                                        ;GET THE BUS REQUEST LEVEL

002516  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
002520  003431                          68$                     ;POINTER TO MESSAGE TO BE PRINTED
002522  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
002524  000004                          4                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002526  000007                          7                       ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
002530  001504                          DZLV0                   ;POINTER TO MAP LOCATION TO BE FILLED
002532     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
002533     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
002534  113737  001504  001305          MOVB    DZLV0,$VECT1+1  ;GET BUS REQUEST LEVEL INTO ETABLE
002542  106337  001305                  ASLB    $VECT1+1        ;ALIGN THE BITS PROPERLY
002546  106337  001305                  ASLB    $VECT1+1        ;ALIGN THE BITS PROPERLY
002552  106337  001305                  ASLB    $VECT1+1        ;ALIGN THE BITS PROPERLY
002556  106337  001305                  ASLB    $VECT1+1        ;ALIGN THE BITS PROPERLY
002562  106337  001305                  ASLB    $VECT1+1        ;ALIGN THE BITS PROPERLY

                                        ;FIND OUT IF MODULE IS EIA OR 20 MA.

002566  104402  004012                  TYPE    ,74$            ;PRINT EIA MESSAGE
002572  005037  001220                  CLR     $TMP1           ;USE $TMP1
002576  105777            176362  80$:    TSTB    @$TKS           ;IS KEYBOARD DONE?
002602  100375                          BPL     80$             ;IF NOT, WAIT FOR IT
```

```
                                                MOV     @$TKB,-(SP)     ;IF YES, PUT CHARACETR ON STACK
                                                BIC     #240,(SP)       ;STRIP DOWN CHARACTER
                                                CMPB    #15,(SP)+       ;IS IT ?
                                                BEQ     81$             ;IF SO, GET OUT
                                                MOV     -(SP),@$TPB     ;IF NOT, PRINT CHARACTER
                                                BIC     #BIT15,DZLVD    ;CLEAR EIA FLAG
                                                CMPB    #102,(SP)+      ;IS IT A B?
                                                BNE     80$             ;IF NOT, GO BACK FOR INPUT
                                                BIS     #BIT15,DZLVD    ;IF SO, SET FLAG
                                                BR      80$             ;GET MORE INPUT
                                        81$:

                                                ;GET THE MODE OF OPERATION (E,I,S)

                                                INSTR                   ;CALL THE STRING INPUT ROUTINE
                                                72$                     ;POINTER TO THE MESSAGE TO BE PRINTED
                                                SETFLG                  ;CALL THE MAINTENANCE FLAG SETUP ROUTINE
                                                MANTD                   ;THIS IS THE FLAG BEING SETUP

                                                ;GET THE NUMBER OF DZ11'S RUNNING↑B

                                                INSTR                   ;CALL THE STRING INPUT ROUTINE
                                                71$                     ;POINTER TO MESSAGE TO BE PRINTED
                                                PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
                                                1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
                                                16.                     ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
                                                $TMP1                   ;POINTER TO MAP LOCATION TO BE FILLED
                                                .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
                                                .BYTE   1               ;NUMBER OF PARAMETERS TO STORE

                                                MOV     #377,LINED      ;SET↑B UP DEFAULT LINES
                                                MOV     #17470,PARD     ;SET UP DEFAULT LPR PARAMETER
                                                                        ;RECEIVER ON; 19.2 KBAUD; 2STOP BITS; 8 BIT/CHAR
                                                BIT     #SW03,@SWR      ;DO YOU WANT PARAMETERS?
                                                BEQ     40$             ;IF NO, SKIP THE PARAMETER CALL
                                                JSR     PC,23$          ;GET PARAMETERS
                                        40$:    MOV     #1,$DEVM        ;INITIALIZE ACTIVE DEVICE SELECTION PARAMETER
                                                MOVB    $TMP1,DZNUM     ;COPY THE NUMBER OF DEVICES
                                                MOVB    $TMP1,SAVNUM    ;COPY A BACKUP NUMBER
                                        62$:    DEC     $TMP1           ;$TMP1 CONTAINS THE COUNT OF UNINITIALIZED
                                                BEQ     61$             ;  SELECTED DEVICES
                                                SEC                     ;SET A BIT FLAG TO INDICATE AN ACTIVE DEVICE
                                                ROL     $DEVM           ;POINT TO THE NEXT DEVICE
                                                BR      62$             ;GO DO THIS PROCEDURE AGAIN
                                        61$:    MOV     $DEVM,$TMP2     ;# OF TIMES
                                                MOV     $DEVM,DZACTV    ;COPY THE ACTIVE DEVICE PARAMETER
                                                MOV     #DZCR0,R0       ;SET A POINTER TO THE SPECIFIED INFORMATION
                                                MOV     #DZCR1,R1       ;POINT R1 TO T↑BHE REST OF THE MAP TABLE
                                                MOV     #$DDW0,R2       ;POINT TO ETABLE'S DEVICE DESCRIPTOR WORDS
                                                CLC                     ;INITIALIZE THE "C" BIT FOR A ROTATION
                                                ROR     $TMP2           ;SKIP MAPPING SETUP FOR DEVICE 0- IT'S DONE
                                        64$:    ASR     $TMP2           ;ISOLATE A SELECTION FLAG IN THE "C" BIT
                                                BCS     41$             ;IS THIS DEVICE SELECTED? IF YES, GO LOAD TABLE
                                                MOV     #-1,(R1)        ;TERMINATE THE LIST
                                                JMP     63$             ;GO TO THE NEXT BLOCK
                                        41$:    MOV     (R0)+,(R1)      ;ADDRESS
```

```
 937  003046  062721  000010                ADD     #10,(R1)+       ;POINT TO THE NEXT DZ11 ADDRESS VALUE
 938  003052  012011                        MOV     (R0)+,(R1)      ;VECTOR
 939  003054  062721  000010                ADD     #10,(R1)+       ;POINT TO THE NEXT VECTOR VALUE
 940  003060  012021                        MOV     (R0)+,(R1)+     ;LEVEL
 941  003062  012021                        MOV     (R0)+,(R1)+     ;LINES
 942  003064  016012  177774                MOV     -4(R0),(R2)     ;GET THE EIA FLAG FROM THE PRIORITY WORD
 943  003070  042712  077777                BIC     #77777,(R2)     ;ISOLATE THAT FLAG
 944  003074  051022                        BIS     (R0),(R2)+      ;ADD PARAMETERS TO DEVICE DESCRIPTOR WORD
 945  003076  012021                        MOV     (R0)+,(R1)+     ;PARAMETERS
 946  003100  012021                        MOV     (R0)+,(R1)+     ;MAINTENANCE MODE
 947  003102  000751                        BR      64$
 948  003104  032777  000010  176046 73$:   BIT     #SW03,@SWR      ;ASK PARAMETERS ?
 949  003112  001002                        BNE     42$             ;IF NO, GO DO AUTO SIZING
 950  003114  000137  004126                JMP     63$             ;GO SET UP FOR AUTO SIZING
 951  003120  004737  003134          42$:  JSR     PC,23$          ;GO ASK PARAMETERS
 952  003124  105337  001415                DECB    INIFLG          ;INSURE NO AUTO SIZE IF QUESTIONS ANSWERED
 953  003130  000137  004152                JMP     16$             ;GO TO THE NEXT BLOCK
 954
 955                                        ;GET THE ACTIVE LINES PARAMETER
 956
 957  0031'B34                              23$:
 958  003134  104403                        INSTR                   ;CALL THE STRING INPUT ROUTINE
 959  003136  003454                        69$                     ;POINTER TO MESSAGE TO BE PRINTED
 960  003140  104405                        PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
 961  003142  000001                        1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 962  003144  000377                        377                     ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 963  003146  001506                        LINE0                   ;POINTER TO MAP LOCATION TO BE FILLED
 964  003150     000                        .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
 965  003151     001                        .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
 966  003152  105037  001416                CLRB    HDRFLG          ;MAKE SURE THE CHANGES ARE PRINTED
 967
 968                                ;THIS SEGMENT CHECKS TO MAKE SURE THE LINE PARAMETER JUST ENTERED
 969                                ;IS LEGITIMATE IN STAGGERED MODE OPERATION IF THAT MODE WAS SELECTED
 970
 971  003156  005737  001512                TST     MANTO           ;IS STAGGERED THE MODE OF OPERATION?
 972  003162  100021                        BPL     26$             ;IF NOT, SKIP THIS SEGMENT
 973  003164  013703  001506                MOV     LINE0,R3        ;GET A SCRATCH COPY OF THE ACTIVE LINES
 974  003170  006003                24$:    ROR     R3              ;GET A LINE SELECTION BIT(EVEN NUMBER LINE)
 975  003172  103410                        BCS     25$             ;IF IT IS SELECTED, CHECK TO SEE IF THE NEXT IS TOO
 976  003174  001414                        BEQ     26$             ;IF ALL HAVE BEEN CHECKED, CONTINUE PROCESSING
 977  003176  006203                        ASR     R3              ;IF IT IS 0,CHECK TO SEE IF THE NEXT IS TOO
 978  003200  103373                        BCC     24$             ;IF THIS ONE'S 0 TOO, GO CHECK THE NEXT PAIR
 979  003202  104402  001230          27$:  TYPE    ,$QUES          ;THIS IS AN INCORRECT PARAMETER
 980  003206  104402  010306                TYPE    ,MBADLN         ;LET THE USER KNOW ABOUT IT
 981  003212  000750                        BR      23$             ;GO GET THE CORRECT PARAMETER
 982  003214  001772                25$:    BEQ     27$             ;IF ANOTHER FLAG ISN'T SET, THERE'S AN ERROR
 983  003216  006203                        ASR     R3              ;GET THE NEXT FLAG
 984  003220  103370                        BCC     27$             ;IF IT ISN'T SET, THERE'S AN ERROR
 985  003222  000241                        CLC                     ;INITIALIZE THE "C" BIT FOR TESTING OF THE NEXT PAIR
 986  003224  000761                        BR      24$             ;GO TEST THE NEXT PAIR OF FLAGS
 987
 988                                        ;GET THE LINE PARAMETER REGISTER ARGUMENT
 989
 990  003226                         26$:
 991  003226  104403                        INSTR                   ;CALL THE STRING INPUT ROUTINE
 992  003230  003530                        70$                     ;POINTER TO MESSAGE TO BE PRINTED
```

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  993  003232  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
  994  003234  000000                          0                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
  995  003236  000017                          17              ↑B      ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
  996  003240  001510                          PAR0                    ;POINTER TO MAP LOCATION TO BE FILLED
  997  003242     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
  998  003243     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
  999  003244  012702  001506                  MOV     #LINE0,R2       ;POINT TO THE LINE SELECTION PARAMETER
 1000  003250  012703  001510                  MOV     #PAR0,R3        ;POINT TO THE CHOSEN PARAMETERS
 1001  003254  011304                          MOV     (R3),R4         ;USE BAUD RATE AS AN INDEX IN DELAY TABLE
 1002  003256  006304                          ASL     R4              ;ALIGN INDEX ON WORD BOUNDARY
 1003  003260  016437  030130  006604          MOV     DLYTBL(R4),DLYCNT ;SET THE DELAY COUNT FOR THIS BAUD RATE
 1004  003266  000313                          SWAB    (R3)            ;PLACE IN HIGH BYTE
 1005  003270  052713  010070                  BIS     #10070,(R3)     ;PLACE EXTRA PARAMETERS INTO LOC
 1006  003274  011262  000014          28$:    MOV     (R2),14(R2)     ;LOAD THE LINES
 1007  003300  011363  000014                  MOV     (R3),14(R3)     ;LOAD THE PARAMETERS
 1008  003304  062702  000014                  ADD     #14,R2          ;POINT TO THE NEXT SET
 1009  003310  062703  000014                  ADD     #14,R3          ;  .. OF BOTH PARAMETERS
 1010  003314  020327  001774                  CMP     R3,#PAR17       ;HAVE THE TABLE BOUNDARIES BEEN EXCEEDED?
 1011  003320  001365                          BNE     28$             ;IF NOT, GO LOAD SOME MORE PARAMETERS
 1012  003322  000207                          RTS     PC              ;RETURN TO CALLING BLOCK↑B
 1013  003324  030600  052123  041440  66$:    .ASCIZ  <200>/1ST CSR ADDRESS (160000:163700):  /
   (1) 003370  030600  052123  053040  67$:    .ASCIZ  <200>/1ST VECTOR ADDRESS (300:770):  /
   (1) 003431     200  051102  046040  68$:    .ASCIZ  <200>/BR LEVEL (4:6):  /
   (1) 003454  046200  047111  051505  69$:    .ASCIZ  <200>/LINES ACTIVE BY BIT <IN OCTAL>(001:377):  /
   (1) 003530  042200  043105  052501  70$:    .ASCIZ  <200>/DEFAULT BAUD RATE <IN OCTAL>(00:17):  /
   (1) 003600  021600  047440  020106  71$:    .ASCIZ  <200>/# OF DZ11'S <IN OCTAL> (1:20):  /
   (1) 003642  046600  044501  052116  72$:    .ASCII  <200>/MAINTENANCE MODE/
   (1) 003663     200  055440  054105          ↑B.ASCII        <200>/ [EXTERNAL  <H325>     (E)]/
   (1) 003717     200  055440  047111          .ASCII  <200>/ [INTERNAL  <DZCSR03=1>(I)]/
   (1) 003753     200  055440  052123          .ASCIZ  <200>/ [STAGGERED <H327>     (S)]: /
   (1) 004012  052200  050131  020105  74$:    .ASCIZ  <200>/TYPE "A" FOR EIA MODULE OR "B" FOR 20 MA (A:B): /
   (1) 004074  042600  052116  051105  75$:    .ASCIZ  <200>/ENTER DELAY PARAMETER: /
   (1)         004126                          .EVEN
   (1) 004126                          63$:
 1014  004126  122737  000377  001415          CMPB    #377,INIFLG     ;ONLY DO AUTO SIZE ON 1ST START
 1015  004134  001006                          BNE     16$             ;
 1016  004136  032777  000200  175014          BIT     #BIT7,@SWR      ;BIT7=1??
 1017  004144  001002                          BNE     16$             ;BR IF NO AUTO SIZE
 1018  004146  004737  011462                  JSR     PC,AUTO.SIZE    ;GO DO THE AUTO SIZE
 1019  004152  105737  001416          16$:    TSTB    HDRFLG          ;HAS THE TABLE BEEN TYPED YET?
 1020  004156  001021                          BNE     1$              ;IF SO, DON'T TYPE IT AGAIN
 1021  004160  105337  001416                  DECB    HDRFLG          ;INDICATE THAT THE TABLE WILL BE TYPED
 1022  004164  104402  010261                  TYPE    ,XHEAD          ;TYPE MAP HEADER
 1023  004170  012700  001500                  MOV     #DZ.MAP,R0      ;SET POINTER
 1024  004174  010037  001220          5$:     MOV     R0,$TMP1        ;POINT TO THE MAP LOCATION
 1025  004200  012037  001222                  MOV     (R0)+,$TMP2     ;SET DATA
 1026  004204  022737  177777  001222          CMP     #-1,$TMP2       ;END OF LIST?
↑B 1027         004212  001403                  BEQ     1$              ;BR IF YES
 1028  004214  104411                  17$:    CONVRT                  ;CALL THE OCTAL TO ASCII CONVERSION ROUTINE
 1029  004216  010350                          XSTATQ                  ;CONVERT THE DATA AT THIS ADDRESS
 1030  004220  000765                          BR      5$              ;GO PRINT THE NEXT PARAMETER
 1031  004222  005737  000042          1$:     TST     @#42            ;IS PROGRAM RUNNING UNDER MONITOR
 1032  004226  001026                          BNE     3$              ;YES
 1033  004230  032777  000100  174722          BIT     #SW06,@SWR      ;DESELECT SPECIFIC DEVICES??
 1034  004236  001422                          BEQ     3$              ;BR IF NO.
 1035  004240  104402  010202                  TYPE    ,MNEW           ;TYPE THE MESSAGE.
```

```
1036  004244  005000                          CLR     R0              ;ZERO DATA DISPLAY
1037  004246  000000                          HALT                    ;WAIT FOR USER TO TELL WHAT DEVICES TO RUN
1038  004250  027737  174704  001312  ..      CMP     @SWR,$DEVM      ;IS THE NUMBER VALID?
1039  004256  101404                          BLOS    2$              ;BR IF NUMBER IS OK.
1040  004260  104402  010054                  TYPE    ,MERR3          ;TELL USER OF INVALID NUMBER.
1041  004264  000000                  9$:     HALT                    ;STOP EVERY THING.
1042  004266  000776                          BR      9$              ;RESTART THE PROGRAM AGAIN.
1043  004270  017737  174664  001404  2$:     MOV     @SWR,DZACTV     ;GET NEW DEVICE PATTERN
1044  004276  013700  001404                  MOV     DZACTV,R0       ;SHOW THE USER WHAT HE SELECTED.
1045  004302  000000                          HALT                    ;CONTINUE DYNAMIC SWITCHES.
1046  004304  032777  000020  174646  3$:     BIT     #SW04,@SWR      ;CHECK TO SEE IF DELAY COUNT CHANGES
1047  004312  001407                          BEQ     18$             ;IF NOT, GO CLEAR VECTOR AREA
1048  004314  104403                          INSTR                   ;CALL THE STRING INPUT ROUTINE
1049  004316  004074                          75$                     ;POINTER TO MESSAGE TO BE PRINTED
1050  004320  104405                          PARAM                   ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
1051  004322  000001                          1                       ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
1052  004324  177777                          177777                  ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
1053  004326  006604                          DLYCNT                  ;POINTER TO MAP LOCATIO↑BN TO BE FILLED
1054  004330     000                          .BYTE   0               ;MASK OF INVALID BITS FOR THIS PARAMETER
1055  004331     001                          .BYTE   1               ;NUMBER OF PARAMETERS TO STORE
1056  004332  012700  000300          18$:    MOV     #300,R0         ;PREPARE TO CLEAR THE FLOATING
1057  004336  012701  000302                  MOV     #302,R1         ;VECTOR AREA. 300-776
1058  004342  010120                  4$:     MOV     R1,(R0)+        ;START PUTTING "PC+2 - HALT"
1059  004344  005021                          CLR     (R1)+           ;IN VECTOR AREA.
1060  004346  022021                          CMP     (R0)+,(R1)+     ;POP POINTERS
1061  004350  022700  001000                  CMP     #1000,R0        ;ALL DONE??
1062  004354  001372                          BNE     4$              ;BR IF NO.
1063
1064                                  ;TEST START AND RESTART
1065                                  ;-----↑B----------------
1066
1067  004356  012706  001120          .BEGIN: MOV     #STACK,SP       ;SET UP STACK
1068  004362  106427  000340                  MTPS    #PR7            ;LOCK OUT INTERRUPTS
1069  004366  005737  000042                  TST     @#42            ;IS PROGRAM UNDER MONITOR CONTROL
1070  004372  001015                          BNE     2$              ;BR IF YES
1071  004374  032777  000004  174556          BIT     #BIT2,@SWR      ;CHECK FOR LOCK ON TEST
1072  004402  001406                          BEQ     1$              ;BR IF NO LOCK DESIRED.
1073  004404  104402  010100                  TYPE    ,MLOCK          ;TYPE LOCK SELECTED.
1074  004410  012737  000240  004672          MOV     #NOP,TTST       ;ADJUST SCOPE ROUTINE.
1075  004416  000403                          BR      2$              ;CONTINUE ALONG.
1076  004420  013737  005114  004672  1$:     MOV     BRW,TTST        ;PREPARE NORMAL SCOPE ROUTINE
1077  004426  012737  010752  001126  2$:     MOV     #CYCLE,$LPADR   ;START AT "CYCLE" FIND WHICH DEVICE TO TEST
1078  004434  104402  007771                  TYPE    ,MR             ;TYPE "RUNNING"
1079  004440  000177  174462                  JMP     @$LPADR         ;START TESTING
```

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

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

004444                          $EOP:
004444  000004                          SCOPE
004446  005037  00. 6                   CLR     $ERRPC          ;CLEAR LAST ERROR PC
004452  105037  001123                  CLRB    $ERFLG          ;CLEAR ERROR FLAG
004456  104402  007745                  TYPE    ,MEPASS         ;TYPE END PASS
004462  104402  010127                  TYPE    ,MCSRX          ;TYPE CSR
004466  104412  004624                  CNVRT   ,XCSR           ;SHOW IT
004472  104402  010135                  TYPE    ,MVECX          ;TYPE VECTOR
004476  104412  004632                  CNVRT   ,XVEC           ;SHOW IT
004502  005237  001242          ↑B      INC     $PASS           ;RAISE PASS COUNT
004506  104402  010143                  TYPE    ,MPASSX         ;TYPE PASSES
004512  104412  004640                  CNVRT   ,XPASS          ;SHOW IT
004516  005337  001242                  DEC     $PASS           ;RESTORE PASS COUNT
004522  104402  010154                  TYPE    ,MERRX          ;TYPE ERRORS
004526  104412  004646                  CNVRT   ,XERR           ;SHOW IT
004532  105337  001411                  DECB    $AVNUM          ;ARE ALL DEVICES TESTED?
004536  001030                          BNE     $DOAGN          ;BR IF NO.
004540  113737  001410  001411          MOVB    DZNUM,SAVNUM    ;RESTORE THE COUNT
004546  005037  001226                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
004552  005237  001242                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
004556  042737  100000  001242          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
004564  005327                          DEC     (PC)+           ;;LOOP?
004566  000001          $EOPCT: .WORD   1
004570  003013                          BGT     $DOAGN          ;;YES
004572  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
004574  000001          $ENDCT: .WORD   1
004576  004566                          $EOPCT
004600  013700  000042  $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
004604  001405                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
004606  000005                          RESET                   ;;CLEAR THE WORLD
004610  004710          $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
004612  000240                          NOP                     ;;SAVE ROOM
↑B004614  000240                        NOP                     ;;FOR
004616  000240                          NOP                     ;;ACT11
004620                          $DOAGN:
004620  000137                          JMP     @(PC)+          ;;RETURN
004622  010752          $RTNAD: .WORD   CYCLE
                        
004624  000001          XCSR:   1
004626     006  002                    .BYTE   6,2
004630  002042                          DZCSR
004632  000001          XVEC:   1
004634     003  002                    .BYTE   3,2
004636  002072                          DZRIV
```

```
                                XPASS:  1
                                        .BYTE   6,2
                                        $PASS
                                        XERR:   1
                                        .BYTE   6,2
                                        $ERTTL

                                        ;SCOPE LOOP AND ITERATION HANDLER
                                        ;--------------------------------

                                .SBTTL  SCOPE HANDLER ROUTINE

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

004654                          $SCOPE:
004654  004737  007242          .SCOPE: JSR     PC,SERV.G       ;FIND OUT IF <↑G> WAS HIT
004660  005037  001136                  CLR     $ERRPC          ;CLEAR LAST ERROR PC.
004664  022716  012220                  CMP     #TST1+2,(SP)    ;IS THIS THE SCOPE AT THE BEGINNING OF TST1?
004670  001413                          BEQ     $XTSTR          ;IF SO, DON'T LOOP ON IT
004672  000406                  TTST:   BR      1$              ;GOTO 1$    (IF LOCK SW02=1; THIS LOC =240)
004674  105777  174264                  TSTB    @$TKS           ;KEYBOARD DONE?
004700  100067                          BPL     $OVER           ;BR IF NO. (LOCK: HIT KE↑BY TO GOTO NEXT TEST)
004702  017766  174260  177776          MOV     @$TKB,-2(SP)    ;CLEAR DONE BIT
004710  032777  040000  174242  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
004716  001060                          BNE     $OVER           ;;YES IF SW14=1
                                        ;*****START OF CODE FOR THE XOR TESTER*****
004720  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
004722  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
004726  012737  004746  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
004734  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
↑B 1175 004740  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
004744  000436                          BR      $SVLAD          ;;GO TO THE NEXT TEST
004746  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
004750  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
004754  000441                          BR      $OVER           ;;LOOP ON THE PRESENT TEST
004756                          6$:;*****END OF CODE FOR THE XOR TESTER*****
004756  105737  001123          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
004762  001404                          BEQ     3$              ;;BR IF NO
004764  105037  001123          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
004770  005037  001226                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
004774  032777  004000  174156  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
005002  001011                          BNE     1$              ;;BR IF YES
005004  005737  001242                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
005010  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
005012  005237  001124                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
005016  023737  001226  001124          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
005024  002015                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
```

```
 1192          005026  012737  000001  001124  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
 1193  005034  013737  005116  001226          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
 1194  005042  105237  001122          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
 1195  005046  113737  001122  001240          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
 1196  005054  011637  001126                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 1197  005060  013777  001122  174074  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 1198  005066  013716  001126                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 1199  005072  105037  001417          3$:     CLRB    MNTFLG          ;CLEAR THE MAINTENANCE BIT SE↑BTTER AFTER EACH TEST
 1200  005076  005737  001370                  TST     MODE            ;HAS THE MODE BEEN CHANGED?
 1201  005102  001003                          BNE     4$              ;IF NOT INTERNAL , GO DO A TEST
 1202  005104  112737  000010  001417          MOVB    #MAINT,MNTFLG   ;IF INTERNAL MODE NOW, SET THE MAINTENANCE BIT
 1203  005112  000002          4$:     RTI             ;GO DO THE TEST
 1204  005114  000406          BRW:    406
 1205  005116  000005          $MXCNT: 5               ;;MAX. NUMBER OF ITERATIONS
 1206
 1207                                  ;CHECK FOR FREEZE ON CURRENT DATA
 1208                                  ;-------------------------------
 1209
 1210  005120  032777  001000  174032  .SCOP1: BIT     #SW09,@SWR      ;IS SW09=1(SET)?
 1211  005126  001405                  BEQ     1$              ;BR IF NOT SET.
 1212  005130  005737  001362                  TST     LOCK            ;IS THER A TIGHT LOOP SPECIFIED?
 1213  005134  001402                  BEQ     1$              ;IF NO, RETURN
 1214  005136  013716  001362                  MOV     LOCK,(SP)       ;IF YES, GOTO THE ADDRESS IN LOCK.
 1215  005142  000002          1$:     RTI             ;GO BACK.
 1216
 1217  005144  032777  010000  174006  .TYPE:  BIT     #SW12,@SWR      ;INHIBIT ALL PRINTOUT??
 1218  005152  001403                  BEQ     1$              ;IF NOT, GO TYPE
 1219  005154  062716  000002                  ADD     #2,(SP)         ;SKIP OVER MESSAGE POINTER
 1220  005160  000002                  RTI                     ;RETURN TO WHERE PROCEDURE WAS INVOKED
 1221  005162                          1$:
 1222                                  .SBTTL  TYPE ROUTINE
 1223
 1224                                  ;;**************************************↑B**************************
 1225                                  ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
 1226                                  ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
 1227                                  ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
 1228                                  ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
 1229                                  ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
 1230                                  ;*
 1231                                  ;*CALL:
 1232                                  ;*1) USING A TRAP INSTRUCTION
 1233                                  ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
 1234                                  ;*OR
 1235                                  ;*      TYPE
 1236                                  ;*      MESADR
 1↑8237                                ;*
 1238
 1239  005162  105737  001177          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
 1240  005166  100002                  BPL     1$              ;;BR IF YES
 1241  005170  000000                  HALT                    ;;HALT HERE IF NO TERMINAL
 1242  005172  000430                  BR      3$              ;;LEAVE
 1243  005174  010046          1$:     MOV     R0,-(SP)        ;;SAVE R0
 1244  005176  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
 1245  005202  122737  000001  001254          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
 1246  005210  001011                  BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
 1247  005212  132737  000100  001255          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
```

```
1248  005220  001405                        BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
1249  005222  010037  005232                MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
1250  005226  004737  005452                JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
1251  005232  000000              61$:      .WORD   0               ;;MESSAGE ADDRESS
1252  005234  132737  000040  001255  62$:  BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
1253  005242  001003                        BNE     60$             ;;YES,SKIP TYPE OUT
1254  005244  112046              2$:       MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
1255  005246  001005                        BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
1256  005250  005726                        TST     (SP)+           ;;IF ↑BTERMINATOR POP IT OFF THE STACK
1257  005252  012600              60$:      MOV     (SP)+,R0        ;;RESTORE R0
1258  005254  062716  000002      3$:       ADD     #2,(SP)         ;;ADJUST RETURN PC
1259  005260  000002                        RTI                     ;;RETURN
1260  005262  122716  000011      4$:       CMPB    #HT,(SP)        ;;BRANCH IF <HT>
1261  005266  001430                        BEQ     8$
1262  005270  122716  000200              CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
1263  005274  001006                        BNE     5$
1264  005276  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
1265  005300  104402                        TYPE                    ;;TYPE A CR AND LF
1266  005302  001231                        $CRLF
1267  005304  105037  005440              CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
1268  005310  000755                        BR      2$              ;;GET N↑BEXT CHARACTER
1269  005312  004737  005374      5$:       JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
1270  005316  123726  001176      6$:       CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
1271  005322  001350                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
1272  005324  013746  001174                MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
1273                                                                ;;AND THE NULL CHAR.
1274  005330  105366  000001      7$:       DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
1275  005334  002770                        BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
1276  005336  004737  005374              JSR     PC,$TYPEC       ;;GO TYPE A NULL
1277  005342  105337  005440              DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
1278  005346  000770                        BR      7$              ;;LOOP
1279
1280                                      ;HORIZONTAL TAB PROCESSOR
1281
1282  005350  112716  000040      8$:       MOVB    #'  ,(SP)       ;;REPLACE TAB WITH SPACE
1283  005354  004737  005374      9$:       JSR     PC,$TYPEC       ;;TYPE A SPACE
1284  005360  132737  000007  005440        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
1285  005366  001372                        BNE     9$              ;;TAB STOP
1286  005370  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
1287  005372  000724                        BR      2$              ;;GET NEXT CHARACTER
1288  005374  105777  173570      $TYPEC:   TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
1289  005400  100375                        BPL     $TYPEC
1290  005402  116677  000002  173562        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPE↑BD INTO DATA REG.
1291  005410  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
1292  005416  001003                        BNE     1$              ;;BRANCH IF NO
1293  005420  105037  005440              CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
1294  005424  000406                        BR      $TYPEX          ;;EXIT
1295  005426  122766  000012  000002  1$:   CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
1296  005434  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
1297  005436  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
1298  005440  000000              $CHARCNT: .WORD   0               ;;CHARACTER COUNT STORAGE
1299  005442  000207              $TYPEX:   RTS     PC
1300
1301                                      .SBTTL  APT COMMUNICATIONS ROUTINE
1302
1303  ↑B                                  ;;**********************************************************************
```

```
1304  005444  112737  000001  005710  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
1305  005452  112737  000001  005706  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
1306  005460  000403                  BR      $ATYC
1307  005462  112737  000001  005710  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
1308  005470                          $ATYC:
1309  005470  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
1310  005472  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1311  005474  105737  005706                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
1312  005500  001450                          BEQ     5$              ;;IF NOT:  BR
1313  005502  122737  000001  001254          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
1314  005510  001031                          BNE     3$              ;;IF NOT:  BR
1315  005512  132737  000100  001255          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
1316  005520  001425                          BEQ     3$              ;;IF NOT:  BR
1317  005522  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
1318  005526  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
1319  005534  005737  001234          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
1320  005540  001375                          BNE     1$              ;;IF NOT:  WAIT
1321  005542  010037  001250                  MOV     R0,@$MSGAD      ;;PUT ADDR IN MAILBOX
1322  005546  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
1323  005550  001376                          BNE     2$
1324  005552  163700  001250                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
1325  005556  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
1326  005560  010037  001252                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
1327  005564  012737  000004  001234          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
1328  005572  000413                          BR      5$
1329  005574  017637  000004  005620  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
1330  005602  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
1331  005610  013746  177776                  MOV     177776,-(SP) !B         ;;PUSH 177776 ON STACK
1332  005614  004737  005162                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
1333  005620  000000                  4$:     .WORD   0
1334  005622                          5$:
1335  005622  105737  005710          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
1336  005626  001416                          BEQ     12$             ;;IF NOT:  BR
1337  005630  005737  001254                  TST     $ENV            ;;RUNNING UNDER APT?
1338  005634  001413                          BEQ     12$             ;;IF NOT:  BR
1339  005636  005737  001234          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
1340  005642  001375                          BNE     11$             ;;IF NOT:  WAIT
1341  005644  017637  000004  001236          MOV     @4(SP),$FATAL   ;;GET ERROR #
1342  005652  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
1343  005660  005237  001234                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
1344  005664  105037  005710          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
1345  005670  105037  005707                  CLRB    $LFLG           ;;CLEAR LOG FLAG
1346  005674  105037  005706                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
1347  005700  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
1348  005702  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
1349  005704  000207                          RTS     PC              ;;RETURN
1350  005706     000          $MFLG:  .BYTE   0               ;;MESSG. FLAG
1351  005707     000          $LFLG:  .BYTE   0               ;;LOG FLAG
1352  005710     000          $FFLG:  .BYTE   0               ;;FATAL FLAG
1353        005712                          .EVEN
1354        000200                  APTSIZE=200
18355                   000001                  APTENV=001
1356        000100                  APTSPOOL=100
1357        000040                  APTCSUP=040
1358
1359                                          ;STRING INPUT ROUTINE
```

```
1360                                            ;-------------------------
1361
1362  005712  010346                .INSTR: MOV     R3,-(SP)        ;SAVE R3 ON STACK
1363  005714  010446                        MOV     R4,-(SP)        ;SAVE R4 ON STACK
1364  005716  017637  000004 005734         MOV     @4(SP),.MSG     ;GET THE ADDRESS OF THE MESSAGE TO BE PRINTED
1365  005724  062766  000002 000004         ADD     #2,4(SP)        ;POINT TO INSTRUCTION AFTER ADDRESS POINTER
1366  005732  104402                .INSTI: TYPE                    ;PRINT THE MESSAGE
1367  005734  000000                .MSG:   0                       ;MESSAGE IS POINTED TO FROM HERE
1368  005736  012704  010502                MOV     #INBUF,R4       ;POINT R4 TO THE INPUT BUFFER
1369  005742  012703  000007                MOV     #7,R3           ;SET THE MAXIMUM NUMBER OF CHARACTERS ALLOWED
1370  005746  105777  173212        1$:     TSTB    @#TKS           ;HAS A CHARACTER BEEN RECEIVED?
1371  005752  100375                        BPL     1$              ;IF NO, KEEP WAITING FOR IT
1372  005754  117714  173206                MOVB    @#TKB,(R4)      ;IF YES, SAVE IT IN THE INPUT BUFFER
1373  005760  142714  000200                BICB    #200,(R4)       ;KEEP ONLY THE 7-BIT ASCII INFORMATION
1374  005764  122427  000015                CMPB    (R4)+,#15       ;IS THIS CHARACTER A LINE FEED?
1375  005770  001417                        BEQ     INSTR2          ;IF SO, TERMINATE THE INPUT SEQUENCE
1376  005772  105777  173172        2$:     TSTB    @#TPS           ;IF NOT, CHECK TO SEE IF THE CHARACTER CAN PRINT
1377  005776  100375                        BPL     2$              ;IF WE CAN'T, WAIT UNTIL WE CAN
1378  006000  017777  173162 173164         MOV     @#TKB,@#TPB     ;ECHO THE CHARACTER BACK
1379  006006  005303                        DEC     R3              ;REDUCE THE NUMBER OF CHARACTERS RECEIVED
1380  006010  001356                        BNE     1$              ;IF WE DON'T HAVE 7, GO GET SOME MORE
1381  006012  012604                        MOV     (SP)+,R4        ;IF WE HAVE 7, RESTORE R4
1382  006014  012603                        MOV     (SP)+,R3        ;RESTORE R3
1383  006016  010346                .INSTE: MOV     R3,-(SP)        ;SAVE R3 ON THE STA↑BCK
1384  006020  010446                        MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1385  006022  104402  001230                TYPE    ,$QUES          ;PRINT A QUESTION MARK... WHAT'S GOING ON?
1386  006026  000741                        BR      .INSTI          ;GO PRINT THE MESSAGE AGAIN
1387  006030  012604                INSTR2: MOV     (SP)+,R4        ;RESTORE R4
1388  006032  012603                        MOV     (SP)+,R3        ;RESTORE R3
1389  006034  000002                        RTI                     ;RETURN TO THE MAIN PROCEDURE
1390
1391                                    ;CONVERT ASCII STRING TO OCTAL
1392                                    ;-----------------------------
1393
1394  006036  010546                .PARAM: MOV     R5,-(SP)        ;SAVE R5 ON THE STACK
1395  006040  010446                        MOV     R4,-(SP)        ;SAVE R4 ON THE STACK
1396  006042  016605  000004                MOV     4(SP),R5        ;GET THE SETUP INFORMATION POINTER
1397  006046  012537  006226                MOV     (R5)+,LOLIM     ;SET THE LOW LIMIT FOR THE INPUT
1398  006052  012537  006230                MOV     (R5)+,HILIM     ;SET THE HIGH LIMIT FOR THE INPUT
1399  006056  012537  006232                MOV     (R5)+,DEVADR    ;SAVE THE ADDRESS WHERE THE RESULT WILL BE STORED
1400  006062  112537  006234                MOVB    (R5)+,LOBITS    ;GET THE MASK OF THE INCORRECT BITS
1401  006066  112537  006235                MOVB    (R5)+,ADRCNT    ;GET THE COUNT OF ITEMS TO BE STORED
1402  006072  010566  000004                MOV     R5,4(SP)        ;POINT TO WHERE MAIN LINE PROGRAM WILL RESUME
1403  006076  005005                PARAM1: CLR     R5              ;INITIALIZE THE ASCII TO OCTAL RESULT WORD
1404  006100  012704  010502                MOV     #INBUF,R4       ;POINT TO THE INPUT BUFFER
1405  006104  122714  000015                CMPB    #15,(R4)        ;IS THIS CHARACTER A CARRIAGE RETURN?
1406  006110  001420                        BEQ     PARERR          ;IF SO, PRINT THE MESSAGE AGAIN
1407  006112  121427  000060        1$:     CMPB    (R4),#60        ;IS THIS CHARACTER BELOW THE NUMERIC RANGE?
1408  006116  002415                        BLT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1409  006120  121427  000067                CMPB    (R4),#67        ;IS THIS CHARACTER ABOVE THE NUMERIC RANGE?
1410  006124  003012                        BGT     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
1411  006126  142714  000060                BICB    #60,(R4)        ;ISOLATE THE NUMBER THE CHARACT↑BER REPRESENTS
1412  006132  152405                        BISB    (R4)+,R5        ;CONCATENATE THESE BITS TO THE ALREADY EXISTING STRING
1413  006134  122714  000015                CMPB    #15,(R4)        ;IS THE NEXT CHARACTER A CARRIAGE RETURN?
1414  006140  001406                        BEQ     LIMITS          ;IF SO, GO SEE IF NUMBER IS WITHIN LIMITS
1415  006142  006305                        ASL     R5              ;CLEAR BIT POSITION 0, MOVE EXISTING STRING TO LEFT
```

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  1416  006144  006305                    ASL     R5              ;CLEAR POSITION 1, MOVE STRING TO LEFT AGAIN
  1417  006146  006305                    ASL     R5              ;MOVE THE STRING ONE MORE TIME TO MAKE ROOM FOR
*B  1418                                                                  ;NEXT THREE BITS
  1419  006150  000760                    BR      1$              ;GO GET THE NEXT CHARACTER
  1420  006152  104404            PARERR: INSTER                  ;THERE WAS AN ERROR... GO PRINT MESSAGE AGAIN
  1421  006154  000750                    BR      PARAM1          ;TRY GETTING THE PARAMETERS AGAIN
  1422
  1423                                    ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
  1424                                    ;--------------------------------------
  1425
  1426  006156  020537  006230    LIMITS: CMP     R5,HILIM        ;DOES RESULT EXCEED ITS MAXIMUM CORRECT VALUE?
  1427  006162  101373                    BHI     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
  1428  006164  020537  006226            CMP     R5,LOLIM        ;IS THE RESULT LOWER THAN ALLOWED?
  1429  006170  103770                    BLO     PARERR          ;IF YES, GO PRINT THE MESSAGE AGAIN
  1430  006172  133705  006234            BITB    LOBITS,R5       ;ARE ANY INCORRECT BITS SET IN THE RESULT?
  1431  006176  001365                    BNE     PARERR          ;IF SO, GO PRINT THE MESSAGE AGAIN
  1432
  1433                                    ;STORE NUMBER AT SPECIFIED ADDRESS
  1434
  1435  006200  013704  006232            MOV     DEVADR,R4       ;POINT TO THE LOCATION WHERE THE RESULT WILL BE STORED
  1436  006204  010524            1$:     MOV     R5,(R4)+        ;STORE THE RESULT
  1437  006206  062705  000002            ADD     #2,R5           ;CALCULATE THE NEXT DATUM
  1438  006212  105337  006235            DECB    ADRCNT          ;REDUCE COUNT OF STORED RESULTS. IS IT EXCEEDED?
  1439  006216  001372                    BNE     1$              ;IF NOT, †BGO STORE THE NEXT DATUM
  1440  006220  012604                    MOV     (SP)+,R4        ;RESTORE R4
  1441  006222  012605                    MOV     (SP)+,R5        ;RESTORE R5
  1442  006224  000002                    RTI                     ;RETURN TO THE MAIN PROGRAM
  1443
  1444  006226  000000            LOLIM:  0                       ;LOWEST ACCEPTABLE VALUE
  1445  006230  000000            HILIM:  0                       ;HIGHEST ACCEPTABLE
  1446  006232  000000            DEVADR: 0                       ;LOCATION WHERE RESULT WILL BE STORED
  1447  006234     000             LOBITS: .BYTE   0              ;INCORRECT BITS MASK
  1448  006235     000             ADRCNT: .BYTE   0              ;COUNT OF ITEMS TO BE STORED
  1449
  1450                                    ;SAVE PC OF TEST THAT FAILED AND R0-R5
  1451                                    ;-------------------------------------
  1452
  1453  †B006236          016637  000004  001402  .SAV05: MOV     4(SP),SAVPC     ;SAVE R7 (PC)
  1454
  1455                                    ;SAVE R0-R5
  1456
  1457  006244  010537  001214    SV05:   MOV     R5,$REG5        ;SAVE R5
  1458  006250  010437  001212            MOV     R4,$REG4        ;SAVE R4
  1459  006254  010337  001210            MOV     R3,$REG3        ;SAVE R3
  1460  006260  010237  001206            MOV     R2,$REG2        ;SAVE R2
  1461  006264  010137  001204            MOV     R1,$REG1        ;SAVE R1
  1462  006270  010037  001202            MOV     R0,$REG0        ;SAVE R0
  1463  006274  000002                    RTI                     ;LEAVE.
  1464
  1465                                    ;RESTORE R0-R5
  1466
  1467  006276  013700  001202    .RESC   MOV     $REG0,R0        ;RESTORE R0
  1468  006302  013701  001204            MOV     $REG1,R1        ;RESTORE R1
  1469  006306  013702  001206            MOV     $REG2,R2        ;RESTORE R2
  1470  006312  013703  001210            MOV     $REG3,R3        ;RESTORE R3
  1471  006316  013704  001212            MOV     $REG4,R4        ;RESTORE R4
```

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1472  006322  013705  001214              MOV     $REGS,R5        ;RESTORE R5
1473  006326  000002                      RTI                     ;LEAVE
1474
1475                                       ;CONVERT OCTAL NUMBER TO ASCII AND OUTPUT TO TELEPRINTER
1476                                       ;-----------------------------------------------------
1477
1478  006330  104402  001231      .CONVR: TYPE    ,$CRLF          ;PRINT A CARRIAGE RETURN
1479  006334  010046              .CNVRT: MOVBV   R0,-(SP)        ;SAVE R0
1480  006336  010146                      MOV     R1,-(SP)        ;SAVE R1
1481  006340  010346                      MOV     R3,-(SP)        ;SAVE R3
1482  006342  010446                      MOV     R4,-(SP)        ;SAVE R4
1483  006344  010546                      MOV     R5,-(SP)        ;SAVE R5
1484  006346  017601  000012              MOV     @12(SP),R1      ;PLACE THE ADDRESS OF THE ARGUMENTS IN R1
1485  006352  062766  000002  000012      ADD     #2,12(SP)       ;POINT TO WHERE MAIN PROGRAM WILL RESUME
1486  006360  012137  006504              MOV     (R1)+,WRDCNT    ;GET NUMBER OF WORDS TO BE PRINTED
1487  006364  112105              1$:     MOVB    (R1)+,R5        ;GET THE NUMBER OF CHARACTERS TO BE PRINTED
1488  006366  112100                      MOVB    (R1)+,R0        ;GET THE NUMBER OF SPACES TO PRINT
1489  01806370        013104              MOV     @(R1)+,R4       ;COPY THE WORD TO BE CONVERTED
1490  006372  110537  006506              MOVB    R5,CHRCNT       ;COPY THE CHARACTER COUNT
1491  006376  010403              3$:     MOV     R4,R3           ;COPY THE ARGUMENT WORD AGAIN
1492  006400  042703  177770              BIC     #^C<7>,R3       ;ISOLATE THREE BITS TO BE TREATED AS A CHARACTER
1493  006404  062703  000060              ADD     #060,R3         ;MAKE AN ASCII CHARACTER OUT OF THEM
1494  006410  110346                      MOVB    R3,-(SP)        ;SAVE THAT CHARACTER
1495  006412  006004                      ROR     R4              ;MOVE THE NEXT THREE BITS INTO PLACE
1496  006414  006204                      ASR     R4              ;MOVE THEM AGAIN
1497  006416  006204                      ASR     R4              ;AND FINALLY A THIRD TIME
1498  006420  005305                      DEC     R5              ;REDUCE CHARACTER COUNT.ARE ALL CHARACTERS
1499                                                               ;BUILT?
1500  006422  001365                      BNE     3$              ;IF NO, GO BUILD THE NEXT ONE.
1501  006424  012703  010606              MOV     #MDATA,R3       ;NOW POINT TO WHERE NUMBER WILL BE PRINTED FROM
1502  006430  112623              4$:     MOVB    (SP)+,(R3)+     ;STORE THE CHARACTER, STARTING WITH THE MOST
1503  006432  105337  006506              DECB    CHRCNT          ;REDUCE COUNT. ARE ALL CHARACTERS TRANSFERRED?
1504  006436  001374                      BNE     4$              ;IF NO, GO TRANSFER ANOTHER
1505  006440  105700                      TSTB    R0              ;ARE ANY SPACES TO BE PRINTED?
1506  006442  001404                      BEQ     6$              ;IF NO, DON'T SET UP ANY
1507  006444  112723  000040      5$:     MOVB    #0!840,(R3)+    ;ADD A SPACE TO THE OUTPUT BUFFER
1508  006450  105300                      DECB    R0              ;REDUCE THE COUNT. SHOULD WE PRINT MORE?
1509  006452  001374                      BNE     5$              ;IF YES, GO ADD ANOTHER SPACE
1510  006454  105013              6$:     CLRB    (R3)            ;TERMINATE THE OUTPUT BUFFER WITH A ZERO
1511  006456  104402  010606              TYPE    ,MDATA          ;PRINT THE STRING WE JUST BUILT
1512  006462  005337  006504              DEC     WRDCNT          ;REDUCE THE WORD COUNT. ARE ANY MORE WORDS LEFT?
1513  006466  001336                      BNE     1$              ;IF YES, GO CONVERT THEM
1514  006470  012605                      MOV     (SP)+,R5        ;RESTORE R5
1515  006472  012604                      MOV     (SP)+,R4        ;RESTORE R4
1516  006474  012603                      MOV     (SP)+,R3        ;RESTORE R3
!81517          006476  012601              MOV     (SP)+,R1        ;RESTORE R1
1518  006500  012600                      MOV     (SP)+,R0        ;RESTORE R0
1519  006502  000002                      RTI                     ;RETURN TO THE MAIN PROGRAM
1520  006504  000000              WRDCNT: 0
1521  006506     000              CHRCNT: .BYTE                   ;NUMBER OF CHARACTERS TO PRINT
1522  006507     000              SPACNT: .BYTE   0               ;NUMBER OF SPACES TO PRINT
1523
1524  006510  000000              BINWRD: 0
1525
1526
1527                                       ;TRAP DISPATCH SERVICE
```

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1528                                    ;ARGUMENT OF TRAP IS EXTRACTED
1529                                    ;AND USED AS OFFSET TO OBTAIN POINTER
1530                                    ;TO SELECTED SUBROUTINE
1531
1532  006512  010046                .TRPSR: MOV     R0,-(SP)        ;SAVE R0. USE R0 TO FIND TRAP ROUTINE
1533  006514  016600  000002                MOV     2(SP),R0        ;GET TRAP ADDRESS
1534  006520  005740                        TST     -(R0)           ;GET TRAP
1535  006522  111000                        MOVB    (R0),R0         ;GET RIGHT BYTE OF TRAP(TRAP OFFSET)
1536  006524  006300                        ASL     R0              ;POSITION OFFSET FOR TABLE INDEXING
1537  006526  016000  002002                MOV     .TRPTAB(R0),R0  ;PLACE INDEXED ADDRESS OF TABLE IN R0
1538  006532  000200                        RTS     R0              ;TRANSFER TO THAT ADDRESS AND RESTORE OLD R0
1539
1540                                    ;DEVICE CLEAR ROUTINE
1541                                    ;ISSUE A DEVICE CLEAR
1542                                    ;---↑B----------------
1543  006534                        .DEVICE.CLR:
1544  006534  052777  000020  173300        BIS     #DCLR,@DZCSR    ;SET DCLR
1545  006542  032777  000020  173272  1$:   BIT     #DCLR,@DZCSR    ;DID IT CLEAR?
1546  006550  001374                        BNE     1$              ;BR IF NO
1547  006552  000002                        RTI                     ;EXIT ROUTINE
1548
1549                                    ;ROUTINE TO HANDLE MAINTENANCE BIT SETTING WITH DEVICE CLEAR
1550                                    ;-----------------------------------------------------------
1551  006554  104413                .DCLASM:DEVICE.CLR              ;ISSUE A DEVICE CLEAR
1552  006556  153777  001417  173256        BISB    MNTFLG,@DZCSR   ;LOAD THE MAINTENANCE BIT IF IT IS I MODE
1553  006564  000002                        RTI                     ;RETURN TO CALLI↑BNG ROUTINE
1554
1555  006566                        .DELAY:
1556  006566  010046                        MOV     R0,-(SP)        ;SAVE R0
1557  006570  013700  006604                MOV     DLYCNT,R0       ;SET COUNT
1558  006574  005300                1$:     DEC     R0              ;DELAY
1559  006576  001376                        BNE     1$              ;
1560  006600  012600                        MOV     (SP)+,R0        ;RESTORE R0
1561  006602  000002                        RTI                     ;LEAVE ROUTINE
1562  006604  000001                DLYCNT: .WORD     1             ;PATCHABLE LOC FOR MORE TIME
1563
1564                                    ;ADVANCE TO NEXT TEST HANDLER
1565                                    ;----------------------------
1566
1567  006606  013716  001360        .ADVANCE:MOV    NEXT,(SP)       ;CRUNCH STACK WITH ADDRESS OF SCOPE CALL
1568  006612  005037  001362                CLR     LOCK            ;RESET TIGHT LOOP ADDRESS
1569  006616  000002                        RTI                     ;CHECK TO SEE IF OLD TEST GETS REPEATED
1570
1571                                    ;ERROR HANDLER
1572                                    ;-------------
1573
1574  006620  004737  007242        $ERROR: JSR     PC,SERV.G       ;FIND OUT IF <↑G> WAS HIT
1575  006624  032777  010000  172326        BIT     #SW12,@SWR      ;BELL ON ERROR?
1576  006632  001406                        BEQ     XBX             ;BR IF NO BELL
1577  006634  105777  172330                TSTB    @$TPS           ;TTY READY.
1578  006640  100003                        BPL     XBX             ;DON'T WAIT IF TTY NOT READY.
1579  006642  112777  000207  172322        MOVB    #207,@$TPB      ;PUSH A BELL AT THE TTY.
1580  006650  032777  020000  172302  XBX:  BIT     #SW13,@SWR      ;DELETE ERROR PRINT OUT?
1581↑B        006656  001113                BNE     HALTS           ;BR IF NO PRINT OUT WANTED.
1582  006660  021637  001136                CMP     (SP),$ERRPC     ;WAS THIS ERROR FOUND LAST TIME?
1583  006664  001404                        BEQ     1$              ;BR IF YES
```

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1584  006666  011637  001136                MOV     (SP),$ERRPC     ;RECORD BEING HERE
1585  006672  105037  001123                CLRB    $ERFLG          ;PREPARE HEADER
1586  006676  104407                  1$:   SAVDS                   ;SAVE ALL PROC REGISTERS
1587  006700  011605                        MOV     (SP),R5         ;GET THE PC OF ERROR
1588  006702  162705  000002                SUB     #2,R5           ;GET ADDRESS OF TRAP CALL
1589  006706  011504                        ↑BMOV   (R5),R4         ;GET ERROR INSTRUCTION
1590  006710  110437  001134                MOVB    R4,$ITEMB       ;COPY TEST NUMBER FOR APT HANDLING
1591  006714  006304                        ASL     R4              ;MULT BY TWO
1592  006716  061504                        ADD     (R5),R4         ;DOUBLE IT
1593  006720  006304                        ASL     R4              ;MULT AGAIN
1594  006722  042704  177001                BIC     #177001,R4      ;CLEAR JUNK
1595  006726  062704  026222                ADD     #.ERRTAB,R4     ;GET POINTER
1596  006732  012437  007056                MOV     (R4)+,ERRMSG    ;GET ERROR MESSAGE
1597  006736  012437  007070                MOV     (R4)+,DATAHD    ;GET DATA HEADRER
1598  006742  011437  007102                MOV     (R4),DATABP     ;GET DATA TABLE
1599  006746  105737  001123                TSTB    $ERFLG          ;TYPE HEADER
1600  006752  001403                        BEQ     TYPMSG          ;BR IF YES
1601  006754  005737  007102                TST     DATABP          ;DOES DATA TABLE EXIST?
1602  006760  001044                        BNE     TYPDAT          ;BR IF YES.
1603  006762  104402  001231          TYPMSG: TYPE    ,$CRLF          ;TYPE A CARRIAGE RETURN
1604  006766  104402  001231                TYPE    ,$CRLF          ;AND TYPE ANOTHER
1605  006772  005737  001362                TST     LOCK
1606  006776  001402                        BEQ     1$
1607  007000  104402  010177                TYPE    ,MASTEK
1608  007004  104402  010165            1$: TYPE    ,MTSTN
1609  007010  104412  007234                CNVRT   ,XTSTN          ;SHOW IT
1610  007014  104402  010254                TYPE    ,MERRPC         ;TYPE PC.
1611  007020  104412  007226                CNVRT   ,ERTABO         ;SHOW IT
1612  007024  104402  010↑B127                TYPE    ,MCSRX
1613  007030  104412  004624                CNVRT   ,XCSR
1614  007034  104402  001231                TYPE    ,$CRLF          ;GIVE A CR/LF
1615  007040  112737  177777  001123        MOVB    #-1,$ERFLG      ;NO MORE HEADER UNLESS NO DATA TABLE.
1616  007046  005737  007056                TST     ERRMSG          ;IS THERE AN ERROR MESSAGE?
1617  007052  001402                        BEQ     WTBS.FM         ;BR IF NO.
1618  007054  104402                        TYPE                    ;TYPE
1619  007056  000000          ERRMSG: 0                             ;    ERROR MESSAGE
1620  007060                  WTBS.FM:                              ;
1621  007060  005737  007070                TST     DATAHD          ;DATA HEADER?
1622  007064  001402                        BEQ     TYPDAT          ;BR IF NO
1623  007066  104402                        TYPE                    ;TYPE
1624  007070  000000          DATAHD: 0                             ;    DAT↑BA HEADER
1625  007072  005737  007102  TYPDAT: TST     DATABP          ;DATA TABLE?
1626  007076  001402                        BEQ     RESREG          ;BR IF NO.
1627  007100  104411                        CONVRT                  ;SHOW
1628  007102  000000          DATABP: 0                             ;    DATA TABLE
1629  007104  104410          RESREG: RESDS                         ;RESTORE PROC REGISTERS
1630  007106  122737  000001  001254  HALTS: CMPB    #APTENV,$ENV    ;IS APT RUNNING?
1631  007114  001007                        BNE     2$              ;SKIP APT CALL IF NOT
1632  007116  113737  001134  007130        MOVB    $ITEMB,7$       ;COPY ERROR NUMBER
1633  007124  004737  005462                JSR     PC,$ATY4        ;CALL APT SERVICE
1634  007130  000000            7$:   .WORD   0                     ;ERROR NUMBER STUCK HERE
1635  007132  000777            8$:   BR      8$                    ;LOCK UP HERE
1636  007134  022737  004610  000042  2$:   CMP     #$ENDAD,@#42    ;CHECK TO SEE IF IN ACT-11 MODE
1637  007142  001403                        BEQ     1$              ;IF SO, HANDLE ACCORDINGLY
1638  007144  005777  172010                TST     @SWR            ;HALT ON ERROR?
1639  007150  100004                        BPL     EXITER          ;BR IF NO HALT ON ERROR
```

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 1640  007152  016677  000002  172002  1$:     MOV     2(SP),@DISPLAY  ;SHOW ERROR PC IN DATA DISPLAY
 1641  007160  000000                          HALT                    ;HALT
 1642  007162  005237  001132          EXITER: INC     $ERTTL          ;UPDATE ERROR COUNT
 1643  007166  032777  000400  171764          BIT     #^BSW08,@SWR    ;GOTO TOP OF TEST?
 1644  007174  001007                          BNE     1$              ;BR IF YES
 1645  007176  032777  002000  171754          BIT     #SW10,@SWR      ;GOTO NEXT TEST?
 1646  007204  001407                          BEQ     2$              ;BR IF NO
 1647  007206  013737  001360  001126          MOV     NEXT,$LPADR     ;SET FOR NEXT TEST
 1648  007214  012706  001120          1$:     MOV     #STACK,SP       ;RESET SP
 1649  007220  000177  171702                  JMP     @$LPADR         ;GOTO SPECIFIED TEST
 1650  007224  000002                  2$:     RTI                     ;RETURN
 1651  007226  000001                  ERTABO: 1
 1652  007230     006     002                  .BYTE   6,2
 1653  007232  001402                          $AVPC
 1654  007234  000001                  XTSTN:  1
 1655  007236     002     002                  .BYTE   2,2
 1656  007240  001122                          $TSTNM
 165!87        007242  022737  177570  001160  SERV.G: CMP     #177570,SWR     ;IS THE SWITCH REGISTER HARDWIRED?
 1658  007250  001513                          BEQ     6$              ;IF SO, IGNORE ^G
 1659  007252  017746  171710                  MOV     @$TKB,-(SP)     ;OTHERWISE, GET THE LAST CHARACTER TYPED
 1660  007256  042716  000200                  BIC     #BIT7,(SP)      ;STRIP PARITY(EIGHTH) BIT
 1661  007262  122726  000007                  CMPB    #7,(SP)+        ;IS IT ^G?
 1662  007266  001104                          BNE     6$              ;IF NOT, IGNORE INPUT
 1663  007270  032777  004000  171666          BIT     #4000,@$TKS     ;RX BUSY?
 1664  007276  001361                          BNE     SERV.G          ;BR IF YES
 1665  007300  017737  171654  007522          MOV     @SWR,90$        ;SAVE (SWR).
 1666  007306  013777  007522  171644  1$:     MOV     90$,@SWR        ;
 1667  007314  104402  007502                  TYPE    ,89$            ;
 1668  007320  104412  007514                  CNVRT   ,88$            ;
 1669  007324  104402  007524                  TYPE    ,91$            ;
 1670  007330  105777  171630                  TSTB    @$TKS           ;WAIT FOR DONE.
 1671  007334  100375                          BPL     .-4             ;
 1672  007336  017746  171624                  MOV     @$TKB,-(SP)     ;
 1673  007342  042716  000200                  BIC     #BIT7,(SP)      ;
 1674  007346  122726  000015                  CMPB    #15,(SP)+       ;
 1675  007352  001450                          BEQ     5$              ;
 1676  007354  005077  171600                  CLR     @SWR            ;
 1677  007360  105777  171604          2$:     TSTB    @$TPS           ;
 1678  007364  100375                          BPL     .-4             ;
 1679  007366  016677  177776  171576          MOV     -2(SP),@$TPB    ;
 1680  007374  000241                          CLC                     ;
 1681  007376  006177  ^B171556                      ROL     @SWR            ;
 1682  007402  006177  171552                  ROL     @SWR            ;
 1683  007406  006177  171546                  ROL     @SWR            ;
 1684  007412  103735                          BCS     1$              ;ERROR
 1685  007414  026627  177776  000060          CMP     -2(SP),#60      ;
 1686  007422  002731                          BLT     1$              ;
 1687  007424  026627  177776  000067          CMP     -2(SP),#67      ;
 1688  007432  003325                          BGT     1$              ;
 1689  007434  042766  177770  177776          BIC     #^C(7),-2(SP)   ;
 1690  007442  056677  177776  171510          BIS     -2(SP),@SWR     ;
 1691  007450  105777  171510                  TSTB    @$TKS           ;
 1692  007454  100375                          BPL     .-4             ;
 1693  007456  017746  171504                  MOV     @$TKB,-(SP)
 1694  007462  042716  000200                  BIC     #BIT7,(SP)
 1695  007466  122726  000015  ^B              CMPB    #15,(SP)+
```

```
1696  007472  001332                        BNE     2$              ;
1697  007474  104402  001231        5$:     TYPE    $CRLF           ;
1698  007500  000207                6$:     RTS     PC
1699
1700  007502  020200  051450  051127  89$:  .ASCIZ  <200>? (SWR)=/?
1701  007510  036451  000057
1702                                .EVEN
1703  007514  000001                88$:    1
1704  007516     006     000              .BYTE   6,0
1705  007520  007522                       90$
1706  007522  000000                90$:    .WORD   0
1707  007524  036457  000057        91$:    .ASCIZ  ?/=/?
1708                                .EVEN
1709                                .SBTTL  POWER DOWN AND UP ROUTINES
1710
1711                                ;;*****************************************************************
1712                                ;POWER DOWN ROUTINE
1713  007530  012737  007674  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
1714  007536  012737  000340  000026         MOV     #340,@#PWRVEC+2 ;;PRIO:7
1715  007544  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
1716  007546  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
1717  007550  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
1718  007552  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
1719  007554  010446                        MOV     R4,-(SP)        ;;PUSH R4 ON STACK
1720  007556  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
1721  007560  017746  171374                MOV↑B   @SWR,-(SP)      ;;PUSH @SWR ON STACK
1722  007564  010637  007700                MOV     SP,$SAVR6       ;;SAVE SP
1723  007570  012737  007602  000024        MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
1724  007576  000000                        HALT
1725  007600  000776                        BR      .-2             ;;HANG UP
1726
1727                                ;;*****************************************************************
1728                                ;POWER UP ROUTINE
1729  007602  012737  007674  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
1730  007610  013706  007700                MOV     $SAVR6,SP       ;;GET SP
1731  007614  005037  007700                CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
1732  007620  005237  007700        1$:     INC     $SAVR6          ;;WAIT FOR THE INC
1733  007624  ↑B001375                       BNE     1$              ;;OF  WORD
1734  007626  012677  171326                MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
1735  007632  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
1736  007634  012604                        MOV     (SP)+,R4        ;;POP STACK INTO R4
1737  007636  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
1738  007640  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
1739  007642  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
1740  007644  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
1741  007646  012737  007530  000024        MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
1742  007654  012737  000340  000026        MOV     #340,@#PWRVEC+2 ;;PRIO:7
1743  007662  104402                        TYPE                    ;;REPORT THE POWER FAILURE
1744  007664  007702                $PWRMG: .WORD   MPFAIL           ;;POWER FAIL MESSAGE POINTER
1745  007666  012716                        MOV     (PC)+,(SP)      ;;RESTART AT RESTART
1746  007670  011304                $PWRAD: .WORD   RESTART         ;;RESTART ADDRESS
1747  007672  000002                        RTI
1748  007674  000000                $ILLUP: HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
1749  007676  000776                        BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
1750  007700  000000                $SAVR6: 0                       ;;PUT THE SP HERE
1751  007702  050200  051127  043040  MPFAIL: .ASCIZ  <200>/PWR FAILED. RESTART AT LAST TEST /
```

```
(2) 007745    200  047105  020104  MEPASS: .ASCIZ  <200>/END PASS DZDZA-C  /
(2) 007771    200  052522  047116  MR:     .ASCIZ  <200>/RUNNING   /
(2) 010005    200  051120  043517  MERR2:  .ASCIZ  <200>/PROGRAM INDICATES NO DEVICES PRESENT./
(2) 010054 044600  051516  043125  MERR3:  .ASCIZ  <200>/INSUFFICIENT DATA!/
(2) 010100 046200  041517  020113  MLOCK:  .ASCIZ  <200>/LOCK ON SELECTED TEST/
(2) 010127    103  051123  020072  MCSRX:  .ASCIZ   /CSR: /
(2) 010135    126  041505  020072  MVECX:  .ASCIZ  /VEC: /
(2) 010143    120  051501  042523  MPASSX: .ASCIZ  /PASSES: /
(2) 010154 051105  047522  05152↑B2 MERRX:  .ASCIZ  /ERRORS: /
(2) 010165    124  051505  020124  MTSTN:  .ASCIZ  /TEST NO: /
(2) 010177    052  000040          MASTEK: .ASCIZ  /* /
(2) 010202 051600  052105  051440  MNEW:   .ASCIZ  <200>/SET SWITCH REG TO DZ11'S DESIRED ACTIVE./
(2) 010254 041520  020072     000  MERRPC: .ASCIZ  /PC: /
(2) 010261    200  040515  020120  XHEAD:  .ASCIZ  <200>/MAP OF DZ11 STATUS/<200>
(2) 010306 044600  046114  043505  MBADLN: .ASCIZ  <200>/ILLEGAL ENTRY IN STAGGERED MODE/<200>
(2)                               .EVEN
(2) 010350 000002                 XSTATQ: 2
1752 010352    006     003                .BYTE   6,3
1753 010354 001220                        $TMP1
1754 010356    006     002                .BYTE   6,2
1755 010360 001222                        $TMP2
1756                              .EVEN
1757                                      ;THIS ROUTINE ESTABLISHES WHICH MAINTENANCE MODE THE DEVICE IS IN
1758                                      ;-------------------------------------------------------------
1759                                      ;E=EXTERNAL LOOP BACK
1760                                      ;I=INTERNAL LOOP BACK
1761                                      ;S=STAGGERED LOOP BACK
1762 010362 017605 000000        .SETFLG:MOV     @(SP),R5        ;PICK UP ADDRESS OF TAG
1763 010366 042737 000040 010502         BIC     #40,INBUF       ;STRIP LOWER CASE
1764 010374 122737 000105 010502         CMPB    #'E,INBUF       ;IS IT EXTERNAL LOOP BACK ?
1765 010402 001005                       BNE     4$              ;NO
1766 010404 013715 010474                MOV     1$,(R5)         ;YES STORE INFO
1767 010410 1050↑B37     001417                  CLRB    MNTFLG          ;SET MAINT BIT =0
1768 010414 000422                       BR      7$              ;GET OUT
1769 010416 122737 000111 010502 4$:     CMPB    #'I,INBUF       ;IS IT INTERNAL LOOP BACK ?
1770 010424 001006                       BNE     5$              ;NO
1771 010426 013715 010476                MOV     2$,(R5)         ;YES STORE INFO
1772 010432 112737 000010 001417         MOVB    #MAINT,MNTFLG   ;SET UP THE MAINTENANCE FLAG LOADER
1773 010440 000410                       BR      7$              ;GET OUT
1774 010442 122737 000123 010502 5$:     CMPB    #'S,INBUF       ;IS IT STAGGERED LOOP BACK ?
1775 010450 001007                       BNE     6$              ;WHAT ?
1776 010452 013715 010500                MOV     3$,(R5)         ;YES STORE INFO
1777 010456 105037 001417                CLRB    MNTFLG          ;ZERO BITS
↑B1778       010462 062716 000002        7$:     ADD     #2,(SP)         ;POP AROUND
1779 010466 000002                       RTI
1780 010470 104404               6$:     INSTER                  ;RETRY
1781 010472 000733                       BR      .SETFLG         ;DITTO
1782 010474 000200               1$:     .WORD   200             ;EXTERNAL = E
1783 010476 000000               2$:     .WORD   0               ;INTERNAL = I
1784 010500 100000               3$:     .WORD   100000          ;STAGGERED = S
1785
1786                                      ;BUFFERS FOR INPUT-OUTPUT
1787
1788 010502 000000               INBUF:  0
1789       010544                .=.+40
1790 010544 000000               TEMP:   0
```

```
1791            010606                  .=.+40
1792  010606    000000                  MDATA:  0
1793            010650                  .=.+40
1794
1795  010650    011637  010746          SET.PS: MOV     (SP),3$
1796  010654    162737  000002  010746          SUB     #2,3$
1797  010662    017737  000060  010750          MOV     @3$,4$
1798  010670    022737  106427  010750          CMP     #106427,4$
1799  010676    001003                          BNE     1$
1800  010700    011637  010746                  MOV     (SP),3$
1801  010704    000412                          BR      2$
1802  010706    022737  106437  010750  1$:     CMP     #106437,4$
1803  010714    001401                          BEQ     .+4
1804  010716    000000                          HALT            ;RESERVED INSTRUCTION NOT "MTPS"
1805  010720    011637  010746                  MOV     (SP),3$
1806  010724    017737  000016  010746          MOV     @3$,3$
1807  010732    062716  000002          2$:     ADD     #2,(SP)
1808  010736    017766  000004  000002          MOV     @3$,2(SP)
1809  010744    000002                          RTI
1810  010746    000000                  3$:     0
1811  010750    000000                  4$:     0
```

```
 1812
 1813                                           ;
 1814                                           ;ROUTINE USED TO "CYCLE" THROUGH UP TO SIXTEEN DZ11'S
 1815                                           ;THIS ROUTINE SETS UP THE CONTROL ADDRESS FOR THE DIAGNOSTIC
 1816                                           ;AND RUNS THE SPECIFIED DZ11'S.   THIS ROUTINE *MUST*
 1817                                           ;BE RUN FIRST BEFORE ENTERING THE DIAGNOSTIC FOR THE
 1818                                           ;SETUP NECESSARY.
 1819                                           ;
 1820
 1821  010752  005737  0014↑B04          CYCLE: TST     DZACTV          ;ARE ANY DZ11'S TO BE TESTED?
 1822  010756  001004                   BNE    1$              ;BR IF OK.
 1823  010760  104402  010005           TYPE   ,MERR2          ;NO DZ11'S SELECTED!!
 1824  010764  000000                   HALT                   ;STOP THE SHOW.
 1825  010766  000776                   BR     .-2             ;DISQUALIFY CONT. SW.
 1826  010770  013737  005116  001226  1$:    MOV    $MXCNT,$TIMES   ;RESTORE THE NUMBER OF ITERATIONS TO MAKE
 1827  010776  033737  001406  001404         BIT    RUN,DZACTV      ;IS THIS ONE "ACTIVE"
 1828  011004  001017                   BNE    2$              ;BR IF GOOD ONE FOUND.
 1829  011006  006137  001406           ROL    RUN             ;UPDATE POINTER
 1830  011012  005537  001406           ADC    RUN             ;CATCH CARRY FROM RUN
 1831  011016  062737  000014  001412   ADD    #14,ACTIVE      ;UPDATE ADDRESS POINTER.
 1832  011024  022737  002000  001412   CMP    #DZ.END,ACTIVE  ;HAVE WE PASSED THE END OF THE MAP?
 1833  011032  001356                   BNE    1$              ;IF NO, KEEP GOING; NOT ALL TESTED FOR.
 1834  011034  012737  001500  001412   MOV    #DZ.MAP,ACTIVE  ;RESET ADDRESS POINTER.
 1835  011042  000752                   BR     1$              ;KEEP LOOKING FOR ACTIVE DZ11
 1836  011044  006137  001406    2$:    ROL    RUN             ;UPDATE POINTER.
 1837  011050  005537  001406           ADC    RUN             ;CATCH CARRY.
 1838  011054  013700  001412           MOV    ACTIVE,R0       ;GET ADDRESS POINTER.
 1839  011060  062737  000014  001412   ADD    #14,ACTIVE      ;UPDATE.
 1840  011066  022737  002000  001412   CMP↑B  #DZ.END,ACTIVE
 1841                                           ;ALL DONE?
 1842  011074  001003                   BNE    3$              ;BR IF NO.
 1843  011076  012737  001500  001412   MOV    #DZ.MAP,ACTIVE  ;RESTORE POINTER.
 1844  011104  012037  001310    3$:    MOV    (R0)+,$BASE     ;LOAD SYSTEM CTRL. REG
 1845  011110  012037  002072           MOV    (R0)+,DZRIV     ;LOAD VECTOR
 1846  011114  012037  026216           MOV    (R0)+,DZPRT     ;LOAD PRIORITY
 1847  011120  113737  026217  001414   MOVB   DZPRT+1,EIAFLG  ;EIA OR 20MA
 1848  011126  042737  100000  026216   BIC    #BIT15,DZPRT    ;CLEAR FLAG
 1849  011134  012037  001364           MOV    (R0)+,LINE      ;SET UP LINE DZ LINES ACTIVE
 1850  011140  012037  001366           MOV    (R0)+,PAR       ;SET UP PARAMETERIZATION
↑B1851         011144  012037  001370           MOV     (R0)+,MODE      ;SET UP MAINTENANCE MODE
 1852  011150  004737  026010           JSR    PC,DZLEV        ;SET UP
 1853  011154  005737  000042           TST    @#42            ;ARE WE UNDER MONITOR CONTROL?
 1854  011160  001046                   BNE    4$              ;IF YES, SKIP THIS SETUP
 1855  011162  032777  000002  167770   BIT    #SW01,@SWR      ;IF SW01=1, GET STARTING TEST #
 1856  011170  001442                   BEQ    4$              ;BR IF NO TEST IS TO BE INPUTTED
 1857  011172  104402  001231    7$:    TYPE   ,$CRLF
 1858  011176  104403                   INSTR                  ;CALL THE STRING INPUT ROUTINE
 1859  011200  010165                   MTSTN                  ;POINTER TO MESSAGE TO BE PRINTED
 1860  011202  104405                   PARAM                  ;CALL THE OCTAL TO ASCII CONVERT ROUTINE
 1861  011204  000001                   1                      ;LOWEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 1862  011206  001000                   1000                   ;HIGHEST LEGITIMATE VALUE OF EXPECTED RESPONSE
 1863  011210  001122                   $TSTNM                 ;POINTER TO MAP LOCATION TO BE FILLED
 1864  011212     000                   .BYTE  0               ;MASK OF INVALID BITS FOR THIS PARAMETER
 1865  011213     001                   .BYTE  1               ;NUMBER OF PARAMETERS TO STORE
 1866  011214  012700  012216           MOV    #TST1,R0
 1867  011220  022710  000004    5$:    CMP    #4,(R0)
```

```
1868  011224  001015                          BNE     6$
1869  011226  02276↑80       012737  000002          CMP     #12737,2(R0)
1870  011234  001011                          BNE     6$
1871  011236  023760  001122  000004          CMP     $TSTNM,4(R0)    ;IS THIS THE TEST ?
1872  011244  001005                          BNE     6$              ;IF NOT, DON'T PROCESS NUMBER
1873  011246  010037  001126                  MOV     R0,$LPADR       ;SAVE PC
1874  011252  104402  001231                  TYPE    ,$CRLF
1875  011256  000412                          BR      8$
1876  011260  005720                  6$:     TST     (R0)+
1877  011262  020027  022156                  CMP     R0,#TLAST+10
1878  011266  001354                          BNE     5$
1879  011270  104402  001230                  TYPE    ,$QUES
1880  011274  000736                          BR      7$
1881  011276  012737  012216  001126  4$:     MOV     #TST1,$LPADR    ;PREPARE TEST ADDRESS
1882  011304                          8$:
1883  011304  0↑800177        167616          RESTART:JMP     @$LPADR         ;GO START TESTING.***WARNING!****
1884                                                                  ;THIS JUMP IS USED BY POWER UP ROUTINE!!!!
1885
```

```
                                        ;-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.

011310  012700  001500          SETAPT: MOV     #DZ.MAP,R0      ;POINT TO THE DEVICE MAP TABLE
011314  013701  001310                  MOV     $BASE,R1        ;BUILD DEVICE ADDRESSES IN R1
011320  013702  001304                  MOV     $VECT1,R2       ;BUILD DEVICE VECTORS IN R2
011324  042702  177007                  BIC     #^C<770>,R2     ;STRIP AWAY OTHER INFORMATION

011330  113703  001305                  MOVB    $VECT1+1,R3     ;LOAD THE INTERRUPT PRIORITY FROM R3
011334  106003                          RORB    R3              ;ALIGN THE NUMBER
011336  106003                          RORB    R3              ;ALIGN THE NUMBER
011340  106003                          RORB    R3              ;ALIGN THE NUMBER
011342  106003                          RORB    R3              ;ALIGN THE NUMBER
011344  106003                          RORB    R3              ;ALIGN THE NUMBER
011346  042703  177770                  BIC     #^C<7>,R3       ;REMOVE ALL BUT BUS LEVEL NUMBER
011352  012704  001320                  MOV     #$DDW0,R4       ;POINT TO THE BEGINNING OF DEVICE^B PARAMETERS
011356  013705  001312                  MOV     $DEVM,R5        ;GET THE MAP OF ACTIVE DEVICES
011362  010537  001404                  MOV     R5,DZACTV       ;SAVE THE BIT MAP
011366  006005                  1$:     ROR     R5              ;GET A DEVICE SELECTION BIT
011370  103407                          BCS     3$              ;IF IT IS SELECTED, GO SET UP A MAP
011372  001425                          BEQ     5$              ;IF NO MORE ARE SELECTED, GET OUT OF SETUP
011374  005724                          TST     (R4)+           ;POINT TO NEXT DEVICE DESCRIPTOR
011376  062701  000010          2$:     ADD     #10,R1          ;SET UP THE NEXT ADDRESS
011402  062702  000010                  ADD     #10,R2          ;SET UP THE NEXT VECTOR GROUP
011406  000767                          BR      1$              ;GO SEE IF MORE DEVICES REMAIN
19^B12  011410  010120                  3$:     MOV     R1,(R0)+        ;LOAD DEVICE ADDRESS
011412  010220                          MOV     R2,(R0)+        ;LOAD THE VECTOR ADDRESS
011414  010320                          MOV     R3,(R0)+        ;LOAD THE INTERRUPT PRIORITY LEVEL
011416  013720  001314                  MOV     $CDW1,(R0)+     ;GET THE NUMBER OF LINES IN OPERATION
011422  012420                          MOV     (R4)+,(R0)+     ;LOAD DEVICE PARAMETERS
011424  100406                          BMI     4$              ;IF 20MA MODE SELECTED, SET IT UP
011426  052760  100000  177772          BIS     #100000,-6(R0)  ;SET THE 20MA FLAG IN DZLVN
011434  042760  100000  177776          BIC     #100000,-2(R0)  ;CLEAR THE FLAG IN DZPARN
011442  005020                  4$:     CLR     (R0)+           ;DEFAULT OPERATION TO INTERNAL MAINTENANCE MODE
011444  000754                          BR      2$              ;GO BUILD THE NEXT ADDRESS
011446  012710  177777          5$:     MOV     #-1,(R0)        ;TERMINATE THE DEVICE MAP
011452  012737  001256  001160          MOV     #$SWREG,SWR     ;SET TO SOFTWARE APT SWITCH REGISTER
011460  000207                          RTS     PC              ;RETURN TO PRINT STATUS TABLE


                                        ;*ROUTINE USED TO "AUTO SIZE" THE DZ11
                                        ;*CSR AND VECTOR.
                                        ;*NOTE: THE CSR MAY BE ANY WHERE IN THE FLOATING
                                        ;*      ADDRESS RANGE (160000:163700)
                                        ;*      AND THE VECTOR MAY BE ANY WHERE IN THE
                                        ;*      FLOATING VECTOR RANGE (300:770)
                                        ;*
193^B4
011462                          AUTO.SIZE:
011462  000005                          RESET                   ;INSURE A BUS INIT.
011464  105337  001415                  DECB    INIFLG          ;SHOW THAT I WAS HERE
011470  012702  001500          CSRMAP: MOV     #DZ.MAP,R2      ;LOAD MAP POINTER.
011474  012703  001320                  MOV     #$DDW0,R3       ;POINT TO ETABLE DEVICE DESCRIPTOR WORDS
011500  005022                  1$:     CLR     (R2)+           ;ZERO ENTIRE MAP
011502  022702  002000                  CMP     #DZ.END,R2      ;ALL DONE?
```

```
 1942  011506  001374                          BNE     1$              ;BR IF NO
 1943  011510  105037  001410                  CLRB    DZNUM           ;SET OCTAL NUMBER OF DZ11'S TO 0
 1944  011514  012702  001500                  MOV     #DZ.MAP,R2
 1945  011520  012701  160000                  MOV     #160000,R1      ;SET FOR FIRST ADDRESS TO BE TESTED
 1946  011524  012737  012020  000004          MOV     #6$,@#4         ;SET FOR NON-EXISTENT DEVICE TIME OUT
 1947  011532  052711  000040          2$:     BIS     #BIT5,(R1)      ;TRY TO SET MASTER SCAN ENABLE
 1948  011536  052761  000200  000004          BIS     #BIT7,4(R1)     ;TRY TO TRANSMIT ON LINE 7
 1949  011544  005000                          CLR     R0              ;USE R0 AS A COUNTER
 1950  011546  005711                  7$:     TST     (R1)            ;HAS TRANSMITTER READY COME UP?
 1951  011550  100403                          BMI     8$              ;IF SO, GO GET A FINAL CHECK
 1952  011552  005300                          DEC     R0              ;REDUCE COUNT. TIME UP?
 1953  011554  001374                          BNE     7$              ;IF NOT, KEEP WAITING
 1954  011556  000451                          BR      3$              ;ASSUME IT'S NOT A DZ11
 1955  011560  032761  000200  000004  8$:     BIT     #BIT7,4(R1)     ;IS LINE 7 ENABLE STILL SET? IT SHOULD BE
 1956  011566  001445                          BEQ     3$              ;IF IT'S NOT, ASSUME IT'S NOT A DZ11
 1957  011570  032711  000040                  BIT     #BIT5,(R1)      ;IS MASTER SCAN ENABLE STILL SET?
 1958  011574  001442                          BEQ     3$              ;IF NOT, ASSUME IT'S NOT A DZ11
 1959  011576  005000                          CLR     R0
 1960  011600  052711  000020                  BIS     #20,(R1)        ;SET DEVICE CLEAR
 1961  011604  032711  000020                  BIT     #20,(R1)        ;SHOULD STAY SET FOR A WHILE IF DZ
 1962  011610  001434                          BEQ     3$              ;BR IF NOT †BDZ11
 1963  011612  032711  000020                  BIT     #20,(R1)        ;WAIT FOR BIT TO CLEAR
 1964  011616  001404                          BEQ     .+12            ;BR WHEN CLEARED
 1965  011620  104414                          DELAY
 1966  011622  005200                          INC     R0
 1967  011624  001372                          BNE     .-12
 1968  011626  000425                          BR      3$              ;BIT NOT CLEARED! MUST NOT BE DZ11
 1969  011630  005011                          CLR     (R1)            ;GET RID OF MASTER SCAN ENABLE
 1970  011632  005061  000004                  CLR     4(R1)           ;GET RID OF LINE 7 ENABLE
 1971                                  ;AT THIS POINT IT IS ASSUMED THAT R1 HOLDS A DZ11 CSR ADDRESS.
 1972  011636  010122                          MOV     R1,(R2)+        ;STORE CSR IN CORE TABLE.
 1973  011640  005722                          TST     (R2)+           ;POP OVER VECTOR STORE AREA
 1974  011642  †B012722          000005                  MOV     #5,(R2)+        ;SET THE DEFAULT BUS LEVEL
 1975  011646  012722  000377                  MOV     #377,(R2)+      ;SET THE DEFAULT LINE SELECTION PARAMETER
 1976  011652  012712  017470                  MOV     #17470,(R2)     ;SET THE DEFAULT PARAMETERS
 1977  011656  012223                          MOV     (R2)+,(R3)+     ;COPY PARAMETERS INTO ETABLE DESCRIPTOR
 1978  011660  005022                          CLR     (R2)+           ;SET THE DEFAULT MODE OF OPERATION
 1979  011662  012712  177777                  MOV     #-1,(R2)        ;TERMINATE LIST
 1980  011666  105237  001410                  INCB    DZNUM           ;UPDATE DEVICE COUNTER
 1981  011672  122737  000020  001410          CMPB    #20,DZNUM       ;ARE MAX. NO. OF DEV FOUND?
 1982  011700  001405                          BEQ     100$            ;YES DON'T LOOK FOR ANY MORE.
 1983  011702  062701  000010          3$:     ADD     #10,R1          ;UPDATE CSR POINTER ADDRESS
 1984  011706  022701  163700                  CMP     #163700,R1
 1985  011712  001307                          BNE     2$              ;BR IF MORE ADDRESS TO CHECK.
 1986  011714                          100$:
 1987  011714  105737  001410                  TSTB    DZNUM           ;WERE ANY DZ11'S FOUND AT ALL?
 1988  011720  001432                          BEQ     5$              ;ERROR AUTO SIZER FOUND NO DZ11'S IN THIS SYS.
 1989  011722  113701  001410                  MOVB    DZNUM,R1
 1990  011726  110137  001411                  MOVB    R1,SAVNUM       ;SAVE NUMBER OF DEVICES
 1991  011732  012737  000001  001404          MOV     #1,DZACTV
 1992  011740  005301                  4$:     DEC     R1
 1993  011742  001404                          BEQ     98$
 1994  011744  000261                          SEC
 1995  011746†B        006137  001404                  ROL     DZACTV
 1996  011752  000772                          BR      4$
 1997  011754  013737  001500  001310  98$:     MOV     DZCR0,$BASE     ;POINT TO THE ADDRESS OF FIRST DEVICE
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 1998  011762  013737  001512  001314          MOV     MANTO,$CDW1     ;INDICATE TO ETABLE WHAT MODE IS BEING USED
 1999  011770  012737  000006  000004  99$:    MOV     #6,@#4          ;RESTORE TRAP VECTOR
 2000  011776  013737  001404  001312          MOV     DZACTV,$DEVM    ;SAVE ACTIVE REGISTER
 2001  012004  000410                          BR      VECMAP          ;GO FIND THE VECTOR NOW.
 2002  012006  104402  010005          5$:     TYPE    ,MERR2          ;NOTIFY OPR↑B THAT NO DZ11'S FOUND.
 2003  012012  005000                          CLR     R0              ;MAKE DATA DISPLAY ZERO
 2004  012014  000000                          HALT                    ;STOP THE SHOW
 2005  012016  000776                          BR      .-2             ;DISABLE CONT. SW.
 2006  012020  012716  011702          6$:     MOV     #3$,(SP)        ;ENTERED BY NON-EXISTENT TIME-OUT
 2007  012024  000002                          RTI                     ;RETURN TO MAINSTREAM
 2008
 2009  012026  012737  000340  000022  VECMAP: MOV     #340,@#22       ;SET IOT TRAP PRIORITY TO 7
 2010  012034  012737  012150  000020          MOV     #4$,@#20        ;SET IOT TRAP VECTOR
 2011  012042  012702  001500                  MOV     #DZ.MAP,R2      ;SET SOFTWARE POINTER
 2012  012046  012700  000300                  MOV     #300,R0         ;FLOATING VECTORS START HERE.
 2013  012052  012701  000302                  MOV     #302,R1         ;PC OF IOT INSTR.
 2014  012056  010120                  1$:     MOV     R1,(R0)+        ;START FILLING VECTOR AREA
 2015  012060  012721  000004                  MOV     #4,(R1)+        ;WITH .+2; IOT
 2016  012064  022021                          CMP     (R0)+,(R1)+     ;ADD 2 TO R0 +R1
 2017  012066  020127  001000                  CMP     R1,#1000        ;HAS THE VECTOR AREA BEEN EXCEEDED?
 2018  012072  101771                          BLOS    1$              ;BR IF MORE TO FILL
 2019  012074  013704  001404                  MOV     DZACTV,R4       ;STORE TEMPORARILY
 2020  012100  006004                  2$:     ROR     R4              ;BRING OUT A BIT
 2021  012102  103036                          BCC     5$              ;BR IF ALL DONE
 2022  012104  106427  000000                  MTPS    #0              ;ZERO CPU PRIO
 2023  012110  012772  040040  000000          MOV     #BIT14+BIT5,@(R2)+  ;B
 2024  012116  011201                          MOV     (R2),R1         ;GET CSR
 2025  012120  112761  000200  000004          MOVB    #BIT7,4(R1)     ;SET THE TCR BIT!
 2026                                                                  ;ATTEMPT TO FORCE AN INTERRUPT
 2027  012126  005200                          INC     R0              ;STALL
 2028  012130  001376                          BNE     .-2             ;       FOR TIME TO INTERRUPT
 2029  012132  012762  000300  000002          MOV     #300,2(R2)      ;NO INTERRUPT ASSUME 300 AND FIX DZ11 LATER
 2030  012140  000005                  3$:     RESET                   ;INIT
 2031  012142  062702  000014                  ADD     #14,R2          ;POP SOFTWARE POINTER
 2032  012146  000754                          BR      2$              ;KEEP GOING
 2033  012150  011662  000002          4$:     MOV     (SP),2(R2)      ;GET VECTOR ADDRESS
 2034  012154  162762  000010  000002          SUB     #10,2(R2)       ;POINT B↑BACK TO THE CORRECT VECTOR
 2035  012162  042762  000007  000002          BIC     #7,2(R2)        ;CLEAR JUNK
 2036  012170  022626                          POP2SP                  ;POP IOT JUNK OFF STACK
 2037  012172  012716  012140                  MOV     #3$,(SP)        ;SET FOR RETURN
 2038  012176  000002                          RTI
 2039  012200  013737  001502  001304  5$:     MOV     DZVC0,$VECT1    ;COPY VECTOR OF FIRST DEVICE INTO ETABLE
 2040  012206  012737  004654  000020          MOV     #.SCOPE,IOTVEC  ;RESTORE THE SCOPE TRAP
 2041  012214  000207                          RTS     PC              ;ALL DONE WITH "AUTO SIZING"
 2042
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                                                ;************************ TEST 1 *******************************
                                                ;*THIS TEST PROVES THE SLAVE SYNC RESPONSE
                                                ;*DURING A READ OR WRITE TO THE FOLLOWING ADDRESS:
                                                ;*      DZCSR, DZRBUF, DZTCR, DZMSR
                                        ;:*  TEST 1
                                        ;:*************************************************************
012216  000004                        TST1:   SCOPE
012220  012737  000001  001122                MOV     #1,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012226  012737  012406  001360                MOV     #TST2,NEXT      ;POINT TO THE START OF THE NEXT TEST
012234  012737  012374  000004                MOV     #5$,4           ;SET TRAP VECTOR
012242  01↑B2737        000340  000006                MOV     #PR7,6          ;SET PRIORITY TO LEVEL 7
012250  012737  012256  001362                MOV     #1$,LOCK        ;SET RETURN IF SW09=11
012256  013700  002042                1$:     MOV     DZCSR,R0        ;SET ADDRESS TO TEST
012262  011001                        MOV     (R0),R1         ;READ THE ADDRESS
012264  000240                        NOP                     ;WASTE TIME
012266  005010                        CLR     (R0)            ;WRITE THE ADDRESS
012270  000240                        NOP                     ;WASTE TIME
012272  012737  012300  001362                MOV     #2$,LOCK        ;SET RETURN ADDRESS FOR SW09
012300  013700  002046                2$:     MOV     DZRBUF,R0       ;SET ADDRESS TO TEST
012304  011001                        MOV     (R0),R1         ;READ THE ADDRESS
012306  000240                        NOP                     ;
01↑B12310       005010                        CLR     (R0)            ;WRITE THE ADDRESS
012312  000240                        NOP                     ;WASTE TIME
012314  012737  012322  001362                MOV     #3$,LOCK        ;SET RETURN ADDRESS FOR SW09
012322  013700  002056                3$:     MOV     DZTCR,R0        ;SET ADDRESS TO TEST
012326  011001                        MOV     (R0),R1         ;READ THE ADDRESS
012330  000240                        NOP
012332  005010                        CLR     (R0)            ;WRITE THE ADDRESS
012334  000240                        NOP
012336  012737  012344  001362                MOV     #4$,LOCK        ;SET RETURN ADDRESS
012344  013700  002062                4$:     MOV     DZMSR,R0        ;SET ADDRESS TO TEST
012350  011001                        MOV     (R0),R1         ;READ FROM ADDRESS
012352  000240                        NOP
012354  005010                        CLR     (R0)            ;WRITE THE ADDRESS
012356  000240                        NOP                     ;
012360  012737  000006  000004                MOV     #6,4            ;SET TRAP CATCHER BACK TO NORMAL
012366  005037  000006                CLR     6               ;
012372  104400                        ADVANCE                 ;SCOPE THIS TEST
012374  011601                5$:     MOV     (SP),R1         ;SAVE PC OF TRAP
012376  022626                        CMP     (SP)+,(SP)+     ;POP TRAP OFF STACK
012400  104001                        ERROR   1               ;*NO SLAVE SYNC RESPONSE.
012402  104401                        SCOP1                   ;SW09=1?
012404  000111                        JMP     (R1)            ;RTI
                                                ;************************ TEST 2 *******************************
                                                ;*THIS TEST PROVES THAT BIT "DCLR"
↑B                                              ;*CAN BE SET AND THAT IT WILL CLEAR
                                                ;*BY ITSELF AFTER A PERIOD OF TIME.
                                        ;:*  TEST 2
                                        ;:*************************************************************
012406  000004                        TST2:   SCOPE
012410  012737  000002  001122                MOV     #2,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012416  012737  012472  001360                MOV     #TST3,NEXT      ;POINT TO THE START OF THE NEXT TEST
012424  013700  002042                MOV     DZCSR,R0        ;SET POINTER
012430  012705  000020                MOV     #DCLR,R5        ;SET DCLR
012434  010510                        MOV     R5,(R0)         ;WRITE DCLR INTO DZCSR
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 2099  012436  011004                        MOV     (R0),R4         ;READ BACK DZCSR
 2100  012440  020504                        CMP     R5,R4           ;DZCSR OK?
 2101  012442  001401                        BEQ     1$              ;IF IT IS SET SKIP THE ERROR CALL
 2102  012444  104002                        ERROR   2               ;*DCLR SHOULD BE SET..MOMENTARILY
 2103                                    ;NOW LETS WATCH IT DISAPPEAR
 2104  012446  005002                1$:     CLR     R2              ;SET COUNTER TO 0
 2105  012450  005005                        CLR     R5              ;SET EXPECTED TO 0
 2106  012452  005003                        CLR     R3              ;DUAL LOOP COUNTER
 2107  012454  011004                2$:     MOV     (R0),R4         ;IS DCLR CLEAR?
 2108  012456  001405                        BEQ     3$              ;IF YES , GO TO THE NEXT TEST
 2109  012460  005203                        INC     R3              ;IF NO,COUNT 1 OF 65535 TICKS
 2110                                                                ;THE WORD CREATED BY THE IMMEDIATE 0 WILL BE
 2111                                                                ;THE COUNTER
 2112  012462  001374                        BNE     2$              ;HAS THE TIME EXPIRED? IF NO, GO TEST BIT AGAIN
 2113  012464  005302                        DEC     R2              ;HAS THE TOTAL TIME EXPIRED?
 2114  012466  001372                        BNE     2$              ;IF NO, CHECK THE BIT AGAIN
 2115  012470  104002                        ERROR   2               ;*DCLR FAILED TO CLEAR
 2116  012472                            3$:
 2117                                                ;************************ TEST 3 *******************************
 2118                                                ;*TEST TO VERIFY THAT BIT "MAINT" CAN
 2119                                                ;*BE SET. THEN VERIFY THAT BIT "MAINT" CAN
 2120                                    ↑B          ;*BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
 2121                                                ;*VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
 2122                                                ;*CLEARED BY A "DEVICE CLEAR"
 2123                                    ;;*  TEST 3
 2124                                    ;;*****************************************************************
 2125  012472  000004                    ↑ST3:   SCOPE
 2126  012474  012737  000003  001122            MOV     #3,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
 2127  012502  012737  012564  001360            MOV     #↑ST4,NEXT      ;POINT TO THE START OF THE NEXT TEST
 2128  012510  013700  002042                    MOV     DZCSR,R0        ;GET BASE ADDRESS
 2129  012514  012705  000010                    MOV     #MAINT,R5       ;SET BIT
 2130  012520  010510                            MOV     R5,(R0)         ;SET SET IN DEVICE
 2131  01↑82522          011004                        MOV     (R0),R4         ;READ THE BIT FROM DEVICE
 2132  012524  020504                            CMP     R5,R4           ;WAS BIT SET?
 2133  012526  001401                            BEQ     1$              ;BR IF YES
 2134  012530  104002                            ERROR   2               ;*BIT R/W FAILURE
 2135  012532  040510                1$:         BIC     R5,(R0)         ;CLEAR THE BIT.
 2136  012534  011004                            MOV     (R0),R4         ;READ DEVICE
 2137  012536  001404                            BEQ     2$              ;BR IF BITS WERE CLEARED.
 2138  012540  010546                            MOV     R5,-(SP)        ;SAVE THE BIT
 2139  012542  005005                            CLR     R5              ;SET EXPECTED RESULTS TO 0
 2140  012544  104002                            ERROR   2               ;*BIT FAILED TO CLEAR
 2141  012546  012605                            MOV     (SP)+,R5        ;RESTORE THE BIT.
 2142  012550  010510                2$:         MOV     R5,(R0)         ;SET THE BIT AGAIN
 2143  012552  104413                            DEVICE.CLR              ;ISSUE DEVICE CLEAR
 2144  012554  011004                            MOV     (R0),R4         ;READ THE BIT.
 2145  012556  001402                            BEQ     3$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR)
 2146  012560  005005                            CLR     R5              ;SET EXPECTED TO ZERO
 2147  012562  104002                            ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
 2148  012564                            3$:
 2149                                                ;************************ TEST 4 *******************************
 2150                                                ;*TEST TO VERIFY THAT BIT "MSENAB" CAN
 2151                                                ;*BE SET. THEN VERIFY THAT BIT "MSENAB" CAN
 2152                                                ;*BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
 2153                                                ;*VERIFY THAT AFTER BEING SET AGAIN IT CA↑BN BE
 2154                                                ;*CLEARED BY A "DEVICE CLEAR"
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                                        ;:*  TEST 4
                                        ;:*****************************************************************
012564  000004                        TST4:   SCOPE
012566  012737  000004  001122                MOV     #4,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012574  012737  012656  001360                MOV     #TST5,NEXT      ;POINT TO THE START OF THE NEXT TEST
012602  013700  002042                        MOV     DZCSR,R0        ;GET BASE ADDRESS
012606  012705  000040                        MOV     #MSENAB,R5      ;SET BIT
012612          010510                                MOV     R5,(R0)         ;SET SET IN DEVICE
012614  011004                                MOV     (R0),R4         ;READ THE BIT FROM DEVICE
012616  020504                                CMP     R5,R4           ;WAS BIT SET?
012620  001401                                BEQ     1$              ;BR IF YES
012622  104002                                ERROR   2               ;*BIT R/W FAILURE
012624  040510                        1$:     BIC     R5,(R0)         ;CLEAR THE BIT.
012626  011004                                MOV     (R0),R4         ;READ DEVICE
012630  001404                                BEQ     2$              ;BR IF BITS WERE CLEARED.
012632  010546                                MOV     R5,-(SP)        ;SAVE THE BIT
012634  005005                                CLR     R5              ;SET EXPECTED RESULTS TO 0
012636  104002                                ERROR   2               ;*BIT FAILED TO CLEAR
012640  012605                                MOV     (SP)+,R5        ;RESTORE THE BIT.
012642  010510                        2$:     MOV     R5,(R0)         ;SET THE BIT AGAIN
012644  104413                                DEVICE.CLR              ;ISSUE DEVICE CLEAR
012646  011004                                MOV     (R0),R4         ;READ THE BIT.
012650  001402                                BEQ     3$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR)
012652  005005                                CLR     R5              ;SET EXPECTED TO ZERO
012654  104002                                ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
012656                                  3$:
                                        ;************************ TEST 5 *******************************
                                        ;*TEST TO VERIFY THAT BIT "SILOEN" CAN
                                        ;*BE SET. THEN VERIFY THAT BIT "SILOEN" CAN
                                        ;*BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                                        ;*VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                                        ;*CLEARED BY A "DEVICE CLEAR"
                                        ;:*  TEST 5
                                        ;:*****************************************************************
012656  000004                        TST5:   SCOPE
012660  012737  000005  001122                MOV     #5,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
012666  012737  012750  001360                MOV     #TST6,NEXT      ;POINT TO THE START OF THE NEXT TEST
012674  013700  002042                        MOV     DZCSR,R0        ;GET BASE ADDRESS
012700  012705  010000                        MOV     #SILOEN,R5      ;SET BIT
012704  010510                                MOV     R5,(R0)         ;SET SET IN DEVICE
012706  011004                                MOV     (R0),R4         ;READ THE BIT FROM DEVICE
012710  020504                                CMP     R5,R4           ;WAS BIT SET?
012712  001401                                BEQ     1$              ;BR IF YES
012714  104002                                ERROR   2               ;*BIT R/W FAILURE
012716  040510                        1$:     BIC     R5,(R0)         ;CLEAR THE BIT.
012720  011004                                MOV     (R0),R4         ;READ DEVICE
012722  001404                                BEQ     2$              ;BR IF BITS WERE CLEARED.
012724  010546                                MOV     R5,-(SP)        ;SAVE THE BIT
012726  005005                                CLR     R5              ;SET EXPECTED RESULTS TO 0
012730  104002                                ERROR   2               ;*BIT FAILED TO CLEAR
012732  012605                                MOV     (SP)+,R5        ;RESTORE THE BIT.
012734  010510                        2$:     MOV     R5,(R0)         ;SET THE BIT AGAIN
012736  104413                                DEVICE.CLR              ;ISSUE DEVICE CLEAR
012740  011004                                MOV     (R0),R4         ;READ THE BIT.
012742  001402                                BEQ     3$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR)
012744  005005                                CLR     R5              ;SET EXPECTED TO ZERO
```

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                                        ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
                                3$:
                                        ;************************ TEST 6 ********************************
                                        ;*TEST TO VERIFY THAT BIT "RIE" CAN
                                        ;*BE SET. THEN VERIFY THAT BIT "RIE" CAN
                                        ;*BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                                        ;*VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                                        ;*CLEARED BY A "DEVICE CLEAR"
                                ;;*  TEST 6
                                ;;*************************************************************
                                TST6:   SCOPE
 012750  000004                        MOV     #6,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
 012752  012737  000006  001122        MOV     #TST7,NEXT      ;POINT TO THE START OF THE NEXT TEST
 012760  012737  013042  001360        MOV     DZCSR,R0        ;GET BASE ADDRESS
 012766  013700  002042                MOV     #RIE,R5 ;SET BIT
 012772  012705  000100                MOV     R5,(R0)         ;SET SET IN DEVICE
 012776  010510                        MOV     (R0),R4         ;READ THE BIT FROM DEVICE
 013000  011004                        CMP     R5,R4           ;WAS BIT SET?
 013002  020504                        BEQ     1$              ;BR IF YES
 013004  001401                        ERROR   2               ;*BIT R/W FAILURE
 013006  104002                1$:     BIC     R5,(R0)         ;CLEAR THE BIT.
 013010  040510                        MOV     (R0),R4         ;READ DEVICE
 013012  011004                        BEQ     2$              ;BR IF BITS WERE CLEARED.
 013014  001404                        MOV     R5,-(SP)        ;SAVE THE BIT
 013016  010546                        CLR     R5              ;SET EXPECTED RESULTS TO 0
 013020  005005                        ERROR   2               ;*BIT FAILED TO CLEAR
 013022  104002                        MOV     (SP)+,R5        ;RESTORE THE BIT.
 013024  012605                2$:     MOV     R5,(R0)         ;SET THE BIT AGAIN
 013026  010510                        DEVICE.CLR              ;ISSUE DEVICE CLEAR
 013030  104413                        MOV     (R0),R4         ;READ THE BIT.
 013032  011004                        BEQ     3$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR)
 013034  001402                        CLR     R5              ;SET EXPECTED TO ZERO
 013036  005005                        ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
 013040  104002                3$:
 013042                                 ;************************ TEST 7 ********************************
                                        ;*TEST TO VERIFY THAT BIT "TIE" CAN
                                        ;*BE SET. THEN VERIFY THAT BIT "TIE" CAN
                                        ;*BE CLEARED (WRITTEN TO A ZERO). AND FINALLY
                                        ;*VERIFY THAT AFTER BEING SET AGAIN IT CAN BE
                                        ;*CLEARED BY A "DEVICE CLEAR"
                                ;;*  TEST 7
                                ;;*************************************************************
 013042  000004                TST7:   SCOPE
 013044  012737  000007  001122        MOV     #7,$TSTNM       ;LOAD THE NUMBER OF THIS TEST
 013052  012737  013134  001360        MOV     #TST10,NEXT     ;POINT TO THE START OF THE NEXT TEST
 013060  013700  002042                MOV     DZCSR,R0        ;GET BASE ADDRESS
 013064  012705  040000                MOV     #TIE,R5 ;SET BIT
 013070  010510                        MOV     R5,(R0)         ;SET SET IN DEVICE
 013072  011004                        MOV     (R0),R4         ;READ THE BIT FROM DEVICE
 013074  020504                        CMP     R5,R4           ;WAS BIT SET?
 013076  001401                        BEQ     1$              ;BR IF YES
 013100  104002                        ERROR   2               ;*BIT R/W FAILURE
 013102  040510                1$:     BIC     R5,(R0)         ;CLEAR THE BIT.
 013104  011004                        MOV     (R0),R4         ;READ DEVICE
 013106  001404                        BEQ     2$              ;BR IF BITS WERE CLEARED.
 013110  010546                        MOV     R5,-(SP)        ;SAVE THE BIT
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2267  013112  005005                        CLR     R5              ;SET EXPECTED RESULTS TO 0
2268  013114  104002                        ERROR   2               ;*BIT FAILED TO CLEAR
2269  013116  012605                        MOV     (SP)+,R5        ;RESTORE THE BIT.
2270  013120  010510                2$:     MOV     R5,(R0)         ;SET THE BIT AGAIN
2271  013122  104413                        DEVICE.CLR              ;ISSUE DEVICE CLEAR
2272  013124  011004                        MOV     (R0),R4         ;READ THE BIT.
2273  013126  001402                        BEQ     3$              ;BR IF BIT CLEARED BY INIT (DEVICE CLEAR.
2274  013130  005005                        CLR     R5              ;SET EXPECTED TO ZERO
2275  013132  104002                        ERROR   2               ;*BIT NOT CLEARED BY DEVICE CLEAR
2276  013134                        3$:
2277                                        ;************************ TEST 10 *******************************
2278                                        ;*THIS TESTS THAT ALL OF THE FOLLOWING
2279                                        ;*BITS CAN BE: SET, CLEARED, CLEARED BY "DEVICE CLEAR "
2280                                        ;*BITS TESTED ARE:
2281                            *B          ;* TCR0, TCR1, TCR2, TCR3, TCR4, TCR5, TCR6, TCR7
2282                                ;:*  TEST 10
2283                                ;:***************************************************************
2284  013134  000004                TST10:  SCOPE
2285  013136  012737  000010  001122        MOV     #10,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2286  013144  012737  013272  001360        MOV     #TST11,NEXT     ;POINT TO THE START OF THE NEXT TEST
2287  013152  013700  002056                MOV     DZTCR,R0        ;SET DEVICE ADDRESS
2288  013156  012705  000001                MOV     #TCR0,R5        ;SET EXPECTED RESULTS
2289  013162  012737  013170  001362        MOV     #1$,LOCK        ;SET FOR SW09
2290  013170  010510                1$:     MOV     R5,(R0)         ;SET THE BIT
2291  013172  011004                        MOV!B   (R0),R4         ;READ THE BIT FROM THE DEVICE
2292  013174  042704  177400                BIC     #^C<377>,R4     ;CLEAR HIGH BYTE
2293  013200  020504                        CMP     R5,R4           ;WAS BIT OK?
2294  013202  001401                        BEQ     2$              ;BR IF YES
2295  013204  104002                        ERROR   2               ;*BIT FAILED TO SET.
2296  013206  040510                2$:     BIC     R5,(R0)         ;CLEAR THE BIT
2297  013210  011004                        MOV     (R0),R4         ;READ THE REGISTER
2298  013212  042704  177400                BIC     #^C<377>,R4     ;CLEAR HIGH BYTE
2299  013216  005704                        TST     R4              ;BITS CLEAR?
2300  013220  001404                        BEQ     3$              ;BR IF YES
2301  013222  010546                        MOV     R5,-(SP)        ;SAVE GOOD RESULTS
2302  013224  005005                        CLR     R5              ;SET EXPECTED TO 0
2303  013226  104002                        ERROR   2               ;*REPORT BIT NOT CLEAR
2304  013230  012605                        MOV     (SP)+,R5        ;RESTORE R5
2305  013232  010510                3$:     MOV     R5,(R0)         ;SET THE BIT AGAIN.
2306  013234  104413                        DEVICE.CLR              ;ISSUE DEVICE CLEAR
2307  013236  011004                        MOV     (R0),R4         ;READ THE REGISTER
2308  013240  042704  177400                BIC     #^C<377>,R4     ;CLEAR HIGH BYTE
2309  013244  005704                        TST     R4              ;BITS CLEAR?
2310  013246  001404                        BEQ     4$              ;BR IF YES
2311  013250  010546                        MOV     R5,-(SP)        ;SAVE GOOD RESULTS
2312  013252  005005                        CLR     R5              ;SET EXPECTED TO 0
2313  013254  104002                        ERROR   2               ;*REPORT BIT NOT CLEAR
2314  013256  012605                        MOV     (SP)+,R5        ;RESTORE R5
*B2315  013260  104401                4$:     SCOP1                   ;LOCK ON BIT? SET SW09=1
2316  013262  106305                        ASLB    R5              ;CHANGE TO NEXT BIT
2317  013264  001341                        BNE     1$              ;CONTINUE TESTING
2318  013266  005037  001362                CLR     LOCK            ;MAKE SURE TIGHT LOOP IS CLEANED UP
2319                                        ;************************ TEST 11 *******************************
2320                                        ;*THIS TESTS THAT ALL OF THE FOLLOWING
2321                                        ;*BITS CAN BE: SET, CLEARED, CLEARED BY "RESET INSTR *NOT* DEVICE CLEAR "
2322                                        ;*BITS TESTED ARE:
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2323                                            ;* DTR0, DTR1, DTR2, DTR3, DTR4, DTR5, DTR6, DTR7
2324                                            ;*THIS TEST IS NOT DONE IF MODULE IS 20MA VERSION
2325                                    ;:*  TEST 11
2326                                    ;:*****************************************************************
2327  013272  000004                    TST11:  SCOPE
2328  013274  012737  000011  001122            MOV     #11,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2329  013302  012737  013446  001360            MOV     #TST12,NEXT     ;POINT TO THE START OF THE NEXT TEST
2330  013310  013700  002056                    MOV     DZTCR,R0        ;SET DEVICE ADDRESS
2331  013314  012705  000400                    MOV     #DTR0,R5        ;SET EXPECTED RESULTS
2332  013320  012737  013336  001362            MOV     #1$,LOCK        ;SET FOR SW09
2333  013326  105737  001414                    TSTB    EIAFLG          ;20MA OR EIA
2334  013332  100001                            BPL     1$              ;BR IF EIA
2335  013334  104400                            ADVANCE                 ;EXIT TEST
2336  013336  010510                    1$:     MOV     R5,(R0)         ;SET THE BIT
2337  013340  011004                            MOV     (R0),R4         ;READ THE BIT FROM THE DEVICE
2338  013342  105004                            CLRB    R4              ;CLEAR LOW BYTE
2339  013344  020504                            CMP     R5,R4           ;WAS BIT OK?
2340  013346  001401                            BEQ     2$              ;BR IF YES
2341  013350  104002                            ERROR   2               ;*BIT FAILED TO SET.
2342  013352  040510                    2$:     BIC     R5,(R0)         ;CLEAR THE BIT
2343  013354  011004                            MOV     (R0),R4         ;READ THE REGISTER
2344  013356  105004                            CLRB    R4              ;CLEAR LOW BYTE
2345  ↑B013360        005704                            TST     R4                      ;BITS CLEAR?
2346  013362  001404                            BEQ     3$              ;BR IF YES
2347  013364  010546                            MOV     R5,-(SP)        ;SAVE GOOD RESULTS
2348  013366  005005                            CLR     R5              ;SET EXPECTED TO 0
2349  013370  104002                            ERROR   2               ;*REPORT BIT NOT CLEAR
2350  013372  012605                            MOV     (SP)+,R5        ;RESTORE R5
2351  013374  010510                    3$:     MOV     R5,(R0)         ;SET THE BIT AGAIN.
2352  013376  104413                            DEVICE.CLR              ;ISSUE DEVICE CLEAR
2353  013400  011004                            MOV     (R0),R4         ;READ THE REGISTER
2354  013402  105004                            CLRB    R4              ;CLEAR LOW BYTE
2355  013404  030510                            BIT     R5,(R0)         ;WAS BIT CLEARED BY DEVICE.CLR?
2356  013406  001001                            BNE     .+4             ;BR IF NO (IT↑B SHOULDN'T BE CLEAR)
2357  013410  104002                            ERROR   2               ;*BIT CLEARED BY DEVICE.CLR
2358  013412  000005                            RESET                   ;ISSUE A BUS INIT
2359  013414  011004                            MOV     (R0),R4         ;READ REGISTER
2360  013416  105004                            CLRB    R4              ;CLEAR LOW BYTE
2361  013420  005704                            TST     R4              ;BITS CLEAR?
2362  013422  001404                            BEQ     4$              ;BR IF YES
2363  013424  010546                            MOV     R5,-(SP)        ;SAVE GOOD RESULTS
2364  013426  005005                            CLR     R5              ;SET EXPECTED TO 0
2365  013430  104002                            ERROR   2               ;*REPORT BIT NOT CLEAR
2366  013432  012605                            MOV     (SP)+,R5        ;RESTORE R5
2367  013434  104401                    4$:     SCOP1                   ;LOCK ON BIT? SET SW09=1
2368  013436  106305                            ASLB    R5              ;CHANGE TO NEXT BIT
2369  013440  001336                            BNE     1$              ;CONTINUE TESTING
2370  013442  005037  001362                    CLR     LOCK            ;MAKE SURE TIGHT LOOP IS CLEANED UP
2371                                            ;************************ TEST 12 *********************************
2372                                            ;*THIS TEST PERFORMS RESET TESTING &
2373                                            ;*TESTING OF WRITE ONLY OR READ ONLY BIT
2374                                            ;* TEST BITS "RDONE, BIT11, BIT10, BIT9, BIT8, BIT2, BIT1
2375                                            ;*              BIT0, SILOAL" ARE READ ONLY AND THAT ↑RDY IS
2376                                            ;*              ZERO UNTIL A LINE IS SELECTED AND MSENAB IS SET.
2377                                            ;*
2378                                    ;:*  TEST 12
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2379                                    ;;*****************************************************************
2380  013446  000004                    ↑ST12:  SCOPE
2381  013450  012737  000012  001122            MOV     #12,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2382  013456  012737  013564  001360            MOV     #TST13,NEXT     ;POINT TO THE START OF THE NEXT TEST
2383  013464  013700  002042                    MOV     DZCSR,R0        ;SET ADDRESS TO R0
2384  013470  005005                            CLR     R5              ;SET EXPECTED TO 0
2385  013472  012710  027607                    MOV     #RDONE+BIT11+BIT10+BIT9+BIT8+BIT2+BIT1+BIT0+SILOAL,(R0)
2386                                                                     ;WRITE THE BITS
2387  ↑B013476        011004                            MOV     (R0),R4         ;READ BACK THE BITS
2388  013500  001401                            BEQ     1$              ;BR IF NONE ARE SET.
2389  013502  104002                            ERROR   2               ;*BITS WERE SET.
2390  013504  012710  100000            1$:     MOV     #TRDY,(R0)      ;ATTEMPT TO WRITE TRDY
2391  013510  011004                            MOV     (R0),R4         ;READ TRDY
2392  013512  001401                            BEQ     2$              ;BR IF NOT SET
2393  013514  104002                            ERROR   2               ;*
2394  013516  012705  100000            2$:     MOV     #TRDY,R5        ;SET EXPECTED BIT
2395  013522  005077  166324                    CLR     @DZLPR          ;LOAD LINE 0
2396  013526  052777  000001  166322            BIS     #TCRO,@DZTCR    ;SET TCR BIT
2397  013534  052710  000040                    BIS     #MSENAB,(R0)    ;
2398  013540  052705  000040                    BIS     #MSENAB,R5      ;SET SCAN ENABLE
2399  013544  005002                            CLR     R2              ;SET COUNTER TO ZERO
2400  013546  011004                    3$:     MOV     (R0),R4         ;READ THE REGISTER
2401  013550  020504                            CMP     R5,R4           ;BIT SET?
2402  013552  001404                            BEQ     4$              ;BR IF YES
2403  013554  104414                            DELAY                   ;STALL TIME
2404  013556  005202                            INC     R2              ;UPDATE COUNTER
2405  013560  001372                            BNE     3$              ;BR IF COUNTER NOT DONE.
2406  013562  104002                            ERROR   2               ;*TRDY NOT SET!
2407  013564                            4$:
2408                                            ;********************** TEST 13 ******************************
2409                                            ;*THIS TEST PERFORMS RESET TESTING AND
2410                                            ;*TESTING OF READ ONLY AND WRITE ONLY BITS
2↑B411                                              ;* IN REGISTER DZCSR
2412                                            ;*VERIFY THAT "TIE", "SILOEN", "RIE", "MSENAB", "MAINT"
2413                                            ;*ARE THE ONLY R/W BITS IN THE DZCSR.
2414                                            ;*THEN SET "DCLR" AND VERIFY THEY ARE CLEARED
2415                                    ;;*  TEST↑ 13
2416                                    ;;*****************************************************************
2417  013564  000004                    ↑ST13:  SCOPE
2418  013566  012737  000013  001122            MOV     #13,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2419  013574  012737  013650  001360            MOV     #TST14,NEXT     ;POINT TO THE START OF THE NEXT TEST
2420  013602  104413                            DEVICE.CLR
2421  013604  013700  002042                    MOV     DZCSR,R0        ;SET UP FOR ERROR MESSAGE
2422  01361↑B0        012710  177757                    MOV     #↑C<DCLR>,(R0)  ;TRY TO WRITE
2423  013614  012705  050150                    MOV     #TIE!SILOEN!RIE!MSENAB!MAINT,R5 ;MAKE EXPECTED
2424  013620  011004                            MOV     (R0),R4         ;ACTUAL
2425  013622  020405                            CMP     R4,R5           ;CMP EXPECTED VS ACTUAL
2426  013624  001401                            BEQ     1$              ;YES
2427  013626  104002                            ERROR   2               ;*NO
2428  013630  012705  000020            1$:     MOV     #DCLR,R5        ;EXPECTED...NOTE THAT DCLR REMAINS
2429                                                                     ;SET LONG ENOUGH TO READ IT....HOWEVER
2430                                                                     ;IF YOU EXAMINE THIS BIT IT SHOULD BE CLEAR.
2431  013634  052710  000020                    BIS     #DCLR,(R0)      ;DEVICE MASTER RESET
2432  013640  011004                            MOV     (R0),R4         ;ACTUAL
2433  013642  020405                            CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2434  013644  001401                            BEQ     2$              ;YES
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2435  013646  104002                        ERROR   2               ;*NO
2436  013650                          2$:
2437                                        ;************************ TEST 14 *******************************
2438                                        ;*THIS TEST PERFORMS RESET TESTING AND
2439                                        ;*TESTING OF READ ONLY REGISTER DZRBUF
2440                                        ;*AND TESTING OF WRITE ONLY REGISTER DZLPR
2441                                  ;;*  TEST 14
2442                                  ;;*****************************************************************B****
2443  013650  000004                  TST14:  SCOPE
2444  013652  012737  000014  001122          MOV     #14,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2445  013660  012737  013740  001360          MOV     #TST15,NEXT     ;POINT TO THE START OF THE NEXT TEST
2446  013666  104413                          DEVICE.CLR              ;CLEAR DZ11
2447  013670  013700  002046                  MOV     DZRBUF,R0               ;SET UP FOR ERROR MESSAGE
2448  013674  012777  177777  166150          MOV     #-1,@DZLPR      ;TRY TO WRITE ALL 1'S
2449  013702  011004                          MOV     (R0),R4         ;ACTUAL
2450  013704  010405                          MOV     R4,R5           ;MAKE EXPECTED
2451  013706  042705  104000                  BIC     #DVALID!BIT11,R5 ;DITTO
2452  013712  020405                          CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2453  013714  †B001401                        BEQ     1$                      ;IF YES,GO CONTINUE PROCESSING
2454  013716  104002                          ERROR   2               ;*ERROR- BIT PATTERN NOT CORRECT
2455  013720  010403                  1$:     MOV     R4,R3           ;GET A COPY OF THE ACTUAL BIT PATTERN
2456  013722  005103                          COM     R3              ;GET THE LOGICAL INVERSE OF THE BIT PATTERN
2457  013724  010377  166122                  MOV     R3,@DZLPR       ;TRY TO WRITE
2458  013730  011004                          MOV     (R0),R4         ;ACTUAL
2459  013732  020405                          CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2460  013734  001401                          BEQ     2$              ;IF YES, GET OUT OF THIS TEST
2461  013736  104002                          ERROR   2               ;*NO
2462  013740                          2$:
2463                                        ;************************ TEST 15 *******************************
2464                                        ;*THIS TEST PERFORMS RESET TESTING AND
2465                                        ;*TESTING OF READ ONLY REGISTER DZMSR
2466                                        ;*AND TESTING OF WRITE ONLY REGISTER DZTDR
2467                                  ;;*  TEST 15
2468                                  ;;*****************************************************************
2469  013740  000004                  TST15:  SCOPE
2470  013742  012737  000015  001122          MOV     #15,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2471  013750  012737  014024  001360          MOV     #TST16,NEXT     ;POINT TO THE START OF THE NEXT TEST
2472  013756  104413                          DEVICE.CLR              ;CLEAR DZ11
2473  013760  013700  002062                  MOV     DZMSR,R0                ;SET UP FOR ERROR MESSAGE
2474  013764  012777  177777  166074          MOV     #-1,@DZTDR      †B;TRY TO WRITE ALL 1'S
2475  013772  011004                          MOV     (R0),R4         ;ACTUAL
2476  013774  010405                          MOV     R4,R5           ;MAKE EXPECTED
2477  013776  020405                          CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2478  014000  001401                          BEQ     1$              ;IF YES,GO CONTINUE PROCESSING
2479  014002  104002                          ERROR   2               ;*ERROR- BIT PATTERN NOT CORRECT
2480  014004  010403                  1$:     MOV     R4,R3           ;GET A COPY OF THE ACTUAL BIT PATTERN
2481  014006  005103                          COM     R3              ;GET THE LOGICAL INVERSE OF THE BIT PATTERN
2482  014010  010377  166052                  MOV     R3,@DZTDR       ;TRY TO WRITE
2483  014014  011004                          MOV     (R0),R4         ;ACTUAL
2484  014016  020405                          CMP     R4,R5           ;CMP ACTUAL VS EXPECTED
2485  014†B020        001401                  BEQ     2$                      ;IF YES, GET OUT OF THIS TEST
2486  014022  104002                          ERROR   2               ;*NO
2487  014024                          2$:
2488
2489                                        ;************************ TEST 16 *******************************
2490                                        ;*VERIFY THAT IF WE ARE IN "STAGGERED" MODE
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```
                                        ;*THAT SETTING "DTR" FOR A LINE WILL
                                        ;*BRING UP "RING" AND "CARRIER" FOR THE
                                        ;*ASSOCIATED LINE IN WHICH WE ARE STAGGERED!
                                        ;* LINE0 DTR= LINE1 RING AND CARRIER
                                        ;* LINE1 DTR= LINE0 RING AND CARRIER
                                        ;* LINE2 DTR= LINE3 RING AND CARRIER
                                        ;* LINE3 DTR= LINE 4 RING AND CARRIER
                                        ;*              ETC...

                                    ;:*  TEST 16
                                    ;:*****************************************************************
014024  000004                      TST16:  SCOPE
014026  012737  000016  001122              MOV     #16,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
014034  012737  014214  001360              MOV     #TST17,NEXT     ;POINT TO THE START OF THE NEXT TEST
014042  012737  014114  001362              MOV     #1$,LOCK        ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELECTED
014050  105737  001414                      TSTB    EIAFLG          ;EIA OR 20MA?
014054  100001                      B2507:  BPL     10$             ;BR IF EIA
014056  104400                              ADVANCE                 ;EXIT TEST
014060  013700  002062              10$:    MOV     DZMSR,R0        ;SET REGISTER
014064  104413                              DEVICE.CLR              ;INIT DZ11
014066  005003                              CLR     R3              ;ZERO LINE NUMBER
014070  012702  000001                      MOV     #1,R2           ;SET POINTER
014074  005737  001370                      TST     MODE            ;ARE WE IN STAGGERED MODE?
014100  100405                              BMI     1$              ;YES WE ARE!
014102  013737  001360  001126              MOV     NEXT,$LPADR     ;LEAVE THIS TEST! NOT STAGGERED
014110  000177  165012                      JMP     @$LPADR         ;EXIT
014114  130237  001364              1$:     BITB    R2,LINE         ;TEST THIS LINE?
014120  0010B04                             BNE     3$                      ;YES
014122  005203                      2$:     INC     R3              ;LINE #
014124  106302                              ASLB    R2              ;GET NEXT LINE
014126  103372                              BCC     1$              ;KEEP TESTING
014130  104400                              ADVANCE                 ;ADVANCE THIS TEST
014132  010204                      3$:     MOV     R2,R4           ;SAVE BINARY BIT FOR LINE #
014134  032703  000001                      BIT     #BIT0,R3        ;GET STAGGERED COMPANION LINE
014140  001402                              BEQ     4$              ;BR IF LINE EVEN
014142  006204                              ASR     R4              ;ADJUST LINE
014144  000401                              BR      5$              ;
014146  006304                      4$:     ASL     R4              ;ADJUST LINE
014150  005005                      5$:     CLR     R5              ;SET EXPECTED
014152  150405                              BISB    R4,R5           ;
014154  000305                              SWAB    R5              ;
014156  150405                              BISB    R4,R5           ;
014160  150277  165674                      BISB    R2,@HDZTCR      ;SET DTR
014164  011004                              MOV     (R0),R4         ;READ MSR REGISTER
014166  020504                              CMP     R5,R4           ;OK?
014170  001401                              BEQ     6$              ;YES
014172  104002                              ERROR   2               ;*ERROR IN RING OR CARRIER
014174  140277  165660              6$:     BICB    R2,@HDZTCR      ;CLEAR DTR
014200  011004                              MOV     (R0),R4         ;READ MSR
014202  001402                              BEQ     7$              ;BR IF THEY CLEARED
014204  005005                              CLR     R5              ;SET EXPECTED TO 0
014206  104002                              ERROR   2               ;*BITS NOT CLEARED
014210  104401                      7$:     SCOP1                   ;LOCK ON SIGNAL?
014212  0B14212         000743              BR      2$                      ;CONTINUE TEST

                                        ;************************* TEST 17 *******************************
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```
                                        ;*TEST TO VERIFY THAT IF IN "EXTERNAL"
                                        ;*MODE; SETTING DTR FOR SELECTED LINES
                                        ;*WILL BRING UP "CARRIER" AND "RING"
                                        ;*FOR THAT SAME LINE. NOTE: IF YOU HAVE
                                        ;*SELECTED MODE AS "EXTERNAL", THE H325 TEST CONNECTER
                                        ;*MUST BE USED ON ALL SPECIFIED LINES.
                                        ;*LINES MAY BE SPECIFIED BY SWR03=1
                                        ;*AND SWR00=1 AT START TIME OR ALTERING
                                        ;*STATUS MAP.
                                ;:*  TEST 17
                                ;:*****************************************************************
014214  000004                  TST17:  SCOPE
014216  012737  000017  001122          MOV     #17,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
014224  012737  014352  001360          MOV     #TST20,NEXT     ;POINT TO THE START OF THE NEXT TEST
014232  012737  014266  001362          MOV     #3$,LOCK        ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELECTED
014240  105737  001370                  TSTB    MODE            ;EXTERNAL?
014244  100401                          BMI     2$              ;BR IF YES
014246  104400                  1$:     ADVANCE                 ;EXIT TEST
014250  105737  001414          2$:     TSTB    EIAFLG          ;YOU BETTER BE IN
014254  100774                          BMI     1$              ;EIA MODE FOR THIS TEST.
014256  013700  002062                  MOV     DZMSR,R0        ;SET REGISTER
014262  012702  000001                  MOV     #1,R2           ;SET LINE POINTER
014266  130237  001364          3$:     BITB    R2,LINE         ;LINE SELECTED?
014272  001003                          BNE     5$              ;BR IF YES
014274  106302                  4$:     ASLB    R2              ;NEXT LINE
014276  103373                          BCC     3$              ;CONTINUE TEST
014300  104400                          ADVANCE                 ;ADVANCE THIS TEST
014302  005005                  5$:     CLR     R5              ;SET EXPECTED
014304  150205                          BISB    R2,R5           ;
014306  000305                          SWAB    R5              ;B;
014310  150205                          BISB    R2,R5           ;
014312  150277  165542                  BISB    R2,@HDZTCR      ;SET DTR
014316  104414                          DELAY                   ;CABLE DELAY
014320  011004                          MOV     (R0),R4         ;READ MSR
014322  020504                          CMP     R5,R4           ;BITS OK?
014324  001401                          BEQ     6$              ;BR IF YES
014326  104002                          ERROR   2               ;CARRIER OR RING ERROR
014330  140277  165524          6$:     BICB    R2,@HDZTCR      ;CLEAR DTR
014334  104414                          DELAY                   ;CABLE DELAY
014336  011004                          MOV     (R0),R4         ;READ MSR
014340  001402                          BEQ     7$              ;BR IF BITS CLEARED
014342  005005                          CLR     R5              ;CLEAR EXPECTED LOC.
014344  104002                          ERROR   2               ;BITS NOT CLEARED.
014346  104401                  7$:     SCOP1                   ;LOCK ON LINE?
014350  000751                          BR      4$              ;CONTINUE TEST

                                        ;************************ TEST 20 ******************************
                                        ;* THIS TEST VERIFIES THAT TRDY IS SET WHEN A LINE
                                        ;* IS READY TO BE LOADED, AND THAT THE LINE SPECI-
                                        ;* FIED IN BITS 8-10 OF DZCSR CORRESPOND
                                        ;* TO THE LINE SELECTED IN DZTCR
                                ;:*  TEST 20
                                ;:*****************************************************************
014352  000004                  TST20:  SCOPE
014354  012737  000020  001122          MOV     #20,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
014362  012737  014466  001360          MOV     #TST21,NEXT     ;POINT TO THE START OF THE NEXT TEST
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2603  014370  104413                          DEVICE.CLR              ;ISSUE A "DEVICE CLEAR" (RESET)
2604  014372  013700  002042                  MOV     DZCSR,R0        ;SET POINTER
2605  014376  012705  100040                  MOV     #MSENAB!TRDY,R5 ;START THE EXPECTED LINE NUMBER AT 0
2606  014402  012702  000001                  MOV     #1,R2           ;USING R2 AS A BIT POINTER, POINT TO LINE 0
2607  014406  130237  001364          1$:     BITB    R2,LINE         ;IS THIS LINE SELECTED?
2608  014410  001412  001420                  BEQ     5$              ;IF NO, SKIP THE STARTUP
2609  014414  050277  165436          2$:     BIS     R2,@DZTCR       ;SET THE GO BIT FOR THIS LINE
2610  014420  052710  000040                  BIS     #MSENAB,(R0)    ;START THE SCANNER
2611  014424  005004                          CLR     R4              ;SET FOR DELAY
2612  014426  032710  100000          3$:     BIT     #TRDY,(R0)      ;TX READY?
2613  014432  001004                          BNE     4$              ;BR IF YES
2614  014434  104414                          DELAY                   ;DELAY
2615  014436  005204                          INC     R4              ;COUNTER
2616  014440  001372                          BNE     3$              ;BR IF <>0!
2617  014442  104002                          ERROR   2               ;*TX NOT READY!
2618  014444  011004                  4$:     MOV     (R0),R4         ;GET THE LINE POINTED TO BY THE SCANNER
2619  014446  020405                          CMP     R4,R5           ;IS!B THE LINE NUMBER WHAT IT SHOULD BE?
2620  014450  001401                          BEQ     5$              ;IF YES,GO WORK ON THE NEXT LINE
2621  014452  104002                          ERROR   2               ;*LINE NUMBER DID NOT MATCH TCR BIT
2622  014454  062705  000400          5$:     ADD     #400,R5         ;POINT TO THE NEXT EXPECTED LINE
2623  014460  104413                          DEVICE.CLR              ;ISSUE A "DEVICE CLEAR" (RESET)
2624  014462  106302                          ASLB    R2              ;POINT TO THE NEXT LINE.ARE ALL LINES TESTED?
2625  014464  103350                          BCC     1$              ;IF NOT, GO DO THE NEXT LINE
2626  014466                          6$:
2627                                          ;********************** TEST 21 ******************************
2628                                          ;*TEST TO TRANSMIT ONE CHAR AND
2629                                          ;*RECEIVE ONE CHAR ON ONE LINE
2630                                          ;*AT A TIME. THE CHAR IS "252" AND
2631                                          ;*ALL SELECTED LINES WILL BE TURNED ON
2632                                          ;*ONE AT A TIME. THIS IS THE FIRST TIME ANY
2633                                          ;*DATA IS CHECKED IN THE RECEIVER.
2634                                          ;*USING SWITCH NINE WITH THIS TEST CREATES A TIGHT SCOPE LOOP
2635                                          ;*WHICH TRANSMITS A STEADY STREAM OF CHARACTERS.
2636                                  ;;*  TEST 21
2637                                  ;;*************************************************************
2638  014466  000004                  TST21:  SCOPE
2639  014470  012737  000021  001122          MOV     #21,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2640  014476  012737  015002  001360          MOV     #TST22,NEXT     ;POINT TO !BTHE START OF THE NEXT TEST
2641  014504  012737  014760  001362          MOV     #16$,LOCK       ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELECTED
2642  014512  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
2643  014514  013701  001366                  MOV     PAR,R1          ;PICK UP PARAMETERS
2644  014520  012702  000001                  MOV     #1,R2           ;PICK UP INIT POINTER
2645  014524  030237  001364          1$:     BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
2646  014530  001402                          BEQ     2$              ;NO
2647  014532  010177  165314                  MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
2648  014536  005201                  2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
2649  014540  106302                          ASLB    R2              ;GOT 'EM ALL ?
2!B650  014542  103370                          BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
2651  014544  005037  001372                  CLR     SAVLIN          ;CLEAR LINE # INDICATOR
2652  014550  012702  000001                  MOV     #1,R2           ;LINE POINTER
2653  014554  052777  000040  165260          BIS     #MSENAB,@DZCSR  ;START SCANNER
2654  014562  030237  001364          3$:     BIT     R2,LINE         ;VALID LINE ?
2655  014566  001462                          BEQ     14$             ;NO SET UP NEXT LINE
2656  014570  010277  165262                  MOV     R2,@DZTCR       ;SET TCR BIT
2657  014574  032777  000200  165240  4$:     BIT     #RDONE,@DZCSR   ;IS REC DONE = 0 ?
2658  014602  001401                          BEQ     5$              ;IF YES, ALLOW TIME FOR TRDY TO SET
```

```
2659  014604  104020                          ERROR   20              ;*REC DONE SHOULD = 0
2660  014606  005005                  5$:     CLR     R5
2661  014610  032777  100000  165224  6$:     BIT     #TRDY,@DZCSR
2662  014616  001004                          BNE     7$
2663  014620  104414                          DELAY
2664  014622  105205                          INCB    R5
2665  014624  001371                          BNE     6$
2666  014626  104003                          ERROR   3               ;*TRDY FAILED TO SET!
2667  014630  112777  000252  165230  7$:     MOVB    #252,@DZTDR     ;LOAD CHARACTER
2668  014636  013705  001372                  MOV     SAVLIN,R5       ;MAKE EXPECTED LINE #
2669  014642  105737  001371                  TSTB    MODE+1          ;IS THIS TEST IN STAGGERED MODE?
2670  014646  001406                          BEQ     10$             ;IF NOT, SKIP STAGGERED SETUP
2671
2672                                          ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
2673
2674  014650  006205                          ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
2675  014652  103402                          BCS     8$              ;IF IT IS SET, GO CLEAR IT
2676  014654  000261                          SEC                     ;IF IT IS CLEAR SET IT HERE
2677  014656  000401                          BR      9$              ;SKIP THE CLEARING
2678  014660  000241                  8$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
2679  014662  006105                  9$:     ROL     R5              ;GET THE NEW BIT BACK INTO R5
2680  014664  000305                  10$:    SWAB    R5              ;MOVE THE LINE NUMBER TO THE UPPER BYTE
2681  014666  152705  000252                  BISB    #252,R5                 ;ADD CHARACTER
2682  014672  052705  100000                  BIS     #DVALID,R5      ;ADD DATA VALID
2683  014676  005003                          CLR     R3
2684  014700  032777  000200  165134  11$:    BIT     #RDONE,@DZCSR
2685  014706  001004                          BNE     12$
2686  014710  104414                          DELAY
2687  014712  105203                          INCB    R3
2688  014714  001371                          BNE     11$
2689  014716  104004                          ERROR   4               ;*RDONE FAILED TO SET!
2690  014720  017704  165122          12$:    MOV     @DZRBUF,R4      ;LOAD THE VALUE ACTUALLY RECEIVED
2691  014724  020405                          CMP     R4,R5           ;COMPARE ACTUAL VS EXPECTED. ARE THEY THE SAME?
2692  014726  001401                          BEQ     13$             ;IF YES, GO DO THE NEXT LINE
2693  014730  104006                          ERROR   6               ;*NO DATA/CONTENTS DID NOT COMPARE
2694  014732  104401                  13$:    SCOPI                   ;CHECK TO SEE IF SWITCH NINE IS SET
2695  014734  040277  165116          14$:    BIC     R2,@DZTCR       ;CLEAR TCR BIT FOR THAT LINE.
2696  014740  005237  001372          15$:    INC     SAVLIN          ;INC EXPECTED LINE
2697  014744  013700  001372                  MOV     SAVLIN,R0       ;SET UP CHARACTER OFFSET
2698  014750  006300                          ASL     R0              ;MAKE THE OFFSET A POWER OF TWO
2699  014752  106302                          ASLB    R2              ;SHIFT THE LINE POINTER. ARE WE ALL DONE?
2700  014754  103302                          BCC     3$              ;IF NO, GO AROUND AGAIN FOR NEXT LINE
2701  014756  104400                          ADVANCE                 ;GO TO NEXT TEST
2702
2703                                          ;TIGHT SCOPE LOOP FOR THIS TEST. LOOP TRANSMITS CHARACTERS ONLY
2704
2705  014760  032777  100000  165054  16$:    BIT     #TRDY,@DZCSR    ;IS TRANSMITTER READY?
2706  014766  001774                          BEQ     16$             ;IF NOT, WAIT FOR IT
2707  014770  112777  000252  165070          MOVB    #252,@DZTDR     ;LOAD THE CHARACTER
2708  014776  104401                          SCOPI                   ;LOOP AGIN IF SW09=1
2709  015000  000755                          BR      14$             ;OTHERWISE. GO PICK UP THE TEST NORMALLY
2710
2711                                          ;************************ TEST 62 ******************************
2712                                          ;* THIS TEST PROVES THAT THE TRANSMITTER TRANSMITS
2713                                          ;*CHARACTERS (FLAG MODE)AND THE RECEIVER RECEIVES (FLAG MODE)
2714                                          ;*(ONE LINE AT A TIME   BASED UPON VALID LINES)
```

```
2715                                            ;*THIS IS THE FIRST TIME THAT ALL DATA IS CHECKED
2716                                    ;:*  TEST 22
2717                                    ;:*****************************************************************
2718  015002  000004                    TST22:  SCOPE
2719  015004  012737  000022  001122            MOV     #22,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2720  015012  012737  015330  001360            MOV     #TST23,NEXT     ;POINT TO THE START OF THE NEXT TEST
2721  015020  012737  015134  001362            MOV     #4$,LOCK        ;USE THIS ADDRESS IF A TIGHT SCOPE LOOP IS SELECTED
2722  015026  104417                            DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
2723  015030  013701  001366                    MOV     PAR,R1          ;PICK UP PARAMETERS
2724  015034  012702  000001                    MOV     #1,R2           ;PICK UP INIT POINTER
2725  015040  030237  001364            1$:     BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
2726  015044  001402                            BEQ     2$              ;NO
2727  015046  010177  165000                    MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
2728  015052  005201                    2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
2729  015054  106302                            ASLB    R2              ;GOT 'EM ALL ?
2730  015056  103370                            BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
2731  015060  005037  001372                    CLR     SAVLIN          ;CLEAR LINE # INDICATOR
2732  015064  012700  001422                    MOV     #TDO,R0         ;POINT TO THE DATA AREA
2733  015070  005020                            CLR     (R0)+           ;CLEAR A DATA WORD
2734  015072  022700  001462                    CMP     #STOP,R0        ;FINISHED ?
2735  015076  001374                            BNE     .-6             ;NO
2736  015100  005000                            CLR     R0              ;CLEAR OFFSET
2737  015102  013737  002046  001400            MOV     DZRBUF,REGIST   ;SAVE FOR ERROR MSG
2738  015110  012702  000001                    MOV     #1,R2           ;LINE POINTER
2739  015114  052777  000040  164720            BIS     #MSENAB,@DZCSR  ;START SCANNER
2740  015122  030237  001364            3$:     BIT     R2,LINE         ;VALID LINE ?
2741  015126  001465                            BEQ     14$             ;NO SET UP NEXT LINE
2742  015130  010277  164722                    MOV     R2,@DZTC+BR     ;SET TCR BIT
2743  015134  032777  000200  164700    4$:     BIT     #RDONE,@DZCSR   ;IS REC DONE = 0 ?
2744  015142  001401                            BEQ     5$              ;IF YES, ALLOW TIME FOR TRDY TO SET
2745  015144  104020                            ERROR   20              ;*REC DONE SHOULD = 0
2746  015146  005005                    5$:     CLR     R5
2747  015150  032777  100000  164664    6$:     BIT     #TRDY,@DZCSR
2748  015156  001004                            BNE     7$
2749  015160  104414                            DELAY
2750  015162  105205                            INCB    R5
2751  015164  001371                            BNE     6$
2752  015166  104003                            ERROR   3               ;*TRDY FAILED TO SET!
2753  015170  116077  001422  164670    7$:     MOVB    TDO(R0),@DZTDR  ;LOAD CHARACTER
2754  015176  013705  001372                    MOV     SAVLIN,R5       ;MAKE EXPECTED LINE #
2755  015202  105737  001371                    TSTB    MODE+1          ;IS THIS TEST IN STAGGERED MODE?
2756  015206  001406                            BEQ     10$             ;IF NOT, SKIP STAGGERED SETUP
2757
2758                                            ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
2759
2760  015210  006205                            ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
2761  015212  103402                            BCS     8$              ;IF IT IS SET, GO CLEAR IT
2762  015214  000261                            SEC                     ;IF IT IS CLEAR SET IT HERE
2763  015216  000401                            BR      9$              ;SKIP THE CLEARING
2764  015220  000241                    8$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
2765  015222  006105                    9$:     ROL     R5              ;GET THE NEW BIT BACK INTO R5
2766  015224  000305                    10$:    SWAB+B  R5              ;MOVE THE LINE NUMBER TO THE UPPER BYTE
2767  015226  156005  001422                    BISB    TDO(R0),R5      ;ADD CHARACTER
2768  015232  052705  100000                    BIS     #DVALID,R5      ;ADD DATA VALID
2769  015236  005003                            CLR     R3
2770  015240  032777  000200  164574    11$:    BIT     #RDONE,@DZCSR
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2771  015246  001004                          BNE     12$
2772  015250  104414                          DELAY
2773  015252  005204                          INC     R4
2774  015254  001371                          BNE     11$
2775  015256  104004                          ERROR   4                       ;*RDONE FAILED TO SET!
2776  015260  017704  164562          12$:    MOVB    @DZRBUF,R4              ;LOAD THE VALUE ACTUALLY RECEIVED
2777  015264  020405                          CMP     R4,R5                   ;COMPARE ACTUAL VS EXPECTED. ARE THEY THE SAME?
2778  015266  001401                          BEQ     13$                     ;IF YES, GO DO THE NEXT LINE
2779  015270  104006                          ERROR   6                       ;*NO DATA/CONTENTS DID NOT COMPARE
2780  015272  104401                  13$:    SCOPE                           ;CHECK TO SEE IF SWITCH NINE IS SET
2781  015274  105260  001422                  INCB    TDO(R0)                 ;INCREMENT BINARY PATTERN FOR THIS LINE
2782  015300  001315                          BNE     4$                      ;GO 'ROUND AGAIN FOR NEXT CHARACTER
2783  015302  040277  164550          14$:    BIC     R2,@DZTCR               ;CLEAR TCR BIT FOR THAT LINE.
2784  015306  005237  001372          15$:    INC     SAVLIN                  ;INC EXPECTED LINE
2785  015312  013700  001372                  MOV     SAVLIN,R0               ;SET UP CHARACTER OFFSET
2786  015316  006300                          ASL     R0                      ;MAKE THE OFFSET A POWER OF TWO
2787  015320  106302                          ASLB    R2                      ;SHIFT THE LINE POINTER. ARE WE ALL DONE?
2788  015322  103277                          BCC     3$                      ;IF NO, GO AROUND AGAIN FOR NEXT LINE
2789  015324  005037  001362                  CLR     LOCK                    ;MAKE SURE LOCK IS CLEAR FOR NEXT TEST
2790
2791
2792                                          ;********************** TEST 23 ******************************
2793                                          ;*THIS TEST WILL PROVE THAT:
2794                                          ;* 1) THE TRANSMITTER "BREAK BIT" WORKS
2795                                          ;* 2) THE RECEIVER CAN FLAG "FRAMING ERRORS"
2796                                          ;* 3) THE RECEIVER CAN'T FLAG "PARITY ERRORS"
2797                                          ;*ONLY ONE LINE AT A TIME WILL BE EXERCISED.
2798                                          ;*THIS TEST WILL NOT BE  EXERCISED UNLESS
2799                                          ;*CONNECTED BY EXTERNAL PLUG.
2800                                  ;;*  TEST 23
2801                                  ;;*************************************************************
2802  015330  000004                  TST23:  SCOPE
2803  015332  012737  000023  001122          MOV     #23,$TSTNM              ;LOAD THE NUMBER OF THIS TEST
2804  015340  012737  015606  001360          MOV     #TST24,NEXT             ;POINT TO THE START OF THE NEXT TEST
2805  015346  012737  015444  001362          MOV     #3$,LOCK                ;SET FOR LOOP
2806  015354  005737  001370                  TST     MODE                    ;ARE WE RUNNING IN INTERNAL MODE?
2807  015?8360        001510                  BEQ     12$                     ;IF SO, SKIP THIS TEST
2808  015362  104417                          DCLASM                          ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
2809  015364  013701  001366                  MOV     PAR,R1                  ;PICK UP PARAMETERS
2810  015370  052701  000300                  BIS     #ODDPAR!PARITY,R1       ;FORCE ODD PARITY
2811  015374  012700  000001                  MOV     #1,R0                   ;PICK UP INIT POINTER
2812  015400  030037  001364          1$:     BIT     R0,LINE                 ;SHOULD THIS LINE BE SET UP ?
2813  015404  001402                          BEQ     2$                      ;IF NOT,DON'T SET IT UP
2814  015406  010177  164440                  MOV     R1,@DZLPR               ;OTHERWISE, SET UP LINE PARAMETERS
2815  015412  005201                  2$:     INC     R1
2816  015414  106300                          ASLB    R0                      ;GOT 'EM ALL ?
2817  015416  103370                          BCC     1$                      ;NO
2818  015420  005037  001372                  CLR     SAVLIN                  ;CLEAR LINE #
2819  015424  012702  000001                  MOV     #1,R2                   ;LINE POINTER
2820  015430  052777  000040  164404          BIS     #MSENAB,@DZCSR          ;SET MASTER SCAN ENABLE
2821  015436  013737  002046  001400          MOV     DZRBUF,REGIST           ;SAVE FOR ERRR MESSAGE
2822  015444  030237  001364          3$:     BIT     R2,LINE
2823  015450  001443                          BEQ     10$
2824  015452  010277  164400                  MOV     R2,@DZTCR               ;SET TCR BIT
2825  015456  110277  164406                  MOVB    R2,@DZTDR               ;SET BREAK BIT
2826  015462  112777  000377  164376  4$:     MOVB    #377,@DZTDR             ;LOAD CHARACTER
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2827  015470  013705  001372                  MOV     SAVLIN,R5       ;MAKE EXPECTED DATA
2828  015474  105737  001371                  TSTB    MODE+1          ;IS THIS TEST IN STAGGERED MODE?
2829  015500  001406                          BEQ     7$              ;IF NOT, SKIP STAGGERED SETUP
2830
2831                                          ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
2832
2833  015502  006205                          ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
2834  015504  103402                          BCS     5$              ;IF IT IS SET, GO CLEAR IT
2835  015506  000261                          SEC                     ;IF IT IS CLEAR SET IT HERE
2836  015510  000401                          BR      6$              ;SKIP THE CLEARING
2837  015512  000241                  5$:     CLC                     ;CLEâ†BAR THE CARRY BIT (INVERSION OF LINE PARITY)
2838  015514  006105                  6$:     ROL     R5              ;GET THE NEW BIT BACK INTO R5
2839  015516  000305                  7$:     SWAB    R5              ;PUT LINE NUMBER IN UPPER BYTE
2840  015520  052705  130000                  BIS     #DVALID!PARER!FRMERR,R5 ;ADD EXPECTED
2841  015524  005004                          CLR     R4
2842  015526  032777  000200  164306  8$:     BIT     #RDONE,@DZCSR
2843  015534  001004                          BNE     9$
2844  015536  104414                          DELAY
2845  015540  005204                          INC     R4
2846  015542  001371                          BNE     8$
2847  015544  104004                          ERROR   4               ;*RDONE FAILED TO SET!
2848  015546  017704  164274          9$:     MOV     @DZRBUF,R4      ;ACTUAL
2849  015552  020405                          CMP     R4,R5           ;CMP ACTUAL VS EXPECTED. DO THEY MATCH?
2850  015554  001401                          BEQ     10$             ;IF YES, GO CLEAN UP
2851  015556  104006                          ERROR   6               ;*DATA/CONTENTS FAILED TO COMPARE
2852  015560  105077  164304          10$:    CLRB    @#DZTDR         ;CLEAR BREAK BITS
2853  015564  104401                          SCOP1                   ;LOOP?
2854  015566  005237  001372          11$:    INC     SAVLIN          ;INC LINE #
2855  015572  040277  164260                  BIC     R2,@DZTCR       ;CLEAR TCR BIT
2856  015576  106302                          ASLB    R2
2857  015600  103321                          BCC     3$
2858  015602  005037  001362          12$:    CLR     LOCK            ;MAKE SURE LOCK IS CLEAR FOR NEXT TEST
2859                                          ;************************ TEST 24 ******************************
2860                                          ;* THIS TEST VERIFIES THAT THE DEâ†BVICE DOES NOT INTERRUPT
2861                                          ;*WHILE THE PROCESSOR STATUS IS SET EXACTLY
2862                                          ;*TO WHAT THE DZ11 PRIORITY IS SET TO.
2863                                          ;*DEFAULT PRIORITY IS AT  5 (240).
2864                                  ;;*  TESTâ† 24
2865                                  ;;**************************************************************
2866  015606  000004                  â†ST24:  SCOPE
2867  015610  012737  000024  001122          MOV     #24,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
2868  015616  012737  016114  001360          MOV     #TSâ†25,NEXT     ;POINT TO THE START OF THE NEXT TE
2869  015624  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF
2870  015626  013701  001366                  MOV     PAR,R1          ;PICK UP PARAMETERS
2871  â†B015632        012702  000001                  MOV     #1,R2           ;PICK UP INIT POINTER
2872  015636  030237  001364          1$:     BIT     R2,LINE         ;SHOULD â†HIS LINE BE SET UP ?
2873  015642  001402                          BEQ     2$              ;NO
2874  015644  010177  164202                  MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
2875  015650  005201                  2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
2876  015652  106302                          ASLB    R2              ;GOT 'EM ALL ?
2877  015654  103370                          BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
2878  015656  005037  001372                  CLR     SAVLIN          ;CLEAR LINE # INDICATOR
2879  015662  106437  026216                  MTPS    @#DZPRT         ;SET CPU STATUS TO DZ11 PRIO,
2880  015666  113777  001364  164162          MOVB    LINE,@DZTCR     ;ENABLE THE VALID LINES
2881  015674                          3$:
2882  015674  012777  015762  164174          MOV     #6$,@DZTIV      ;SET UP THE TRANSMITTER INTERRUPT VECTOR
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 2883  015702  012777  015770  164162          MOV     #7$,@DZRIV      ;SET UP THE RECEIVER INTERRUPT VECTOR
 2884  015710  013777  026216  164156          MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATLS
 2885  015716  013777  026216  164154          MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
 2886  015724  052777  040040  164110          BIS     #TIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
 2887  015732  005005                          CLR     R5
 2888  015734  032777  100000  164100  4$:     BIT     #TRDY,@DZCSR
 2889  015742  001403                          BEQ     5$
 2890  015744  000240                          NOP
 2891  015746  000240                          NOP
 2892  015750  000411                          BR      8$
 2893  015752  104414                  5$:     DELAY
 2894  015754  005205                          INC     R5
 2895  015756  001366                          BNE     4$
 2896  015760  104003                          ERROR   3               ;*TRDY NOT SET!
 2897  015762  104010                  6$:     ERROR   10              ;*TRANSMITTER SHOULD NOT INTERRUPT
 2898  015764  022626                          CMP     (SP)+,(SP)+     ;POP FOR FAKE RTI
 2899  015766  000402                          BR      8$              ;CONTINUE TEST
 2900  015770  104012                  7$:     ERROR   12              ;*RECEIVER SHOULD NOT INTERRUPT
 2901  015772  022626                          CMP     (SP)+,(SP)+     ;POP FOR ↑BFAKE RTI
 2902  015774  042777  040000  164040  8$:     BIC     #TIE,@DZCSR     ;RESET TRANSMITTER INTERRUPT ENABLE
 2903  016002  113777  001422  164056          MOVB    TDO,@DZTDR      ;PUT ANY RANDOM CHARACTER IN TRANSMITTER BUFFER
 2904  016010  012777  016100  164060          MOV     #11$,@DZTIV     ;SET UP THE TRANSMITTER INTERRUPT VECTOR
 2905  016016  012777  016106  164046          MOV     #12$,@DZRIV     ;SET UP THE RECEIVER INTERRUPT VECTOR
 2906  016024  013777  026216  164042          MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATUS
 2907  016032  013777  026216  164040          MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
 2908  016040  052777  000140  163774          BIS     #RIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
 2909  016046  005005                          CLR     R5
 2910  016050  032777  000200  163764  9$:     BIT     #RDONE,@DZCSR
 2911  016056  001403                          BEQ     10$
 2912  016060  000240                          NOP
 2913  016062  000240                          NOP
 2914  016064  000412                          BR      13$
 2915  016066  104414                  10$:    DELAY
 2916  016070  005205                          INC     R5
 2917  016072  001366                          BNE     9$
 2918  016074  104004                          ERROR   4               ;*NO RX DONE! (NOT SET)
 2919  016076  000405                          BR      13$             ;CONTINUE TEST
 2920  016100  104010                  11$:    ERROR   10              ;*TRANSMITTER SHOULD NOT INTERRUPT
 2921  016102  022626                          CMP     (SP)+,(SP)+     ;POP FOR FAKE RTI
 2922  016104  000402                          BR      13$             ;CONT TEST
 2923  016106  104012                  12$:    ERROR   12              ;*R↑BECEIVER SHOULD NOT INTERRUPT
 2924  016110  022626                          CMP     (SP)+,(SP)+     ;POP FOR FAKE RTI
 2925  016112                          13$:
 2926  016112  104413                          DEVICE.CLR              ;ISSUE DEVICE CLEAR (RESET)
 2927                                          ;************************ TEST 25 ******************************
 2928                                          ;* THIS TEST VERIFIES THAT THE DEVICE DOES INTERRUPT
 2929                                          ;*WHILE THE PROCESSOR STATUS IS SET TO EXACTLY
 2930                                          ;*ONE LEVEL LOWER THAN THE DZ11. DZ11 PRIORITY
 2931                                          ;*DEFAULT TO LEVEL 5 MINUS ONE LEVEL IS LEVEL 4.
 2932                                  ;;*  TEST 25
 2933                                  ;;*************************************************************
 2934  016114  000004                  TST25:  SCOP↑BE
 2935  016116  012737  000025  001122          MOV     #25,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
 2936  016124  012737  016450  001360          MOV     #TST26,NEXT     ;POINT TO THE START OF THE NEXT TEST
 2937  016132  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
 2938  016134  013701  001366                  MOV     PAR,R1          ;PICk UP PARAMETERS
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```
 2939  016140  012702  000001                    MOV     #1,R2           ;PICK UP INIT POINTER
 2940  016144  030237  001364          1$:       BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
 2941  016150  001402                             BEQ     2$              ;NO
 2942  016152  010177  163674                    MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
 2943  016156  005201                    2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
 2944  016160  106302                             ASLB    R2              ;GOT 'EM ALL ?
 2945  016162  103370                             BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
 2946  016164  005037  001372                    CLR     SAVLIN          ;CLEAR LINE # INDICATOR
 2947  016170  106437  026216                    MTPS    @#DZPRT         ;SET CPU STATUS TO DZ11 PRIO,
 2948  016174  106437  026220                    MTPS    @#LESS1         ;MAKE CPU ONE LEVEL LOWER THAN DZ11
 2949  016200  113777  001364  163650            MOVB    LINE,@DZTCR     ;ENABLE THE VALID LINES
 2950  016206                            3$:
 2951  016206  012777  016276  163662            MOV     #6$,@DZTIV      ;SET UP THE TRANSMITTER INTERRUPT VECTOR
 2952  016214  012777  016320  163650            MOV     #7$,@DZRIV      ;SET UP THE RECEIVER INTERRUPT VECTOR
 2953  016222  013777  026216  163644            MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATUS
 2954  016230  013777  026216  163642            MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
 2955  016236  052777  040040  163576            BIS     #TIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
 2956  016244  005005                             CLR     R5
 2957  016246  032777  100000  163566  4$:       BIT     #TRDY,@DZCSR
 2958  016254  001404                             BEQ     5$
 2959  016256  000240                             NOP
 2960  016260  000240                             NOP
 2961  016262  104007                             ERROR   7               ;*TRANSMITTER FAILED TO INTERRUPT
 2962  ↑B016264        000417                     BR      8$
 2963  016266  104414                    5$:     DELAY
 2964  016270  005205                             INC     R5
 2965  016272  001365                             BNE     4$
 2966  016274  104003                             ERROR   3               ;*TRDY NOT SET!
 2967  016276  022626                    6$:     POP2SP                  ;REMOVE THE INTERRUPT FROM THE STACK
 2968  016300  042777  040000  163534            BIC     #TIE,@DZCSR     ;DON'T LET ANY MORE INTERRUPTS OCCUR
 2969  016306  106437  026216                    MTPS    @#DZPRT         ;SET CPU STATUS TO DZ11 PRIORITY
 2970  016312  106437  026220                    MTPS    @#LESS1         ;MAKE CPU ONE LEVEL LOWER THAN DZ11
 2971  016316  000402                             BR      8$              ;RETURN TO THE NORMAL FLOW
 2972  016320  104012                    7$:     ERROR   12              ;*RECEIVER SHOULD NOT INTERRUPT
 2973  016322  022626                             CMP     (SP)+,(SP)+     ;POP FOR FAKE RTI
 2974  016324  042777  040000  163510  8$:       BIC     #TIE,@DZCSR     ;RESET TRANSMITTER INTERRUPT ENABLE
 2975  016332  113777  001422  163526            MOVB    TDO,@DZTDR      ;PUT ANY RANDOM CHARACTER IN TRANSMITTER BUFFER
 2976  016340  012777  016432  163530            MOV     #11$,@DZTIV     ;SET UP THE TRANSMITTER INTERRUPT VECTOR
 2977  016346  012777  016440  163516            MOV     #12$,@DZRIV     ;SET UP THE RECEIVER INTERRUPT VECTOR
 2978  016354  013777  026216  163512            MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATUS
 2979  016362  013777  026216  163510            MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
 2980  016370  052777  000140  163444            BIS     #R↑BIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
 2981  016376  005005                             CLR     R5
 2982  016400  032777  000200  163434  9$:       BIT     #RDONE,@DZCSR
 2983  016406  001404                             BEQ     10$
 2984  016410  000240                             NOP
 2985  016412  000240                             NOP
 2986  016414  104011                             ERROR   11              ;*RECEIVER FAILED TO INTERRUPT
 2987  016416  000413                             BR      13$
 2988  016420  104414                    10$:    DELAY
 2989  016422  005205                             INC     R5
 2990  016424  001365                             BNE     9$
 2991  016426  104004                             ERROR   4               ;*NO RX DONE! (NOT SET)
 2992  016430  000406                             BR      13$             ;CONTINUE TEST
 2993  016432  104010                    11$:    ERROR   10              ;*TRANSMITTER SHOULD NOT INTERRUPT
 2994  016434  022626                             CMP     (SP)+,(SP)+     ;POP ↑BFOR FAKE RTI
```

```
2995  016436  000403                          BR      13$             ;CONT TEST
2996  016440  022626                  12$:    POP2SP                  ;REMOVE THE INTERRUPT FROM THE STACK
2997  016442  005077  163374                  CLR     @DZCSR          ;DON'T ALLOW ANY MORE INTERRUPTS
2998  016446                          13$:
2999  016446  104413                          DEVICE.CLR              ;ISSUE DEVICE CLEAR (RESET)
3000
3001                                          ;************************ TEST 26 *******************************
3002                                          ;*THIS TEST VERIFIES THAT THE RECEIVER WILL
3003                                          ;*INTERRUPT BEFORE THE TRANSMITTER EVEN
3004                                          ;*THOUGH THE TRANSMITTER WAS ENABLED
3005                                          ;*FIRST.  SET PS TO LEVEL 7;
3006                                          ;*GET RDONE AND TRDY TO SET;
3007                                          ;*SET TX IE AND RX IE;
3008                                          ;*CLEAR PS AND EXPECT RX TO INTERRUPT FIRST
3009                                  ;;*  TEST 26
3010                                  ;;*************************************************************
3011  016450  000004                  TST26:  SCOPE
3012  016452  012737  000026  001122          MOV     #26,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
3013  016460  012737  017102  001360          MOV     #TST27,NEXT     ;POINT TO THE START OF THE NEXT TEST
3014  016466  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
3015  01647↑B0        013701  001366                  MOV     PAR,R1          ;PICK UP PARAMETERS
3016  016474  012702  000001                  MOV     #1,R2           ;PICK UP INIT POINTER
3017  016500  030237  001364          1$:     BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
3018  016504  001402                          BEQ     2$              ;NO
3019  016506  010177  163340                  MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
3020  016512  005201                  2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
3021  016514  106302                          ASLB    R2              ;GOT 'EM ALL ?
3022  016516  103370                          BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
3023  016520  005037  001372                  CLR     SAVLIN          ;CLEAR LINE # INDICATOR
3024  016524  012777  016754  163340          MOV     #8$,@DZRIV      ;SETUP INTERRUPT STUFF
3025  016532  01↑B13777        026216  163334          MOV     DZPRT,@DZRIS    ;
3026  016540  012777  017044  163330          MOV     #12$,@DZTIV     ;
3027  016546  013777  026216  163324          MOV     DZPRT,@DZTIS    ;
3028  016554  052777  000040  163260          BIS     #MSENAB,@DZCSR
3029  016562  012702  000001                  MOV     #1,R2           ;LINE POINTER
3030  016566  030237  001364          3$:     BIT     R2,LINE         ;VALID LINE ?
3031  016572  001004                          BNE     4$
3032  016574  005237  001372                  INC     SAVLIN
3033  016600  106302                          ASLB    R2
3034  016602  000771                          BR      3$
3035  016604  106427  000340          4$:     MTPS    #PR7
3036  016610  000240                          NOP
3037  016612  000240                          NOP
3038  016614  110277  163236                  MOVB    R2,@DZTCR       ;SET TCR BIT
3039  016620  005777  163222                  TST     @DZRBUF         ;VALID DATA?
3040  016624  100001                          BPL     .+4             ;IT BETTER NOT BE SET
3041  016626  104017                          ERROR   17              ;DATA VALID SHOULD NOT BE SET
3042  016630  105777  163206          5$:     TSTB    @DZCSR          ;RECEIVER DONE ?
3043  016634  100001                          BPL     .+4
3044  016636  104020                          ERROR   20              ;RECEIVER DONE BIT SHOULD NOT BE SET
3045  016640  005005                          CLR     R5
3046  016642  005004                          CLR     R4
3047  016644  005777  163172          99$:    TST     @DZCSR          ;WAIT FOR TRDY
3048  016650  100404                          BMI     100$            ;BR IF READY
3049  016652  104414                          DELAY                   ;STALL TIME
3050  016654  005204                          INC     R4              ;
```

```
 3051  016656  001372                          BNE     99$
 3052  016660  104003                          ERROR   3               ;TRDY FAILED TO SET
 3053  016662  105077  163200          100$:   CLRB    @DZTDR
 3054  016666  005004                          CLR     R4
 3055  016670  032777  000200  163144  6$:     BIT     #RDONE,@DZCSR
 3056  016676  001004                          BNE     7$
 3057  016700  104414                          DELAY
 3058  016702  005204                          INC     R4
 3059  016704  001371                          BNE     6$
 3060  016706  104004                          ERROR   4               ;*RDONE FAILED TO SET!
 3061  016710  005777  163126          7$:     TST     @DZCSR          ;TRANS DONE BIT = 1 ?
 3062  016714  100401                          BMI     .+4             ;YES
 3063  016716  104003  ↑B                      ERROR   3               ;*NO   TRANS DONE FAILED TO SET
 3064                                          ;NOW THAT BOTH TRANSMITTER AND RECEIVER DONE BIT =1
 3065                                          ;SET INTERRUPT ENABLES AND WATCH THE FUR FLY
 3065  016720  052777  040000  163114          BIS     #TIE,@DZCSR
 3067  016726  052777  000100  163106          BIS     #RIE,@DZCSR
 3068  016734  106427  000000                  MTPS    #0
 3069  016740  000240                          NOP
 3070  016742  000240                          NOP
 3071  016744  104007                          ERROR   7               ;*TRANSMITTER FAILED TO INTERRUPT
 3072  016746  104011                          ERROR   11              ;*RECEIVER FAILED TO INTERRUPT
 3073                                          ;CHECK BR LEVEL
 3074  016750  000137  017050                  JMP     13$     ;GET OUT
 3075
 3076                                          ;RECEIVER INTERRUPT ROUTINE
 3077  016754  017704  163066          8$:     MOV     @DZRBUF,R4              ;ACTUAL
 3078  016760  010403                          MOV     R4,R3
 3079  016762  000303                          SWAB    R3
 3080  016764  042703  177770                  BIC     #↑C<7>,R3       ;STRIP JUNK
 3081  016770  105737  001371                  TSTB    MODE+1          ;IS THIS TEST IN STAGGERED MODE?
 3082  016774  001406                          BEQ     11$             ;IF NOT, SKIP STAGGERED SETUP
 3083
 3084                                          ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
 3085
 3086  016776  006203                          ASR     R3              ;GET THE LAST BIT INTO THE CARRY BIT
 3087  017000  103402                          BCS     9$              ;IF IT IS SET, GO CLEAR IT
 3088  017002  000261                          SEC                     ;IF IT IS CLEAR SET IT HERE
 3089  017004  000401                          BR      10$             ;SKIP THE CLEARING
↑B 3090         017006  000241          9$:     CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
 3091  017010  006103                  10$:    ROL     R3              ;GET THE NEW BIT BACK INTO R3
 3092  017012  020337  001372          11$:    CMP     R3,SAVLIN       ;IS THIS A VALID LINE
 3093  017016  001401                          BEQ     .+4             ;YES
 3094  017020  104015                          ERROR   15              ;*INVALID LINE
 3095  017022  042704  177400                  BIC     #↑C<377>,R4     ;STRIP JUNK
 3096  017026  120504                          CMPB    R5,R4           ;DATA COMPARE ?
 3097  017030  001401                          BEQ     .+4             ;YES
 3098  017032  104005                          ERROR   5               ;*DATA DOES NOT COMPARE
 3099  017034  040277  163016                  BIC     R2,@DZTCR       ;CLEAR TCR BIT
 3100  017040  022626                          POP2SP                  ;REMOVE HE INTERRUPT VECTOR F↑BROM THE STACK
 3101  017042  000402                          BR      13$             ;GO GET OUT OF INTERRUPT MODE
 3102                                          ;TRANSMITTER INTERRUPT SVC ROUTINE
 3103  017044  104011                  12$:    ERROR   11              ;THE RECEIVER INTERRUPT FAILED
 3104                                          ;TO OVERRIDE THE TRANSMITTER
 3105  017046  022626                          POP2SP                  ;REMOVE THE INTERRUPT VECTOR FROM THE STACK
 3106  017050  042777  040100  162764  13$:    BIC     #TIE!RIE,@DZCSR ;CLEAR INTERRUPT ENABLES
```

```
3107  017056  013777  002074  163006          MOV     DZRIS,@DZRIV    ;RESTORE TRAPCATCHER
3108  017064  005077  163004                  CLR     @DZRIS
3109  017070  013777  002100  163000          MOV     DZTIS,@DZTIV
3110  017076  005077  162776                  CLR     @DZTIS
3111                                          ;************************ TEST 27 *******************************
3112                                          ;*THIS TEST VERIFIES OVERRUN AND SILO ALARM
3113                                          ;*ONE LINE AT A TIME  - BASED UPON VALID LINES
3114                                          ;*AS EACH OF THE FIRST 16 CHARS ARE SENT; SILO ALARM IS
3115                                          ;*TESTED TO BE CLEARED. ON THE 16TH CHAR THE PROGRAM THEN
3116                                          ;*EXPECTS SILO ALARM TO SET. THEN THE ENTIRE
3117                                          ;*SILO IS FILLED AND AN OVERRUN IS EXPECTED ON THE 65TH
3118                                          ;*CHAR PULLED OUT OUT THE SILO↑B.
3119                                          ;*USING SWITCH NINE FOR THIS TEST SENDS 20. CHARACTERS
3120                                          ;*ON DZ LINE PREVIOUSLY SELECTED CONTINUOUSLY WHILE SW09=1.
3121                                          ;*USED TO SCOPE SILO ALARM PULSES, ETC.
3122                                  ;;*  TEST 27
3123                                  ;;*****************************************************************
3124  017102  000004                  ↑ST27:  SCOPE
3125  017104  012737  000027  001122          MOV     #27,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
3126  017112  012737  017630  001360          MOV     #TST30,NEXT     ;POINT TO THE START OF THE NEXT TEST
3127  017120  012737  017534  001362          MOV     #18$,LOCK       ;SET FOR LOOP
3128  017126  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT I↑BF I MODE
3129  017130  013701  001366                  MOV     PAR,R1          ;PICK UP PARAMETERS
3130  017134  012702  000001                  MOV     #1,R2           ;PICK UP INIT POINTER
3131  017140  030237  001364          1$:     BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
3132  017144  001402                          BEQ     2$              ;NO
3133  017146  010177  162700                  MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
3134  017152  005201                  2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
3135  017154  106302                          ASLB    R2              ;GOT 'EM ALL ?
3136  017156  103370                          BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
3137  017160  005037  001372                  CLR     SAVLIN          ;CLEAR LINE # INDICATOR
3138  017164  012700  001422                  MOV     #TDO,R0         ;POINT TO THE DATA AREA
3139  017170  005020                          CLR     (R0)+           ;CLEAR A DATA WORD
3140  017172  022700  001462                  CMP     #STOP,R0        ;FINISHED ?
3141  017176  001374                          BNE     .-6             ;NO
3142  017200  005000                          CLR     R0              ;CLEAR OFFSET
3143  017202  012702  000001                  MOV     #1,R2           ;LINE POINTER
3144  017206  052777  010040  162626          BIS     #MSENAB!SILOEN,@DZCSR   ;START SCANNER & SET SILO ENABLE
3145  017214  030237  001364          3$:     BIT     R2,LINE         ;VALID LINE?
3146  017220  001002                          BNE     .+6             ;YES
3147  017222  000137  017510                  JMP     17$             ;TRY NEXT LINE
3148  017226  013700  001372                  MOV     SAVLIN,R0       ;MAKE OFFSET
3149  017232  006300                          ASL     R0              ;MAKE POWER OF TWO
3150  017234  010277  162616  ↑B              MOV     R2,@DZTCR       ;SET TCR BIT
3151  017240  105777  162576          4$:     TSTB    @DZCSR          ;REC DONE = 1 ?
3152  017244  100001                          BPL     .+4
3153  017246  104020                          ERROR   20              ;REC DONE SHOULD NOT = 1
3154  017250  005003                          CLR     R3              ;SET CHARACTER COUNT
3155  017252  005004                  5$:     CLR     R4
3156  017254  032777  100000  162560  6$:     BIT     #TRDY,@DZCSR
3157  017262  001004                          BNE     7$
3158  017264  104414                          DELAY
3159  017266  105204                          INCB    R4
3160  017270  001371                          BNE     6$
3161  017272  104003                          ERROR   3               ;*TRDY FAILED TO SET
3162  017274  116077  001422  162564  7$:     MOVB    TDO(R0),@DZTDR  ;LOAD A CHARACTER
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3163  017302  005260  001422                  INC     TDO(R0)         ;SET UP NEXT CHARACTER
3164  017306  020327  000017                  CMP     R3,#15.         ;16 CHARACTERS ?
3165  017312  103006                          BHIS    8$
3166  017314  032777  020000  162520          BIT     #SILOAL,@DZCSR  ;SILO ALARM = 0 ?
3167  017322  001401                          BEQ     .+4             ;YES
3168  017324  104013                          ERROR   13              ;*SILO ALARM SHOULD NOT = 1
3169                                                                  ;UNTIL 16. DATA CHARACTERS
3170  017326  000411                          BR      10$
3171  017330  005004                  8$:     CLR     R4
3172  017332  032777  020000  162502  9$:     BIT     #SILOAL,@DZCSR
3173  017340  001004                          BNE     10$
3174  017342  104414                          DELAY
3175  017344  005204                          INC     R4
3176  017346  001371                          BNE     9$
3177  017350  104014                          ERROR   14              ;*SILO ALARM FAILED TO SET!
3178                                                                  ;SILO ALARM SHOULD =1 AFTER 16.
3179                                                                  ;DATA CHARACTERS
3180  017352  005203                  10$:    INC     R3              ;INC CHAR COUNT
3181  017354  022703  000102                  CMP     #66.,R3         ;FINISHED SENDING CHARACTERS ?
3182  017360  001334                          BNE     5$              ;NO
3183  017362  005004                          CLR     R4
3184  017364  104414                          DELAY
3185  017366  105204                          INCB    R4
3186  017370  001375                          BNE     .-4
3187                                          ;NOW LETS READ THE SILO
3188  017372  013705  001272                  MOV     SAVLIN,R5       ;MAKE EXPECTED LTBINE #
3189  017376  105737  001371                  TSTB    MODE+1          ;IS THIS TEST IN STAGGERED MODE?
3190  017402  001406                          BEQ     13$             ;IF NOT, SKIP STAGGERED SETUP
3191
3192                                          ;WE MUST NOW INVERT THE LAST BIT OF THE LINE NUMBER
3193
3194  017404  006205                          ASR     R5              ;GET THE LAST BIT INTO THE CARRY BIT
3195  017406  103402                          BCS     11$             ;IF IT IS SET, GO CLEAR IT
3196  017410  000261                          SEC                     ;IF IT IS CLEAR SET IT HERE
3197  017412  000401                          BR      12$             ;SKIP THE CLEARING
3198  017414  000241                  11$:    CLC                     ;CLEAR THE CARRY BIT (INVERSION OF LINE PARITY)
3199  017416  006105                  12$:    ROL     R5              ;GET THE NEW BIT BACK INTO R5
3200  017420  000301B5                  13$:    SWAB    R5                      ;PUT IN UPPER BYTE
3201  017422  052705  100000                  BIS     #DVALID,R5      ;ADD DATA VALID
3202  017426  017704  162414          14$:    MOV     @DZRBUF,R4      ;ACTUAL
3203  017432  020405                          CMP     R4,R5           ;ACTUAL VS. EXPECTED
3204  017434  001401                          BEQ     15$             ;YES
3205  017436  104006                          ERROR   6               ;*DATA/CONTENTS DID NOT COMPARE
3206  017440  032777  020000  162374  15$:    BIT     #SILOAL,@DZCSR  ;SILO ALARM= 0 ?
3207  017446  001401                          BEQ     16$             ;YES
3208  017450  104016                          ERROR   16              ;READING DZRBUF DID NOT CLEAR SILO ALARM
3209  017452  005205                  16$:    INC     R5              ;UP CHARACTER
3210  017454  120527  000077                  CMPB    R5,#63.         ;LAST SILO CHAR ?....64TH CHAR
3211  017460  101762                          BLOS    14$
3212  017462  005205                          INC     R5              ;ADD 1 MORE FOR THE CLOBBERED CHAR
3213  017464  052705  040000                  BIS     #OVRRUN,R5      ;ADD OVERRUN TO EXPECTED
3214  017470  120527  000101                  CMPB    R5,#65.         ;LAST CHARACTER ?
3215  017474  001754                          BEQ     14$
3216  017476  017704  162344                  MOV     @DZRBUF,R4      ;FOR GOOD MEASURE
3217  017502  005704                          TST     R4              ;DATA VALID SHOULD = 0
3218  017504  100001                          BPL     17$             ;YES
```

```
3219  017506  104017                          ERROR   17              ;DATA VALID SHOULD = ↑B0
3220  017510  040277  162342          17$:    BIC     R2,@DZTCR       ;CLR TCR BIT
3221  017514  104401                          SCOP1                   ;LOOP?
3222  017516  005237  001372                  INC     SAVLIN          ;INC EXPECTED LINE
3223  017522  106302                          ASLB    R2              ;NEXT LINE
3224  017524  103402                          BCS     .+6             ;NO
3225  017526  000137  017214                  JMP     3$              ;YES
3226  017532  104400                          ADVANCE                 ;GO TO NEXT TEST
3227
3228                                  ;TIGHT SCOPE LOOP FOR THIS TEST. SENDS 20. CHARACTERS
3229                                  ;ON DZ LINE PREVIOUSLY SELECTED CONTINUOUSLY WHILE SW09=1.
3230                                  ;USED TO SCOPE SILO ALARM PULSES, ETC.
3231
3232  017534  052777  010040  162300  18$:    BIS     #MSENAB!SILOEN,@DZCSR   ;SETUP DEVICE
3233  01↑87542        012777  017620  162326          MOV     #20$,@DZTIV     ;SETUP TRANSMITTER VECTOR
3234  017550  012737  000024  001216          MOV     #20.,$TMP0      ;TEMPORARY COUNT OF CHARACTER BURST
3235  017556  050277  162274                  BIS     R2,@DZTCR       ;ENABLE LINE
3236  017562  052777  040000  162252          BIS     #TIE,@DZCSR     ;ENABLE INTERRUPTS
3237  017570  106427  000000                  MTPS    #0              ;LOWER PRIORITY
3238  017574  000001                  19$:    WAIT                    ;ALLOW INTERRUPTS
3239  017576  005337  001216                  DEC     $TMP0           ;REDUCE COUNT. ALL CHARACTERS SENT?
3240  017602  001374                          BNE     19$             ;IF NO, WAIT FOR MORE
3241  017604  042777  050040  162230          BIC     #SILOEN!MSENAB!TIE,@DZCSR ;RESET SILO COUNTER, CLEAR STROBE
3242  017612  104401                          SCOP1                   ;LOOP AGAIN?
3243  017614  000137  017510                  JMP     17$             ;IF NOT, RETURN TO WHERE YOU LEFT OFF
3244  017620  112777  000252  162240  20$:    MOVB    #252,@DZTDR     ;SEND A CHARACTER
3245  017626  000002                          RTI                     ;ALLOW MORE CHARACTERS TO COME
3246                                  ;********************** TEST 30 ******************************
3247                                  ;*THIS TEST THAT "SILO ENABLE" WILL INHIBIT
3248                                  ;*RECEIVER INTERRUPTS AND THAT ON THE
3249                                  ;*16TH CHAR THAT "SILO ALARM" WILL CAUSE AN
3250                                  ;*INTERRUPT WITH "RIE" SET.
3251                                  ;*THIS WILL DO ALL SELECTED LINES ONE AT A TIME.
3252                              ;:*  TEST↑ 30
3253                              ;:*↑B*************************************************************
3254  017630  000004                  ↑ST30:  SCOPE
3255  017632  012737  000030  001122          MOV     #30,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
3256  017640  012737  020212  001360          MOV     #TS↑31,NEXT     ;POINT TO THE START OF THE NEXT TEST
3257  017646  012737  017734  001362          MOV     #3$,LOCK        ;SET FOR LOOP
3258  017654  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
3259  017656  013701  001366                  MOV     PAR,R1          ;PICK UP PARAMETERS
3260  017662  012702  000001                  MOV     #1,R2           ;PICK UP INIT POINTER
3261  017666  030237  001364          1$:     BIT     R2,LINE         ;SHOULD THIS LINE BE SET UP ?
3262  017672  001402                  ↑B      BEQ     2$              ;NO
3263  017674  010177  162152                  MOV     R1,@DZLPR       ;SET UP LINE PARAMETERS
3264  017700  005201                  2$:     INC     R1              ;POSITION POINTER TO THE NEXT LINE
3265  017702  106302                          ASLB    R2              ;GOT 'EM ALL ?
3266  017704  103370                          BCC     1$              ;IF NO, GO SET UP THE NEXT LINE
3267  017706  005037  001372                  CLR     SAVLIN          ;CLEAR LINE # INDICATOR
3268  017712  012700  001422                  MOV     #TDO,R0         ;POINT TO THE DATA AREA
3269  017716  005020                          CLR     (R0)+           ;CLEAR A DATA WORD
3270  017720  022700  001462                  CMP     #STOP,R0        ;FINISHED ?
3271  017724  001374                          BNE     .-6             ;NO
3272  017726  005000                          CLR     R0              ;CLEAR OFFSET
3273  017730  012702  000001                  MOV     #1,R2           ;LINE POINTER
3274  017734  012777  020154  162130  3$:     MOV     #11$,@DZRIV     ;SET FOR UNEXPECTED INTER.
```

```
3275  017742  012777  000340  162124          MOV     #PR7,@DZRIS     ;SET PRIO.
3276  017750  052777  010140  162064          BIS     #MSENAB!SILOEN!RIE,@DZCSR
3277                                                                  ;START SCANNER & SET SILO ENABLE
3278  017756  030237  001364                  BIT     R2,LINE         ;VALID LINE?
3279  017762  001002                          BNE     .+6             ;YES
3280  017764  000137  020164                  JMP     17$             ;TRY NEXT LINE
3281  017770  005777  162052                  TST     @DZRBUF         ;EMPTY THE↑B SILO
3282  017774  100775                          BMI     .-4             ;BR IF DATA VALID IS SET!
3283  017776  106427  000000                  MTPS    #0              ;SET PROCESSOR PRIORITY TO 0
3284  020002  013700  001372                  MOV     SAVLIN,R0       ;MAKE OFFSET
3285  020006  006300                          ASL     R0              ;MAKE POWER OF TWO
3286  020010  010277  162042                  MOV     R2,@DZTCR       ;SET TCR BIT
3287  020014  005004                  5$:     CLR     R4
3288  020016  032777  100000  162016  6$:     BIT     #TRDY,@DZCSR
3289  020024  001004                          BNE     7$
3290  020026  104414                          DELAY
3291  020030  005204                          INC     R4
3292  020032  001371                          BNE     6$
3293  020034  104003                          ERROR   3               ;*TRDY FAILED TO SET
3294  020036  116077  001422  162022  7$:     MOVB    TDO(R0),@DZTDR  ;LO↑BAD A CHARACTER
3295  020044  005260  001422                  INC     TDO(R0)         ;SET UP NEXT CHARACTER
3296  020050  022760  000017  001422          CMP     #15.,TDO(R0)    ;15 CHARS YET?
3297  020056  001406                          BEQ     8$
3298  020060  032777  020000  161754          BIT     #SILOAL,@DZCSR  ;SILO ALARM = 0 ?
3299  020066  001401                          BEQ     .+4             ;YES
3300  020070  104013                          ERROR   13              ;*SILO ALARM SHOULD NOT = 1
3301                                                                  ;UNTIL 16. DATA CHARACTERS
3302  020072  000751                          BR      6$
3303  020074  012777  020162  161770  8$:     MOV     #12$,@DZRIV     ;SET NEW VECTOR
3304  020102  032777  100000  161732          BIT     #TRDY,@DZCSR    ;READY FOR 16TH CHAR
3305  020110  001774                          BEQ     .-6
3306  020112  016077  001422  161746          MOV     TDO(R0),@DZTDR  ;LOAD THE 16TH CHAR.
3307  020120  005004                          CLR     R4
3308  020122  032777  020000  161712  9$:     BIT     #SILOAL,@DZCSR
3309  020130  001005                          BNE     10$
3310  020132  104414                          DELAY
3311  020134  005204                          INC     R4
3312  020136  001371                          BNE     9$
3313  020140  104014                          ERROR   14              ;*SILO ALARM FAILED TO SET!
3314  020142  000410                          BR      17$             ;SILO ALARM SHOULD =1 AFTER 16.
3315                                                                  ;DATA CHARACTERS
3316  020144  000240                  10$:    NOP                     ;STALL
3317  020146  000240                          NOP
3318  020150  104000                          ERROR                   ;SILO ALARM NOT INTERRUPTING.
3319  020152  000404                          BR      17$             ;CONTINUE TEST.
3320  020154  022626                  11↑B$:  CMP     (SP)+,(SP)+     ;FAKE RTI
3321  020156  104012                          ERROR   12              ;RX SHOULD NOT INTERRUPT
3322  020160  000401                          BR      17$             ;CONTINUE
3323  020162  022626                  12$:    CMP     (SP)+,(SP)+     ;GOOD INTERRUPT TO HERE.
3324  020164  040277  161666          17$:    BIC     R2,@DZTCR       ;CLR TCR BIT
3325  020170  104401                          SCOP1                   ;LOOP?
3326  020172  005237  001372                  INC     SAVLIN          ;INC EXPECTED LINE
3327  020176  106302                          ASLB    R2              ;NEXT LINE
3328  020200  103402                          BCS     .+6             ;NO
3329  020202  000137  017734                  JMP     3$              ;YES
3330  020206  005037  001362                  CLR     LOCK            ;CLEAR TIGHT LOOP FOR NEXT TEST
```

```
3331                                    ;************************ TEST 31 *******************************
3332                                    ;*THIS TEST RUNS ALL LINES FULL BORE
3333                                    ;*BASED UPON QUALIFIED LINES
3334                                    ;*..THIS IS AN INTERRUPT TEST ON THE RECEIVER AND
3335                                    ;*TRANSMITTER
3336                                ;:*  TEST 31
3337                                ;:*************************************************************
3338  020212  000C04                TST31:  SCOPE
3339  020214  012737  000031  001122        MOV     #31,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
3340  020222  012737  021020  001360        MOV     #TST32,NEXT     ;POINT TO THE START OF THE NEXT TEST
3341  020230  104417                       DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
3342  020232  013737  001364  021016        MOV     LINE,RXTCR      ;SET IMAGE OF TCR BITS
3343  020240  013701  001366        RSTART: MOV     PAR,R1          ;PICK UP PARAMETER
3344  020244  012700  000001                MOV     #1,R0           ;;PICK UP INIT POINTER
3345  020250  030037  001364        INIT:   BIT     R0,LINE         ;SHOULD THIS LINE BE SET UP
3346  020254  001402                       BEQ     1$              ;NO
3347  020256  010177  161570                MOV     R1,@DZLPR       ;SET UP LINE PARAM REGISTER
3348  020262  005201                1$:     INC     R1
3349  020264  106300                       ASLB    R0              ;GOT 'EM ALL ?
3350  020266  103370                       BCC     INIT            ;NO
3351  020270  012700  001422  ↑B          MOV     #TDO,R0         ;CLEAR TRANS DATA POINTER & REC POINTERS
3352  020274  005020                INIT1:  CLR     (R0)+
3353  020276  022700  001462                CMP     #STOP,R0                ;FINISHED ?
3354  020302  001374                       BNE     INIT1           ;NO, CONTINUE CLEARING
3355  020304  012777  020542  161560        MOV     #RXSVC,@DZRIV   ;SET UP REC INTR VECTOR
3356  020312  012777  000340  161554        MOV     #PR7,@DZRIS     ;STATUS
3357  020320  012777  020442  161550        MOV     #TXSVC,@DZTIV   ;SET UP TRANS INTR VECTOR
3358  020326  012777  000340  161544        MOV     #PR7,@DZTIS     ;STATUS
3359  020334  052777  000040  161500        BIS     #MSENAB,@DZCSR  ;SET MASTER SCAN ENABLE
3360  020342  052777  000100  161472        BIS     #RIE,@DZCSR             ;SET REC I↑BNTR ENABLE
3361  020350  052777  040000  161464        BIS     #TIE,@DZCSR             ;SET TRANS INTR ENABLE
3362  020356  113777  001364  161472        MOVB    LINE,@DZTCR     ;SET TCR BITS...UP UP AND AWAY !
3363  020364  106437  026220                MTPS    @#LESS1                 ;ALLOW INTERRUPTS
3364
3365
3366  020370  005037  020440        SNAP:   CLR     66$
3367  020374  013727  006604        67$:    MOV     DLYCNT,(PC)+    ;SET FOR DELAY
3368  020400  000000                68$:    0
3369  020402  005337  020400                DEC     68$
3370  020406  001375                       BNE     .-4
3371  020410  105737  021016                TSTB    RXTCR           ;WAIT FOR ALL RECIEVERS TO FINISH
3372  020414  001002                       BNE     3$              ;
3373  020416  000137  020716                JMP     OUT
3374  020422  005237  020440        3$:     INC     66$
3375  020426  001362                       BNE     67$
3376  020430  104007                       ERROR   7               ;*TRANSMITTER FAILED TO INTERRUPT
3377  020432  104011                       ERROR   11              ;*RECEIVER FAILED TO INTERRUPT
3378  020434  000137  020770                JMP     FINI
3379  020440  000000                66$:    0
3380
3381                                ;TRANS INTR SVC ROUTINE
3382  020442  005777  161374        TXSVC:  TST     @DZCSR          ;TRANS INTR ?
3383  020446  100401                       BMI     .+4
3384  020450  104003                       ERROR   3               ;*TRANSMITTER FAILED
3385  020452  117703  161366                MOVB    @#DZCSR,R3      ;SAVE IT
3386                                ;NOW TEST FOR LINE # ETC
```

```
3387  020456  042703  177770              BIC     #!C<7>,R3       ;STRIP JUNK
3388  020462  010304                      MOV     R3,R4           ;SAVE
3389  020464  012702  000001              MOV     #1,R2           ;SET UP POSITION POINTER
3390  020470  105303              3$:     DECB    R3              ;IS IT THIS LINE ?
3391  020472  100402                      BMI     4$              ;YES
3392  020474  006302                      ASL     R2              ;UP THE LINE #
3393  020476  000774                      BR      3$              ;GO 'ROUND AGAIN
3394  020500  030237  001364        4$:   BIT     R2,LINE         ;VALID LINE?
3395  020504  001001                      BNE     .+4             ;YES
3396  020506  104011                      ERROR   11              ;NO,INVALID LINE!!!!
3397  020510  042704  177770              BIC     #!C<7>,R4       ;STRIP JUNK
1 8398        020514  006304                      ASL     R4              ;MAKE POWER OF 2
3399  020516  116477  001422  161342      MOVB    TDO(R4),@DZTDR  ;LOAD CHARACTER
3400  020524  105264  001422              INCB    TDO(R4)         ;SET UP NEXT CHARACTER
3401  020530  001002                      BNE     5$              ;LAST CHARACTER ?
3402  020532  040277  161320              BIC     R2,@DZTCR       ;YES ,CLEAR TCR BIT
3403  020536  005200              5$:     INC     R0              ;INCR RECEIVER TIMER
3404  020540  000002                      RTI
3405
3406
3407                                      ;REC INTR SVC ROUTINE
3408  020542  105777  161274      RXSVC:  TSTB    @DZCSR          ;REC DONE ?
3409  020546  100401                      BMI     .+4             ;YES
3410  020550  104004                      ERROR   4               ;FALSE INTERRUPT
3411  020552  032777  020000  161262      BIT     #SILOAL,@DZCSR  ;SILO ALARM?
3412  020560  001401                      BEQ     .+4             ;NO
3413  020562  104000                      ERROR                   ;SILO ALARM SHOULD NOT =1
3414  020564  017704  161256              MOV     @DZRBUF,R4      ;SAVE IT
3415  020570  100401                      BMI     .+4             ;YES
3416  020572  104000                      ERROR                   ;YOU LOSE  ...DATA VALID WAS'NT SET
3417  020574  032704  070000              BIT     #OVRRUN!FRMERR!PARER,R4
3418  020600  001401                      BEQ     .+4
3419  020602  104000                      ERROR                   ;RECEIVER ERROR FLAG/S WERE SET
3420  020604  010403                      MOV     R4,R3
3421  020606  000303                      SWAB    R3
3422  020610  042703  177770              BIC     #!C<7>,R3       ;STRIP JUNK
3423  020614  010337  001372              MOV     R3,SAVLIN       ;SAVE LINE NUMBER
3424  020620  !B012702        000001              MOV     #1,R2           ;SET UP POSITION POINTER
3425  020624  105303              5$:     DECB    R3
3426  020626  100402                      BMI     6$
3427  020630  006302                      ASL     R2              ;RE POSITION POINTER
3428  020632  000774                      BR      5$              ;GO 'ROUND AGAIN
3429  020634  030237  001364        6$:   BIT     R2,LINE         ;LINE VALID ?
3430  020640  001001                      BNE     .+4             ;YES
3431  020642  104011                      ERROR   11              ;INVALID LINE #
3432  020644  013703  001372              MOV     SAVLIN,R3       ;GET THE LINE NUMBER AGAIN
3433  020650  006303                      ASL     R3              ;USE R3 AS A POINTER IN THE DATA TABLE
3434  020652  126304  001442              CMPB    TRO(R3),R4      ;DOES THE DATA CHARACTER COMPARE ?
3435  020656  001405                      BEQ     2$              ;YES
1B 3436       020660  016305  001442              MOV     TRO(R3),R5      ;SAVE EXPECTED
3437  020664  042704  177400              BIC     #!C<377>,R4     ;CLEAR JUNK
3438                                                              ;R2 = LINE # BY BIT POSITION
3439                                                              ;R4 = ACTUAL DATA
3440                                                              ;R5 = EXPECTED DATA
3441  020670  104005                      ERROR   5               ;*NO, DATA DOES NOT COMPARE
3442  020672  005263  001442        2$:   INC     TRO(R3)         ;SET UP FOR NEXT CHARACTER
```

```
3443  020676  105763  001442                  TSTB    TRO(R3) ;ALL CHARS DONE?
3444  020702  001002                          BNE     .+6
3445  020704  040237  021016                  BIC     R2,RXTCR        ;ZERO LINE DONE INDICATOR.
3446  020710  012716  020340                  MOV     #SNAP,(SP)      ;RESET THE BACKGROUND TIMING LOOP
3447  020714  000002                          RTI
3448
3449
3450                                          ;FINISH UP ROUTINE
3451  020716  106427  000340          OUT:    MTPS    #PR7                    ;STOP ALL INTERRUPTS
3452  020722  104413                          DEVICE.CLR              ;CLEAR ALL INTERRUPTS AWAY
3453  020724  005003                          CLR     R3
3454  020726  005037  001372                  CLR     SAVLIN
3455  020732  012702  000001                  MOV     #1,R2
3456  020736  030237  001364          1$:     BIT     R2,LINE         ;VALID LINE ?
3457  020742  001405                          BEQ     2$              ;NO
3458  020744  022763  000400  001442          CMP     #400,TRO(R3)    ;RECEIVED A BINARY COUNT PATTERN ?
3459  020752  001401                          BEQ     .+4             ;YES
3460  020754  104000                          ERROR   0               ;THE LINE FAILED TO RECEIVE A FULL
3461                                                                  ;BINARY COUNT PATTERN
3462  020756  005237  001372          2$:     INC     SAVLIN          ;SET UP FOR NEXT LINE
3463  020762  005723                          TST     (R3)+           ;ADD 2
3464  020764  106302                          ASLB    R2              ;SET UP NEXT LINE POINTER
3465  020766  103363                          BCC     1$              ;FINISHED ?
3466  020770                          FINI:
3467  020770  013777  002074  161074          MOV     DZRIS,@DZRIV    ;RESTORE TRAPCATCHER
3468  020776  005077  161072                  CLR     @DZRIS
3469  021002  013777  002100  161066          MOV     DZTIS,@DZTIV
3470  021010  005077  161064                  CLR     @DZTIS
3471  021014  104400                          ADVANCE                 ;GOTO TO THE NEXT TEST
3472  021016  000000                  RXTCR:  0                       ;RX IMAGE OF TCR BITS
3473
3474
3475                                          ;************************ TEST 32 *********************************
3476                                          ;*DZ11 RELATIVE TIMING TEST.
3477                                          ;*EACH SELECTED LINE WILL IN TURN RUN 16. CHARS
3478                                          ;*AT ALL BAUD RATES AND THEN THE HIGHEST BAUD
3479                                          ;*WITH ALL CHAR LENGTHS. EACH NEW PARAMETER SHOULD
3480                                          ;*DECREASE IN TIME FROM THE PREVIOUS PARAMETERS SELECTED.
3481                                          ;*THE TIME IS CHECKED AGAINST THE LAST PARAMETER USED
3482                                          ;* AND A LOWER TIME IS EXPECTED ON THE CURRENT PARAMETER.
3483                                          ;*PARAMETERS ARE:
3484                                          ;*  EIGHT BITS/PER/CHAR - TWO STOP BITS AT
3485                                          ;*      50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000
3486                                          ;*      2400, 3600, 4800, 7200, 9600 BAUD.
3487                                          ;*  19.2 K BAUD - TWO STOP BITS AT
3488                                          ;*      SEVEN, SIX, FIVE BITS/PER/CHAR.
3489                                          ;*AFTER EACH LINE HAS FINISHED ALL THE ABOVE PARAMETERS
3490                                          ;*THE NEXT SELECTED LINE IS THE TESTED.
3491                                  ;:*  TEST 32
3492                                  ;:*************************************************************
3493  021020  000004                  TST32:  SCOPE
3494  021022  012737  000032  001122          MOV     #32,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
3495  021030  012737  000002  180012          MOV     #2,$TIMES
3496  021036  012737  021514  001360          MOV     #TST33,NEXT     ;POINT TO THE START OF THE NEXT TEST
3497  021044  012737  021170  001362          MOV     #3$,LOCK        ;SET FOR LOOP
3498  021052  005037  023140                  CLR     OFFSET          ;RESET THIS VARIABLE
```

```
3499  021056  005037  001372                  CLR     SAVLIN          ;RESET LINE NUMBER INDICATOR
3500  021062  005037  001374                  CLR     XMTLIN          ;USE THIS WORD TO TELL WHAT LINE TRANSMITTED
3501  021066  012737  000001  001216          MOV     #1,$TMP0        ;USE $TMP0 AS A BIT POINTER
3502          021074  012737  C10070  021512          MOV     #RCVON!S50!EIGHT!TWOSTOP,7$ ;BUILD TEMPORARY PARAMETERS
3503  021102  033737  001216  001364  1$:     BIT     $TMP0,LINE      ;IS THIS LINE ACTIVE?
3504  021110  001027                          BNE     3$              ;IF SO, GO GET STARTED
3505  021112  012737  010070  021512  2$:     MOV     #RCVON!S50!EIGHT!TWOSTOP,7$ ;LOAD PARAMETERS TEMPORARILY
3506  021120  012700  001422                  MOV     #TDO,R0         ;POINT TO THE DATA AREA
3507  021124  005020                          CLR     (R0)+           ;CLEAR A DATA WORD
3508  021126  022700  001462                  CMP     #STOP,R0        ;FINISHED ?
3509  021132  001374                          BNE     .-6             ;NO
3510  021134  005237  001374                  INC     XMTLIN          ;POINT TO THE NEXT LINE TO TRANSMIT
3511  021140  042737  000007  021512          BIC     #7,7$           ;MAKE SURE TEMPORARY PARAMETERS POINT TO 0
3512  021146  053737  001374  021512          BIS     XMTLIN,7$       ;ADD DESIRED LINE NUMBER
3513  021154  005037  023140                  CLR     OFFSET
3514  021160  106337  001216                  ASLB    $TMP0           ;POINT TO THE NEXT LINE
3515  021164  103346                          BCC     1$              ;PROCESS THE NEXT LINE
3516  021166  104400                          ADVANCE                 ;TEST TO SEE IF THIS TEST GETS REPEATED
3517  021170                          3$:
3518  021170  104417                          DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
3519  021172  042737  010000  021512          BIC     #RCVON,7$       ;ZERO PARAMTERS FOR TX LINE
3520  021200  013777  021512  160644          MOV     7$,@DZLPR       ;LOAD PARAMTERS FOR TX+B
3521  021206  005737  001370                  TST     MODE            ;STAGGERED?
3522  021212  100011                          BPL     100$            ;BR IF NO
3523  021214  000241                          CLC                     ;SET UP LINE
3524  021216  006037  021512                  ROR     7$              ;
3525  021222  103002                          BCC     98$             ;BR IF LINE WAS EVEN
3526  021224  000241                          CLC                     ;PREPARE TO MKE LINE EVEN
3527  021226  000401                          BR      99$             ;CONTINUE
3528  021230  000261                  98$:    SEC                     ;PREPARE TO MAKE LINE ODD
3529  021232  006137  021512          99$:    ROL     7$              ;SET ALTERED LINE
3530  021236  052737  010000  021512  100$:   BIS     #RCVON,7$       ;SET RX ON
3531  021244  013777  021512  160600          MOV     7$,@DZLPR       ;LOAD RX PARAMETERS
3532  021252  042737  000007  021512          BIC     #B7,7$          ;CLEAR OLD LINE #
3533  021260  053737  001374  021512          BIS     XMTLIN,7$       ;SET LINE UP AGAIN
3534  021266  013737  021512  001400          MOV     7$,REGIST       ;SAVE PARAMETERS FOR PRINTOUT
3535  021274  012700  001422                  MOV     #TDO,R0         ;POINT TO THE DATA AREA
3536  021300  005020                          CLR     (R0)+           ;CLEAR A DATA WORD
3537  021302  022700  001462                  CMP     #STOP,R0        ;FINISHED ?
3538  021306  001374                          BNE     .-6             ;NO
3539  021310  005002                          CLR     R2              ;USE R2 TO COUNT TOTAL NUMBER OF TRANSMISSIONS
3540  021312  005003                          CLR     R3              ;USE R3 TO COUNT TOTAL NUMBER OF RECEPTIONS
3541  021314  005037  001220                  CLR     $TMP1           ;INITIALIZE THE TIMER
3542  021320  005037  001224                  CLR     $TMP3           ;INITIALIZE THESE BITS ALSO
3543  021324  012737  000020  001376          MOV     #20,XMTCNT      ;SET HOW MANY CHARACTERS TO TRANSMIT
3544  021332  012777  022600  160536          MOV     #XMTSRV,@DZTIV
3545  021340  012777  022724  160524          MOV     #RXISR1,@DZRIV
3546  021346  013777  026216  160520          MOV     DZPRT,@DZRIS
3547  021354  013777  026216  160516          MOV     DZPRT,@DZTIS
3548  021362  113777  001216  160466          MOVB    $TMP0,@DZTCR    ;START THE VALID LINE
3549  021370  052777  040140  160444          BIS     #TIE!RIE!MSENAB,@DZCSR
3550  021376  106427  000000                  MTPS    #0              ;LOWER THE PRIORITY TO ALLOW INTERRUPTS
3551  021402  032777  000100  160432  4$:     BIT     #RIE,@DZCSR     ;IS ROUTIN+BE DONE?
3552  021410  001407                          BEQ     5$              ;WHEN ALL IS DONE RX IE IS CLEARED IN ISR.
3553  021412  005237  001220                  INC     $TMP1           ;COUNT TIME
3554  021416  001371                          BNE     4$              ;CONTINUE TEST
```

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3555  021420  105237  001224                    INCB    $TMP3           ;DOUBLE COUNT
3556  021424  001366                            BNE     4$              ;CONTINUE TEST
3557  021426  104011                            ERROR   11              ;INTERRUPTS NOT FINISHED
3558  021430  004737  007242          5$:       JSR     PC,SERV.G       ;<^G>?
3559  021434  104401                            SCOP1                   ;LOOP?
3560  021436  062737  000002  023140  ^B        ADD     #2,OFFSET
3561  021444  013700  021512                    MOV     7$,R0
3562  021450  042700  170377                    BIC     #^C<17#400>,R0
3563  021454  022700  007400                    CMP     #<17#400>,PC
3564  021460  001010                            BNE     6$
3565  021462  032737  000030  021512            BIT     #BIT4+BIT3,7$
3566  021470  001610                            BEQ     2$
3567  021472  162737  000010  021512            SUB     #BIT3,7$
3568  021500  000633                            BR      3$
3569  021502  062737  000400  021512  6$:       ADD     #400,7$
3570  021510  000627                            BR      3$
3571  021512  000000                  7$:       0
3572                                            ;************************* TEST 33 *********************************
3573                                            ;* THIS TEST VERIFIES THAT EVEN PARITY WORKS
3574                                            ;* FOR ALL ODD LINES SELECTED AND THAT ODD PARITY WORKS FOR ALL
3575                                            ;* EVEN LINES SELECTED.
3576                                            ;*THE MAIN FUNCTION OF THIS TEST IS TO VERIFY
3577                                            ;*THAT "PE" (PARITY ERROR) CAN BE FLAGGED BY
3578                                            ;*THE UARTS. THIS TEST WILL NOT BE DONE UNLESS
3579                                            ;*YOU ARE IN "STAGGERED" MODE.
3580                                            ;*40(8) CHARS ARE USED FOR THIS TEST.
3581                                            ;*ALL SELECTED LINES WILL BE ENABLED
3582                                            ;*AT THE SAME TIME!
3583                                    ;:*  TEST 33
3584                                    ;:*****************************************************************
3585  021514  000004                  ^TST33:   SCOPE
3586  021516  012737  000033  001122            MOV     #33,$TSTNM      ;LOAD THE NUMBER^B OF THIS TEST
3587  021524  012737  022146  001360            MOV     #TST34,NEXT     ;POINT TO THE START OF THE NEXT TEST
3588  021532  005737  001370                    TST     MODE            ;IS THIS STAGGERED MODE?
3589  021536  100111                            BPL     6$              ;IF NOT, DON'T DO THIS TEST
3590  021540  104417                            DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
3591  021542  013701  001366                    MOV     PAR,R1          ;USE R1 TO BUILD PARAMETERS TO BE LOADED
3592  021546  042701  000200                    BIC     #ODDPAR,R1      ;MAKE SURE ODD PARITY ISN'T SET
3593  021552  052701  000100                    BIS     #PARITY,R1      ;MAKE SURE PARITY IS TURNED ON
3594  021556  012702  000001                    MOV     #1,R2           ;USE R2 AS A LINE POINTER
3595  021562  030237  0013^B64          1$:       BIT     R2,LINE                 ;IS THIS A VALID LINE?
3596  021566  001411                            BEQ     3$              ;IF NOT, SKIP TO THE NEXT LINE
3597  021570  032701  000001                    BIT     #BIT0,R1        ;IS THIS LINE AN ODD LINE?
3598  021574  001002                            BNE     2$              ;IF IT'S ODD, USE EVEN PARITY
3599  021576  052701  000200                    BIS     #ODDPAR,R1      ;IF IT'S EVEN, USE ODD PARITY
3600  021602  010177  160244          2$:       MOV     R1,@DZLPR       ;LOAD THE LINE PARAMETER REGISTER
3601  021606  042701  000200                    BIC     #ODDPAR,R1      ;SET UP THE NEXT PARITY TO EVEN
3602  021612  005201                  3$:       INC     R1              ;POINT TO THE NEXT LINE
3603  021614  106302                            ASLB    R2              ;MOVE THE BIT POINTER IN R2 TO THE NEXT LINE
3604  021616  103361                            BCC     1$              ;IF WE'RE NOT DONE, GO CHECK THE NEXT LINE
3605  021620  005037  001372                    CLR     SAVLIN          ;CLEAR THE LINE NUMBER INDICATOR
3606  021624  005002                            CLR     R2              ;USE R2 TO COUNT TOTAL NUMBER OF TRANSMISSIONS
3607  021626  005003                            CLR     R3              ;USE R3 TO COUNT TOTAL NUMBER OF RECEPTIONS
3608  021630  012737  000040  001376            MOV     #40,XMTCNT      ;TRANSMIT A BINARY COUNT PATTERN(00-40)
3609  021636  012700  001422                    MOV     #TDO,R0         ;POINT TO THE DATA AREA
3610  021642  005020                            CLR     (R0)+           ;CLEAR A DATA WORD
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3611  021644  022700  001462                    CMP     #STOP,R0        ;FINISHED ?
3612  021650  001374                            BNE     .-6             ;NO
3613  021652  005000                            CLR     R0              ;CLEAR OFFSET
3614  021654  012777  022600  160214            MOV     #XMTSRV,@DZTIV  ;SET UP THE TRANSMITTER INTERRUPT VECTOR
3615  021662  012777  021770  160202            MOV     #9$,@DZRIV      ;SET UP THE RECEIVER INTERRUPT VECTOR
3616  021670  013777  026216  160176            MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATUS
3617  021676  013777  026216  160174            MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
3618  021704  052777  040140  160130            BIS     #RIE!TIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
3619  021712  113777  001364  1601↑836           MOVB    LINE,@DZTCR     ;ENABLE ALL SELECTED LINES
3620  021720  106427  000000                    MTPS    #0              ;ALLOW INTERRUPTS
3621  021724  005037  021764          4$:       CLR     7$
3622  021730  005037  021766                    CLR     8$
3623  021734  032777  000100  160100  5$:       BIT     #RIE,@DZCSR     ;WHEN RX DONE; RIE WILL =0
3624  021742  001407                            BEQ     6$              ;BR IF ALL DONE
3625  021744  005237  021764                    INC     7$
3626  021750  001371                            BNE     5$
3627  021752  105237  021766                    INCB    8$
3628  021756  100366                            BPL     5$
3629  021760  104011                            ERROR   11              ;*RX FAILED TO FINISH (INTERRUPT)
3630  021762  104400                  6$:       ADVANCE                 ;ADVANCE LOOP
3631  021764  000000                  7$:       0
3632  021766  000000                  8$:       0
3633
3634
3635                                            ;RECEIVER SERVICE ROUTINE
3636
3637  021770  017704  160052          9$:       MOV     @DZRBUF,R4      ;GET THE CHARACTER
3638  021774  100401                            BMI     10$             ;IF IT WAS VALID, CONTINUE TESTING
3639  021776  104000                            ERROR                   ;ERROR- ILLEGAL CHAR... DATA VALID NOT SET
3640  022000  010401                  10$:      MOV     R4,R1           ;COPY THE RECEIVED INFORMATION
3641  022002  000301                            SWAB    R1              ;GET THE LINE NUMBER IN THE LOWER BYTE
3642  022004  042701  177770                    BIC     #↑C<7>,R1       ;ISOLATE THE LINE NUMBER
3643  022010  006301                            ASL     R1              ;ALIGN IT ON A WORD BOUNDARY
3644  022012  032704  010000                    BIT     #PARER,R4       ;PARITY ERROR SHOULD BE SET. IS IT?
3645  ↑B022016        001013                    BNE     11$                     ;IF SO, GO CHECK CHARACTER
3646  022020  013737  002046  001400            MOV     @RBUF,REGIST    ;SET UP FOR THE ERROR MESSAGE
3647  022026  010405                            MOV     R4,R5
3648  022030  042705  000377                    BIC     #377,R5
3649  022034  156105  001442                    BISB    TRO(R1),R5      ;GET THE CORRECT CHARACTER
3650  022040  052705  110000                    BIS     #DVALID!PARER,R5 ;BUILD WHAT WAS EXPECTED
3651  022044  104006                            ERROR   6               ;*ERROR- DID NOT GET CORRECT INFORMATION
3652  022046  126104  001442          11$:      CMPB    TRO(R1),R4      ;CHECK THE CHARACTER. IS IT CORRECT?
3653  022052  001413                            BEQ     12$             ;IF SO, GO SET UP NEXT CHARACTER
3654  022054  116105  001442                    MOVB    TRO(R1)↑B,R5    ;LOAD THE CHARACTER FOR ERROR REPORTING
3655  022060  042705  177400                    BIC     #↑C<377>,R5     ;CLEAR SIGN EXTEND
3656  022064  010137  001372                    MOV     R1,SAVLIN       ;GET THE LINE NUMBER FOR REPORTING
3657  022070  006237  001372                    ASR     SAVLIN          ;ALIGN IT CORRECTLY
3658  022074  042704  177400                    BIC     #↑C<377>,R4     ;REMOVE THE JUNK FROM R4, THE ACTUAL CHARACTER
3659  022100  104005                            ERROR   5               ;DATA ERROR
3660  022102  005261  001442          12$:      INC     TRO(R1)         ;SET UP THE NEXT CHARACTER
3661  022106  005203                            INC     R3              ;ADD TO THE TOTAL RECEIVED COUNT
3662  022110  032777  040000  157724            BIT     #TIE,@DZCSR     ;ARE TRANSMISSIONS DONE?
3663  022116  001010                            BNE     13$             ;IF NO, GO RECEIVE SOME MORE
3664  022120  020203                            CMP     R2,R3           ;ARE ALL CHARACTERS RECEIVED?
3665  022122  001006                            BNE     13$             ;IF NO, GO RECEIVE SOME MORE
3666  022124  042777  000100  157710            BIC     #RIE,@DZCSR     ;DISABLE RECEIVER INTERRUPTS
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 3667  022132  012716  021762                    MOV     #6$,(SP)        ;CRUNCH THE STACK
 3668  022136  000002                            RTI                     ;RETURN AND FINISH
 3669  022140  012716  021724          13$:      MOV     #4$,(SP)        ;CRUNCH THE STACK
 3670  022144  000002                            RTI                     ;GO BACK TO RECEIVER WAIT L↑BCOP
 3671                                            ;************************ TEST 34 ******************************
 3672                                            ;*THIS TEST VERIFIES THAT ODD PARITY WORKS FOR ALL ODD LINES
 3673                                            ;* SELECTED AND THAT EVEN PARITY WORKS FOR ALL EVEN LINES SELECTED
 3674                                            ;*THE MAIN FUNCTION OF THIS TEST IS TO VERIFY
 3675                                            ;*THAT "PE" (PARITY ERROR) CAN BE FLAGGED BY
 3676                                            ;*THE UARTS. THIS TEST WILL NOT BE DONE UNLESS
 3677                                            ;*YOU ARE IN "STAGGERED" MODE.
 3678                                            ;*40(8) CHARS ARE USED FOR THIS TEST.
 3679                                            ;*ALL SELECTED LINES WILL BE ENABLED
 3680                                            ;*AT THE SAME TIME!
 3681                                    ;:*  TEST 34
 3682                                    ;:**********↑B**********************************************************
 3683  022146  000004                    TST34:  SCOPE
 3684  022150  012737  000034  001122            MOV     #34,$TSTNM      ;LOAD THE NUMBER OF THIS TEST
 3685  022156  012737  004444  001360            MOV     #$EOP,NEXT      ;POINT TO THE END-OF-PASS HANDLER
 3686  022164  005737  001370                    TST     MODE            ;IS THIS STAGGERED MODE?
 3687  022170  100111                            BPL     6$              ;IF NOT, DON'T DO THIS TEST
 3688  022172  104417                            DCLASM                  ;CLEAR DEVICE AND SET MAINT BIT IF I MODE
 3689  022174  013701  001366                    MOV     PAR,R1          ;USE R1 TO BUILD PARAMETERS TO BE LOADED
 3690  022200  042701  000200                    BIC     #ODDPAR,R1      ;MAKE SURE ODD PARITY ISN'T SET
 3691  022204  052701  000100                    BIS     #PARITY,R1      ;MAKE SURE PARITY IS TURNED ON
 3692  022210  012702  000001                    MOV     #1,R2           ;USE R2 AS A LINE POINTER
 3693  022214  030237  001364          1$:       BIT     R2,LINE         ;IS THIS A VALID LINE?
 3694  022220  001411                            BEQ     3$              ;IF NOT, SKIP TO THE NEXT LINE
 3695  022222  032701  000001                    BIT     #BIT0,R1        ;IS THIS LINE AN ODD LINE?
 3696  022226  001402                            BEQ     2$              ;IF IT'S EVEN, USE EVEN PARITY
 3697  022230  052701  000200                    BIS     #ODDPAR,R1      ;IF IT'S ODD, USE ODD PARITY
 3698  022234  010177  157612          2$:       MOV     R1,@DZLPR       ;LOAD THE LINE PARAMETER REGISTER
 3699  022240  042701  000200                    BIC     #ODDPAR,R1      ;SET UP THE NEXT PARITY TO EVEN
 3700↑B        022244  005201                    3$:     INC     R1              ;POINT TO THE NEXT LINE
 3701  022246  106302                            ASLB    R2              ;MOVE THE BIT POINTER IN R2 TO THE NEXT LINE
 3702  022250  103361                            BCC     1$              ;IF WE'RE NOT DONE, GO CHECK THE NEXT LINE
 3703  022252  005037  001372                    CLR     SAVLIN          ;CLEAR THE LINE NUMBER INDICATOR
 3704  022256  005002                            CLR     R2              ;USE R2 TO COUNT TOTAL NUMBER OF TRANSMISSIONS
 3705  022260  005003                            CLR     R3              ;USE R3 TO COUNT TOTAL NUMBER OF RECEPTIONS
 3706  022262  012737  000040  001376            MOV     #40,XMTCNT      ;TRANSMIT A BINARY COUNT PATTERN(00-40)
 3707  022270  012700  001422                    MOV     #TDO,R0         ;POINT TO THE DATA AREA
 3708  022274  005020                            CLR     (R0)+           ;CL↑BEAR A DATA WORD
 3709  022276  022700  001462                    CMP     #STOP,R0        ;FINISHED ?
 3710  022302  001374                            BNE     .-6             ;NO
 3711  022304  005000                            CLR     R0              ;CLEAR OFFSET
 3712  022306  012777  022600  157562            MOV     #XMTSRV,@DZTIV  ;SET UP THE TRANSMITTER INTERRUPT VECTOR
 3713  022314  012777  022422  157550            MOV     #9$,@DZRIV      ;SET UP THE RECEIVER INTERRUPT VECTOR
 3714  022322  013777  026216  157544            MOV     DZPRT,@DZRIS    ;SET THE INTERRUPT VECTOR STATUS
 3715  022330  013777  026216  157542            MOV     DZPRT,@DZTIS    ;SET TRANSMITTER INTERRUPT PRIORITY
 3716  022336  052777  040140  157476            BIS     #RIE!TIE!MSENAB,@DZCSR ;ENABLE THE DEVICE
 3717  022344  113777  001364  157504            MOVB    LINE,@DZTCR     ;ENABLE ALL SELECTED LINES
 3718  022352  106427  000000                    MTPS    #0              ;ALLOW INTERRUPTS
 3719  022356  005037  022416          4$:       CLR     7$
 3720  022362  005037  022420                    CLR     8$
 3721  022366  032777  000100  157446  5$:       BIT     #RIE,@DZCSR     ;WHEN RX DONE; RIE WILL =0
 3722  022374  001407                            BEQ     6$              ;BR IF ALL DONE
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3723  022376  005237  022416              INC     7$
3724  022402  001371                      BNE     5$
3725  022404  105237  022420              INCB    8$
3726  022410  100366                      BPL     5$
3727  022412  104011                      ERROR 11                ;*RX FAILED TO FINISH (INTERRUPT)
3728  022414  104400              6$:     ADVANCE                 ;ADVANCE LOOP
3729  022416  000000              7$:     0
3730  022420  000000              8$:     0
3731
3732
3733                                      ;RECEIVER SERVICE ROUTINE
3734
3735  022422  017704  157420      9$:     MOV     @DZRBUF,R4      ;GET THE CHARACTER
3736  022426  100401                      BMI     10$             ;IF IT WAS VALID, CONTINUE TESTING
3737  022430  104000                      ERROR                   ;ERROR- ILLEGAL CHAR... DATA VALID NOT SET
3739  022432  010401              10$:    MOV     R4,R1           ;COPY THE RECEIVED INFORMATION
3739  022434  000301                      SWAB    R1              ;GET THE LINE NUMBER IN THE LOWER BYTE
3740  022436  042701  177770              BIC     #^C<7>,R1       ;ISOLATE THE LINE NUM^BBER
3741  022442  006301                      ASL     R1              ;ALIGN IT ON A WORD BOUNDARY
3742  022444  032704  010000              BIT     #PARER,R4       ;PARITY ERROR SHOULD BE SET. IS IT?
3743  022450  001013                      BNE     11$             ;IF SO, GO CHECK CHARACTER
3744  022452  013737  002046  001400      MOV     DZRBUF,REGIST   ;SET UP FOR THE ERROR MESSAGE
3745  022460  010405                      MOV     R4,R5
3746  022462  042705  000377              BIC     #377,R5
3747  022466  156105  001442              BISB    TRO(R1),R5      ;GET THE CORRECT CHARACTER
3748  022472  052705  110000              BIS     #DVALID!PARER,R5 ;BUILD WHAT WAS EXPECTED
3749  022476  104006                      ERROR   6               ;*ERROR- DID NOT GET CORRECT INFORMATION
3750  022500  126104  001442      11$:    CMPB    TRO(R1),R4      ;CHECK THE CHARACTER. IS IT CORRECT?
3751  022504  001413                      BEQ     12$             ;IF SO, GO SET UP NEXT CHARACTER
3752  022506  116105  001442              MOVB    TRO(R1),R5      ;LOAD THE CHARACTER FOR ERROR REPORTING
3753  022512  042705  177400              BIC     #^C<377>,R5     ;CLEAR SIGN EXTEND
3754  022516  010137  001372              MOV     R1,SAVLIN       ;GET THE LINE NUMBER FOR REPORTING
3755  022522  006237  001372              ASR     SAVLIN          ;ALIGN IT CORRECTLY
3756  022526  042704  177400              BIC     #^C<377>,R4     ;REMOVE THE JUNK FROM R4, THE ACTUAL CHARACTER
3757  022532  104005                      ERROR   5               ;DATA ERROR
3758  022534  005261  001442      12$:    INC     TRO(R1)         ;SET UP THE NEXT CHARACTER
3759  022540  00^BS203                     INC     R3                      ;ADD TO THE TOTAL RECEIVED COUNT
3760  022542  032777  040000  157272      BIT     #TIE,@DZCSR     ;ARE TRANSMISSIONS DONE?
3761  022550  001010                      BNE     13$             ;IF NO, GO RECEIVE SOME MORE
3762  022552  020203                      CMP     R2,R3           ;ARE ALL CHARACTERS RECEIVED?
3763  022554  001006                      BNE     13$             ;IF NO, GO RECEIVE SOME MORE
3764  022556  042777  000100  157256      BIC     #RIE,@DZCSR     ;DISABLE RECEIVER INTERRUPTS
3765  022564  012716  022414              MOV     #6$,(SP)        ;CRUNCH THE STACK
3766  022570  000002                      RTI                     ;RETURN AND FINISH
3767  022572  012716  022356      13$:    MOV     #4$,(SP)        ;CRUNCH THE STACK
3768  022576  000002                      R^I                     ;GO BACK TO RECEIVER WAIT _OOP^B
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3769
3770                                    ;TRANSMITTER INTERRUPT SERVICE
3771                                    ;----------------------------
3772
3773  022600  117701  157240    XMTSRV: MOVB    @#DZCSR,R1      ;GET THE LINE NUMBER. IS THE TRANSMITTER
3774  022604  100401                    BMI     1$              ;REALLY READY? IF SO, GO LOAD THE CHARACTER
3775  022606  104003                    ERROR   3               ;*TRANSMITTER NOT READY- FALSE INTERRUPT
3776  022610  042701  177770    1$:     BIC     #^C<7>,R1       ;ISOLATE THE LINE NUMBER
3777  022614  006301                    ASL     R1              ;MAKE SURE IT REFERENCES A WORD BOUNDARY
3778  022616  116177  001422  157242    MOVB    TDO(R1),@#DZTDR ;LOAD THE CURRENT CHARACTER FOR THIS LINE
3779  022624  005261  001422            INC     TDO(R1)         ;SET UP NEXT CHARACTER FOR THIS LINE
3780  022630  005202                    INC     R2              ;UP THE NUMBER OF TRANSMISSIONS
3781  022632  023761  001376  001422    CMP     XMTCNT,TDO(R1)  ;HAVE WE DONE ALL PATTERNS ON THIS LINE?
3782  022640  001015                    BNE     4$              ;IF NOT, KEEP ON TRANSMITTING
3783  022642  012700  000001            MOV     #1,R0           ;SET UP A DESELECTION POINTER
3784  022646  006201                    ASR     R1              ;GET THE LINE NUMBER AGAIN
3785  022650  005301            2$:     DEC     R1              ;REDUCE THE COUNT. WAS THIS THE LINE?
3786  022652  100402                    BMI     3$              ;IF SO, GO DISABLE THE ENABLE BIT FOR IT
3787  022654  006300                    ASL     R0              ;MOVE THE POINTER TO THE NEXT LINE
3788  022656  000774                    BR      2$              ;GO CHECK THE NEXT LINE
3789  022660  140077  157172    3$:     BICB    R0,@#DZTCR      ;DISABLE THE LINE POINTED TO BY R0
3790  022664  001003                    BNE     4$              ;IF MORE LINES ARE ACTIVE , GO CONTINUE TRANSMIT
3791  022666  042777  040000  157146    BIC     #^TIE,@#DZCSR   ;IF NOT, DISABLE TRANSMITTER INTERRUPTS
3792  022674  000002            4$:     RTI                     ;RETURN TO THE TIMING LOOP
3793
3794                                    ; RELATIVE TIME BUILDING ROUTINE
3795                                    ; -----------------------------
3796
3797  022676  012737  0000^B04  001222  BUILD:  MOV     #4,$TMP2        ;ROTATE 4 BITS BACK INTO $TMP1
3798  022704  006037  001224    1$:     ROR     $TMP3           ;GET THE BITS FROM $TMP3, THE HIGH BYTE
3799  022710  006037  001220            ROR     $TMP1           ;OF THE RELATIVE TIME COUNTER. PUT THEM BACK
3800  022714  005337  001222            DEC     $TMP2           ;INTO $TMP1 USING THE CARRY BIT WITH
3801                                                            ;ROTATE INSTRUCTIONS
3802  022720  001371                    BNE     1$              ;REDUCE COUNT. ALL BITS BACK? IF NOT, GET MORE
3803  022722  000207                    RTS     PC              ;RETURN TO CALLING TEST
3804
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3805                                            ;RECEIVER SERVICE ROUTINE
3806
3807  022724  105777  157112          RXISR1: TSTB    @DZCSR          ;IS THE RECEIVER REALLY READY?
3808  022730  100401                          BMI     1$              ;IF SO, GO SERVICE IT
3809  022732  104004                          ERROR   4               ;*ERROR- RECEIVER DONE FLAG ISN'T SET
3810  022734  017704  157106          1$:     MOV     @DZRBUF,R4      ;SAVE THE RECEIVER INFORMATION
3811  022740  100401                          BMI     2$              ;IF IT WAS VALID, GO PROCESS IT
3812  022742  104000                          ERROR                   ;ERROR- DATA VALID WASN'T SET
3813  022744  032704  070000          2$:     BIT     #OVRRUN!FRMERR!PARER,R4 ;ARE ANY ERROR FLAGS SET?
3814  022750  001404                          BEQ     3$              ;IF NOT, GO CONTINUE PROCESSING
3815  02†82752       013737  072046  001400          MOV     DZRBUF,REGIST   ;SET UP FOR ERROR REPORTING
3816  022760  104002                          ERROR   2               ;ERROR- RECEIVER ERROR FLAG SET
3817  022762  010401                  3$:     MOV     R4,R1           ;COPY THE RECEIVER INFORMATION
3818  022764  000301                          SWAB    R1              ;GET THE LINE NUMBER IN THE LOWER BYTE
3819  022766  042701  177770                  BIC     #†C<7>,R1       ;ISOLATE THE LINE NUMBER
3820  022772  006301                          ASL     R1              ;ALIGN IT ON A WORD BOUNDARY
3821  022774  120461  001442                  CMPB    R4,TRO(R1)      ;IS THE CHARACTER WHAT IT SHOULD BE?
3822  023000  001413                          BEQ     4$              ;IF SO,GO CONTINUE PROCESSING
3823  023002  116105  001442                  MOVB    TRO(R1),R5      ;GET WHAT WAS EXPECTED FOR ERROR†B PEPORTING
3824  023006  042705  177400                  BIC     #†C<377>,R5     ;ELIMINATE PROPAGATED SIGN
3825  023012  042704  177400                  BIC     #†C<377>,R4     ;ISOLATE THE ACTUAL CHARACTER
3826  023016  010137  001372                  MOV     R1,SAVLIN       ;GET THE LINE NUMBER OF THE RECEIVER ERROR
3827  023022  006237  001372                  ASR     SAVLIN          ;ALIGN IT CORRECTLY FOR REPORTING
3828  023026  104005                          ERROR   5               ;*DATA ERROR
3829  023030  005261  001442          4$:     INC     TRO(R1)         ;SET UP THE NEXT EXPECTED CHARACTER
3830  023034  005203                          INC     R3              ;INCREMENT THE COUNT OF RECEIVED CHARACTERS
3831  023036  032761  000020  001442          BIT     #20,TRO(R1)     ;HAVE ALL CHARACTERS BEEN RECEIVED?
3832  023044  001402                          BEQ     5$              ;IF NOT, GO RECEIVE SOME MORE
3833  023046  020203                          CMP     R2,R3           ;HAVE WE RECEIVED ALL CHARACTERS?
3834  023050  001401                          BEQ     6$              ;IF SO,GO DETERMINE THE TIMING
3835  023052  000002                  5$:     RTI                     ;GO CONTINUE TIMING AND ALLOW INTERRUPTS
3836  023054  004737  022676          6$:     JSR     PC,BUILD        ;GET THE RELATIVE TIME (SIGNIFICANT BITS)
3837
3838  023060  013700  023140                  MOV     OFFSET,R0       ;GET POINTER
3839  023064  013760  001220  002102          MOV     $TMP1,†TMTBL(R0) ; SAVE THIS TEST'S TIME
3840  023072  005737  023140                  TST     OFFSET†         ;FIRST TEST?
3841  023076  001414                          BEQ     7$              ;IF NOT, GO CHECK THE TIME
3842  023100  005740                          TST     -(R0†B)         ;POINT TO THE PREVIOUS  TIME TAKEN
3843  023102  026037  002102  001220          CMP     TMTBL(R0),$TMP1 ;IS THIS TIME WHAT IT SHOULD BE?
3844  023110  101007                          BHI     7$              ;IF SO, GO TO THE NEXT TEST
3845  023112  016005  002102                  MOV     TMTBL(R0),R5    ;PLACE WHAT WAS EXPECTED IN R5
3846  023116  010137  001372                  MOV     R1,SAVLIN       ;GET THE LINE NUMBER OF THE RECEIVER
3847  023122  006237  001372                  ASR     SAVLIN          ;MAKE SURE IT'S THE LINE NUMBER
3848  023126  104021                          ERROR   21              ;TIMING ERROR
3849  023130  042777  000140  156704  7$:     BIC     #RIE!MSENAB,@DZCSR ;DISABLE THE DEVICE
3850  023136  000002                          RTI                     ;RETURN TO THE PROGRAM
3851  023140  000000          OFFSE†BT:       0
```

```
3852                                    ;DZ11 ECHO/CABLE TEST
3853                                    ;COPYRIGHT 1976, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
3854
3855                                            ;*STARTING PROCEDURE
3856                                            ;*LOAD PROGRAM
3857                                            ;*LOAD ADDRESS 000210
3858                                            ;*PRESS START
3859                                            ;*PROGRAM WILL TYPE DZ11 ECHO/CABLE TEST
3860                                            ;*PROGRAM WILL TYPE  WHICH TEST- ECHO OR CABLE
3861                                            ;*TYPE IN  E  OR  C  RESPECTIVELY
3862                                            ;*PROGRAM WILL TYPE "VECTOR ADDRESS-"
3863                                            ;*TYPE IN THE ADDRESS OF THE RECEIVER INTERRUPT VECTOR
3864                                            ;*FOR THE DZ11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
3865                                            ;*PROGRAM WILL TYPE "CONTROL REGISTER ADDRESS-"
3866                                            ;*TYPE IN THE ADDRESS OF THE SYSTEM CONTROL REGISTER
3867                                            ;*FOR THE DZ11 TO BE TESTED, FOLLOWED BY <CARRIAGE RETURN>
3868                                            ;*PROGRAM WILL TYPE "LINE NUMBER-"
3869                                            ;*TYPE IN THE LINE NUMBER TO BE TESTED (IN OCTAL)
3870                                            ;*,FOLLOWED BY <CARRIAGE RETURN>
3871                                            ;*PROGRAM WILL TYPE "BAUD RATE-"
3872                                            ;*TYPE IN THE BAUD RATE OF THE DZ11 TERMINAL
3873                                            ;*,FOLLOWED BY <CARRIAGE RETURN>
3874                                                    ;*THE FOLLOWING BAUD RATES ARE ACCEPTED IN DECIMAL
3875                                            ;*              50
3876                                            ;*              75
3877                                            ;*              110
3878                                            ;*              135     (ROUNDED OFF   134.5)
3879                                            ;*              150
3880                                            ;*              300
3881                                            ;*              600
3882                                            ;*              1200
3883                                            ;*              1800
3884                                            ;*              2000
3885                                            ;*              2400
3886                                            ;*              3600
3887                                            ;*              4800
3888                                            ;*              7200
3889                                            ;*              9600
3890                                            ;*ALL OTHERS ARE REJECTED
3891
3892                                            ;*PROGRAM WILL TYPE "ECHO"  OR  "CABLE TEST" TO INDICATE THAT TESTING HAS STARTE
3893
3894
3895                                            ;PROGRAM INITIALIZATION
3896                                            ;LOCK OUT INTERRUPTS
3897                                            ;SET UP ↑BPROCESSOR STACK
3898                                            ;SET UP POWER FAIL VECTOR
3899                                            ;CLEAR PROGRAM FLAGS AND COUNTS
3900
3901  023142  012706  001120          XSTART: MOV     #STACK,SP       ;SET UP PROCESSOR STACK
3902  023146  106427  000340                  MTPS    #PR7            ;LOCK OUT INTERRUPTS
3903  023152  012737  023142  001126          MOV     #XSTART,$LPADR  ;SET UP IN CASE OF POWER FAIL
3904  023160  005037  025322                  CLR     STFLG           ;CLEAR TEST START FLAG
3905  023164  005037  001242                  CLR     $PASS           ;CLEAR PASS COUNT
3906  023170  005037  001132                  CLR     $ERTTL          ;CLEAR ERROR COUNT
3907  023174  105037  001123                  CLRB    $ERFLG          ;CLEAR ERROR FLAG
```

```
 3908  023200  005037  025326                CLR     LAST            ;CLEAR LAST ERROR PC
 3909  023204  032777  000001  155746 VEC1:  BIT     #SW00,@SWR      ;IF SW00=1, GET NEW VECTOR
 3910  023212  001465                        BEQ     OTHER           ;AND CSR
 3911  023214  012701  000300          VEC2: MOV     #300,R1
 3912  023220  012702  000302                MOV     #302,R2
 3913  023224  010221                  1$:   MOV     R2,(R1)+        ;RESTORE TRAPCATCHER
 3914  023226  005022                        CLR     (R2)+           ;IN FLOATING VECTOR AREA
 3915  023230  022122                        CMP     (R1)+,(R2)+     ;UPDATE THE POINTERS
 3916  023232  020127  001000                CMP     R1,#1000
 3917  023236  001372                        BNE     ↑B1$
 3918  023240  104403                        INSTR                   ;INPUT ADDRESS OF DEVICE VECTOR
 3919  023242  025354                        MVECTOR                 ;MESSAGE "VECTOR ADDRESS-"
 3920  023244  104405                        PARAM                   ;CONVERT STRING TO OCTAL
 3921  023246  000300                        300                     ;LOW LIMIT
 3922  023250  000770                        770                     ;HIGH  LIMIT
 3923  023252  002072                        DZRIV                   ;LOCATIONS TO BE FILLED
 3924  023254     003                .BYTE   3                       ;LSB MASK
 3925  023255     004                .BYTE   4                       ;NUMBER OF LOCATIONS
 3926  023256  104403                        INSTR                   ;INPUT ADDRESS OF DEVICE CSR
 3927  023260  025376                        MREGAD                  ;MESSAGE "CONTROL REGISTER ADDRESS-"
 3928  023262  104405                        PARAM                   ;CONVERT STRING TO OCTAL
 3929  023264  1600↑B00                                 160000                  ;LOW LIMIT
 3930  023266  163700                        163700                  ;HIGH LIMIT
 3931  023270  002042                        DZCSR                   ;LOCATIONS TO BE FILLED
 3932  023272     007                .BYTE   7                       ;LSB MASK
 3933  023273     001                .BYTE   1                       ;NUMBER OF LOCATIONS
 3934  023274  013737  002042  002046        MOV     DZCSR,DZRBUF    ;BEGIN BUILDING DEVICE ADDRESSES
 3935  023302  062737  000002  002046        ADD     #2,DZRBUF       ;FORM THE READ BUFFER ADDRESS
 3936  023310  013737  002046  002052        MOV     DZRBUF,DZLPR    ;REMEMBER THAT THIS IS ALSO LINE PARAMETER REG.
 3937  023316  013737  002046  002056        MOV     DZRBUF,DZTCR    ;BEGIN BUILDING TRANSMITTER CONTROL REGISTER
 3938  023324  062737  000002  002056        ADD     #2,DZTCR        ;FORM THE TRANSMITTER CONTROL REGISTER POINTER
 3939  023332  013737  002056  002060        MOV     DZTCR,HDZTCR
 3940  023340  005237  002060                INC     HDZTCR
 3941  023344  013737  002056  002066        MOV     DZTCR,DZTDR     ;BEGIN FORMING TRANSMITTER DATA REGISTER
 3942  023352  062737  000002  002066        ADD     #2,DZTDR        ;FORM THE TRANSMITTER DATA REGISTER
 3943  023360  013737  002066  002062        MOV     DZTDR,DZMSR
 3944  023366  032777  000002  155564 OTHER: BIT     #SW01,@SWR      ;RESELECT OF TEST?
 3945  023374  001427                        BEQ     XBEGIN          ;IF NOT, SKIP ASKING WHICH ONE
 3946  023376  104403                        INSTR                   ;INPUT WHICH TEST YOU ARE RUNNING
 3947  023400  025562                        MWHICH                  ;ECHO OR CA↑BBLE
 3948  023402  104416                        PAWCH                   ;SET FLAG
 3949  023404  025320                        WCHFLG                  ;THIS FLAG
 3950  023406  104403          BAUD:  INSTR                          ;INPUT BAUD RATE
 3951  023410  025504                        MSPEED                  ;MESSAGE "BAUD RATE-"
 3952  023412  104415                        PARMD                   ;CONVERT DECIMAL STRING TO OCTAL
 3953  023414  000062                        50.                     ;LOW LIMIT
 3954  023416  022600                        9600.                   ;HIGH LIMIT
 3955  023420  025336                        LINESP                  ;LOCATION TO BE FILLED
 3956  023422     000                .BYTE   0                       ;LSB MASK
 3957  023423     001                .BYTE   1                       ;NUMBER OF LOCATIONS
 3958  023424  104413          LINEX: DEVICE.CLR                     ;CLEAR DEVICE
 3959  023426  005037  025322                CLR     STFLG           ;CLEAR PROGRAM START FLAG
↑B3960         023432  104403                        INSTR                   ;INPUT LINE NUMBER
 3961  023434  025474                        MLINE                   ;MESSAGE "LINE NUMBER-"
 3962  023436  104405                        PARAM                   ;CONVERT  STRING TO OCTAL
 3963  023440  000000                        0                       ;LOW LIMIT
```

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3964  023442  000007                          7                       ;HIGH LIMIT
3965  023444  001372                          SAVLIN                  ;LOCATION TO BE FILLED
3966  023446     000                .BYTE      0                       ;LSB MASK
3967  023447     001                .BYTE      1                       ;NUMBER OF LOCATIONS
3968  023450  004537  025124                  JSR       R5,SET
3969
3970  023454  106427  000340      XBEGIN:     MTPS      #PR7            ;LOCK OUT INTERRUPTS
3971  023460  012706  001120                  MOV       #STACK,SP       ;SET UP PROCESSOR STACK
3972  023464  005037  025324                  CLR       LOCKUP          ;CLEAR TIMEOUT
3973  023470  005737  025320                  TST       WCHFLG          ;ECHO OR CABLE TEST ?
3974  023474  001413                          BEQ       2$              ;ECHO
3975  023476  012737  024176  001126          MOV       #TEST2,$LPADR   ;CABLE TEST
3976  023504  005737  025322                  TST       STFLG           ;ARE YOU LOOPING ?
3977  023510  001017                          BNE       1$              ;YES
3978  023512  005137  025322                  COM       STFLG           ;NO
3979  023516  104402  025655                  TYPE      ,MCABLE         ;TYPE CABLE TEST
3980  023522  000412                          BR        1$
3981  023524  012737  023554  001126  2$:     MOV       #TEST1,$LPADR   ;SET U↑BP ECHO TEST
3982  023532  005737  025322                  TST       STFLG           ;ARE YOU LOOPING ?
3983  023536  001004                          BNE       1$              ;YES
3984  023540  005137  025322                  COM       STFLG           ;NO
3985  023544  104402  025630                  TYPE      ,MTERM          ;TYPE ECHO TEST
3986  023550  000177  155352      1$:         JMP       @$LPADR         ;START TESTING
3987                                          ;THIS TEST WILL ACCEPT 1 CHARACTER AT A TIME
3988                                          ;(IN INTERRUPT MODE) AND TRANSMIT THAT SAME CHARACTER,
3989                                          ;ONE LINE AT A TIME, ANY LINE 0 THRU 7 (OCTAL)
3990
3991  023554  104413              TEST1:      DEVICE.CLR                ;CLEAR DZ11
3992  023556  012737  000001  001122          MOV       #1,$TSTNM
3993  023564  013777  025344  156264          MOV       NUMTCR,@DZTCR   ;SET T↑BCR BIT
3994  023572  013737  025342  001366          MOV       NUMLIN,PAR      ;SET PARAMETERS
3995  023600  053737  025340  001366          BIS       SPEED,PAR       ;SET BAUD RATE
3996  023606  013777  001366  156236          MOV       PAR,@DZLPR      ;LOAD PARAM.
3997  023614  012777  000040  156220          MOV       #MSENAB,@DZCSR  ;SET SCANN ENABLE
3998  023622  005004                          CLR       R4
3999  023624  012705  025672                  MOV       #MQUICK,R5      ;SET MESSAGE BUFFER
4000  023630  005777  156206      3$:         TST       @DZCSR          ;TRDY?
4001  023634  100404                          BMI       2$              ;BR IF YES
4002  023636  104414                          DELAY                     ;WAIT
4003  023640  005304                          DEC       R4              ;
4004  023642  001372                          BNE       3$              ;
4005  023644  104003                          ERROR     3               ;NO TRDY SET! WHY?
4006  023646  005004                  2$:     CLR       R4              ;RESET COUNTER TO 0
4007  023650  112577  156212                  MOVB      (R5)+,@DZTDR    ;LOAD CHAR
4008  023654  001365                          BNE       3$              ;
4009  023656  004737  007242                  JSR       PC,SERV.G       ;<↑G>?
4010  023662  122777  000377  155270          CMPB      #377,@SWR       ;RE-DO QUICK BROWN?
4011  023670  001731                          BEQ       TEST1           ;BR IF REPEAT PATTERN
4012  023672  104413                          DEVICE.CLR
4013  023674  106427  000340                  MTPS      #PR7            ;LOCK OUT INTERRUPTS
4014  023700  012737  024634  001360          MOV       #XEOP,NEXT
4015  023706  104413                          DEVICE.CLR
4016  023710  013737  025342  001366          MOV       NUMLIN,PAR      ;SELECT LINE # & SET INTERRUPT ENABLE
4017  023716  053737  025340  0013↑B66                  BIS     SPEED,PAR       ;SET LINE SPEED AND
4018                                                                    ;CHARACTER LENGTH (TRANS. & REC.)
4019  023724  052737  010000  001366          BIS       #RCVON,PAR      ;MAKE SURE RECEIVER IS TURNED ON
```

```
4020  023732  013777  001366  156112          MOV     PAR,@DZLPR      ;LOAD THE LINE PARAMETER REGISTER
4021  023740  012777  024014  156124          MOV     #INTSVC,@DZRIV  ;SET UP INTERRUPT SERVICE
4022  023746  013777  025346  156120          MOV     PRIO,@DZRIS     ;AND LEVEL
4023  023754  106437  026220                  MTPS    @#LESS1         ;ALLOW INTERRUPTS
4024  023760+8        012777  000140  156054          MOV     #RIE!MSENAB,@DZCSR ;SET RECEIVER INTERRUPT ENABLE
4025  023766  104402  025522                  TYPE    ,MCHAR          ;TYPE "ANY CHARACTER"
4026  023772  105777  155166          1$:     TSTB    @$TKS           ;IF SOMBODY HITS A KEY- GET NEW LINE #
4027  023776  100375                  BPL     1$              ;LOOP HERE
4028  024000  005777  155162                  TST     @$TKB           ;CLEAR CHAR
4029  024004  004737  007242                  JSR     PC,SERV.G       ;MAKE SURE IT WASN'T <^G>
4030  024010  000137  023424                  JMP     LINEX           ;
4031
4032
4033                                          ;THE FOLLOWING IS THE RECEIVER INTERRUPT SVC ROUTINE
4034  024014  105777  156022          INTSVC: TSTB    @DZCSR          ;TEST REC. FLAG
4035  024020  100401                  BMI     .+4
4036  024022  104004                  ERROR   4               ;ERROR - INTERRUPT NOT CAUSED BY FLAG
4037  024024  017737  156016  025350          MOV     @DZRBUF,RECDAT
4038  024032  100401                  BMI     .+4
4039  024034  104023                  ERROR   23              ;NON- VALID CHARACTER
4040  024036  032737  020000  025350          BIT     #BIT13,RECDAT   ;CHECK FOR FRAMING ERROR
4041  024044  001401                  BEQ     .+4             ;BR IF NO ERROR
4042  024046  104025                  ERROR   25              ;EITHER SOMBODY HIT THE
4043                                          ;"BREAK KEY" OR YOU HAVE AN ERROR!
4044  024050  113737  025350  025352          MOVB    RECDAT,TBUF     ;MOVE CHARACTER TO OUTPUT AREA
4045  024056  113737  025350  010502          MOVB    RECDAT,INBUF    ;MOVE CHARACTER TO CHECK FOR ^C
4046  024064  042737  17760+80         010502          BIC     #^C<177>,INBUF  ;STRIP JUNK PLUS PARITY
4047  024072  042737  174377  025350          BIC     #174377,RECDAT  ;SAVE ONLY LINE  NUMBER
4048  024100  000337  025350                  SWAB    RECDAT
4049  024104  023737  001372  025350          CMP     SAVLIN,RECDAT   ;DOES THE LINE # COMPARE?
4050  024112  001401                  BEQ     .+4
4051  024114  104015                  ERROR   15              ;*WRONG LINE NUMBER
4052  024116  013777  025344  155732          MOV     NUMTCR,@DZTCR   ;ENABLE THE LINE TO TRANSMIT
4053  024124  012777  000040  155710          MOV     #MSENAB,@DZCSR  ;START THE TRANSMITTERS SCANNER
4054  024132  123727  010502  000003          CMPB    INBUF,#3                ;IS IT A ^C ?
4055  024140  001004                  BNE     1$              ;NO
4056  024142  10441+83                        DEVICE.CLR
4057  024144  012716  024634                  MOV     #XEOP,(SP)      ;CRUNCH STACK
4058  024150  000002                  RTI
4059  024152  013777  025344  155676  1$:     MOV     NUMTCR,@DZTCR   ;ENABLE THE LINE
4060  024160  113777  025352  155700          MOVB    TBUF,@DZTDR     ;TRANSMIT THE CHARACTER
4061  024166  012777  000140  155646          MOV     #RIE!MSENAB,@DZCSR      ;RESTART THE RECEIVER
4062  024174  000002                  RTI
4063
4064
4065                                  ;THIS TEST TRANSMITS A BINARY COUNT PATTERN
4066                                  ;VIA INTERRUPT MODE TO THE RECEIVER
4067                                  ;...THE LINE UNDER TEST MUST BE TERMINATED WITH THE TEST CONNECTOR
4068  024176  106427  000340          TEST2:  MTPS    #PR7            ;DISABLE INTERRUPTS
4069  024202  012737  000002  001122          MOV     #2,$TSTNM
4070  024210  012737  024634  001360          MOV     #XEOP,NEXT
4071  024216  104413                          DEVICE.CLR              ;
4072                                          ;*TEST TO VERIFY THAT SETTING DTR FOR A GIVEN LINE
4073                                          ;*WILL BRING UP "CO" AND "RING" FOR THE SAME LINE
4074                                          ;*THE DIST PNL MUST HAVE JUMPER FROM DTR TO RQST TO SEND
4075                                          ;*IN ORDER FOR THIS TEST TO WORK!
```

```
4076  024220  012737  024226  001362          MOV     #1$,LOCK        ;LOOP
4077  024226  113777  025344  155624  1$:     MOVB@#B NUMTCR,@#DZTCR  ;SET DTR
4078  024234  005005                          CLR     R5              ;
4079  024236  153705  025344                  BISB    NUMTCR,R5       ;BUILD EXPECTED
4080  024242  000305                          SWAB    R5              ;PUT IN HIGH BYTE
4081  024244  153705  025344                  BISB    NUMTCR,R5       ;
4082  024250  104414                          DELAY                   ;WAIT FOR CABLE DELAY
4083  024252  017704  155604                  MOV     @#DZMSR,R4      ;READY MODEM BITS
4084  024256  020504                          CMP     R5,R4           ;ARE THEY OK?
4085  024260  001401                          BEQ     2$              ;BR IF YES
4086  024262  104022                          ERROR   22              ;IS THE TEST CONNECTOR ON?
4087                                                                  ;HAS RIGHT LINE BEEN SELECTED?
4088                                                                  ;IF SO- YOU HAVE A PROBLEM!
4089                                                                  ;MODEM BITS NOT RIGHT
4090  024264  @#B104401               2$:     SCOP1                   ;LOOP
4091  024266  104413                  3$:     DEVICE.CLR              ;INIT DZ11
4092  024270  013737  025340  001366          MOV     SPEED,PAR       ;SET LINE SPEED
4093  024276  053737  025342  001366          BIS     NUMLIN,PAR      ;SELECT LINE # & REC.  INTERRUPT ENABLE
4094  024304  052737  010000  001366          BIS     #RCVON,PAR      ;ENABLE THE RECEIVER FOR THIS LINE
4095  024312  052777  040140  155522          BIS     #TIE!RIE!MSENAB,@#DZCSR ;SET TRANSMITTER INTERRUPT ENABLE
4096  024320  012777  024434  155544          MOV     #INTREC,@#DZRIV ;SET UP INTR SERVICE
4097  024326  013777  025346  155540          MOV     PRIO,@#DZRIS    ;SET UP LEVEL
4098  024334  012777  024614  155534          MOV     #INTRAN,@#DZTIV ;SET UP INTR SERVICE
4099  024342  013777  025346  155530          MOV     PRIO,@#DZTIS    ;SET UP LEVEL
4100  024350  005001                          CLR     R1              ;RX DATA POINTER- SET TO 0
4101  024352  005002                          CLR     R2              ;TX DATA POINTER- SET TO 0
4102  024354  013777  001366  155470          MOV     PAR,@#DZLPR     ;SET THE PARAMETERS AND TURN ON RECEIVER
4103  024362  106437  026220                  MTPS    @#LESS1         ;ALLOW INTERRUPTS
4104  024366  013777  025344  155462          MOV     NUMTCR,@#DZTCR  ;SET UP TCR BIT
4105
4106                                          ;YOU RETURN HERE AFTER EVERY RECEIVER INTERRUPT
4107  024374  105777  154564          SPIN:   TSTB    @#$TKS          ;IF SOMEBODY HITS A KEY- GET A NEW LINE #
4108  024400  100006                          BPL     1$              ;BR IF NO KEY HIT
4109  024402@#82      005777  154560                  TST     @#$TKB          ;CLEAR CHAR
4110  024406  004737  007242                  JSR     PC,SERV.G       ;MAKE SURE IT WASN'T (^G)
4111  024412  000137  023424                  JMP     LINEX           ;SW02=1
4112  024416  005237  025324          1$:     INC     LOCKUP          ;INC TIMEOUT FLAG
4113  024422  001364                          BNE     SPIN            ;IF NOT 0  RETURN SPINNING
4114  024424  104011                          ERROR   11              ;*RECEIVER FAILED TO INTERRUPT  CHECK CABLE,TERMINATOR
4115  024426  104413                  QUITS:  DEVICE.CLR
4116  024430  000137  024634                  JMP     XEOP            ;CALL FOR END OF PASS
4117  024434  005037  025324          INTREC: CLR     LOCKUP          ;CLEAR TIMEOUT FLAG
4118  024440  105777  155376                  TSTB    @#DZCSR         ;TEST REC DONE
4119  024444  100401                          BMI@#B  .+4             ;YES
4120  024446  104004                          ERROR   4               ;*FALSE INTERRUPT
4121  024450  017737  155372  025350          MOV     @#DZRBUF,RECDAT ;SAVE WORD
4122  024456  100401                          BMI     .+4
4123  024460  104023                          ERROR   23              ;*NON VALID CHARACTER
4124  024462  032737  040000  025350          BIT     #BIT14,RECDAT   ;DATA OVERRUN ?
4125  024470  001401                          BEQ     .+4             ;NO
4126  024472  104024                          ERROR   24              ;*YES
4127  024474  032737  020000  025350          BIT     #BIT13,RECDAT   ;FRAMING ERROR ?
4128  024502  001401                          BEQ     .+4             ;NO
4129  024504  104025                          ERROR   25              ;*YES
4130  024506  032737  010000  025350          BIT     #BIT12,RECDAT   ;PARITY ERROR ?
4131  024514  001401                          BEQ     .+4             ;NO
```

```
4132  024516  104026                          ERROR   26              ;*YES
4133  024520  110105                          MOVB    R1,R5           ;SET EXPECTED
4134  024522  042705  177400                  BIC     #^C<377>,R5     ;CLEAR HIGH BYTE
4135  024526  113704  025350                  MOVB    RECDAT,R4       ;GET FOUND
4136  024532  042704  177400                  BIC     #^C<377>,R4     ;CLEAR HIGH BYTE
4137  024536  020504                          CMP     R5,R4   ;OK?
4138  024540  001401                          BEQ     .+4
4139  024542  104005                          ERROR   5               ;DATA ERROR
4140  024544  042737  174377  025350          BIC     #174377,RECDAT  ;SAVE ONLY LINE NUMBER
4141  024552  001B0337        025350          SWAB    RECDAT
4142  024556  023737  001372  025350          CMP     SAVLIN,RECDAT   ;DOES THE LINE # COMPARE ?
4143  024564  001401                          BEQ     .+4             ;YES
4144  024566  104015                          ERROR   15              ;*WRONG LINE #
4145  024570  120127  000377                  CMPB    R1,#377         ;LAST CHARACTER ?
4146  024574  001003                          BNE     1$              ;NO
4147  024576  012716  024426                  MOV     #QUITS,(SP)     ;CRUNCH STACK
4148  024602  000403                          BR      2$
4149  024604  105201                  1$:     INCB    R1              ;UPDATE EXPECTED DATA
4150  024606  012716  024374                  MOV     #SPIN,(SP)      ;CRUNCH STACK
4151  024612  000002                  2$:     RTI
4152
4153  024614  005777  155222          INTRAN: TST     @DZCSR  ;TEST TRANSMIT FLAG
4154  024620  100401          ↑B              BMI     .+4
4155  024622  104003                          ERROR   3               ;*FALSE INTERRUPT
4156  024624  110277  155236                  MOVB    R2,@DZTDR       ;TRANSMIT A CHARACTER
4157  024630  105202                          INCB    R2              ;UPDATE TX DATA
4158  024632  000002                          RTI     ;RETURN
```

```
4159
4160                                            ;END OF PASS
4161                                            ;RESTART TEST
4162
4163  024634  104402                  XEOP:     TYPE                    ;TYPE NAME OF TEST
4164  024636  025432                            MPASS
4165  024640  005037  025326                    CLR     LAST            ;CLEAR LAST ERROR PC
4166  024644  105037  001123                    CLRB    $ERFLG          ;CLEAR ERROR FLAG
4167  024650  000137  023454          RSTRT:    JMP     XBEGIN
4168
4169                                            ;CONVERT DECIMAL ASCII STRING TO OCTAL
4170  024654  011605                  .PARMD:   MOV     (SP),R5
4171  024656  012537  025040                    MOV     (R5)+,6$
4172  024662  012537  025042                    MOV     (R5)+,7$
4173  024666  012537  025044                    MOV     (R5)+,8$
4174  024672  112537  025046                    MOVB    (R5)+,9$
4175  024676  112537  025047                    MOVB    (R5)+,10$
4176  024702  010516                            MOV     R5,(SP)
4177  024704  005005                  2$:       CLR     R5
4178  024706  012704  010502                    MOV     #INBUF,R4
4179  024712  122714  000015                    CMPB    #15,(R4)
4180  024716  001424                            BEQ     3$
4181  024720  121427  000060          1$:       CMPB    (R4),#'0
4182  †B024724                                  BLT     3$
4183  024726  121427  000071                    CMPB    (R4),#'9
4184  024732  003016                            BGT     3$
4185  024734  142714  000060                    BICB    #'0,(R4)
4186  024740  005002                            CLR     R2
4187  024742  152402                            BISB    (R4)+,R2
4188  024744  060205                            ADD     R2,R5
4189  024746  122714  000015                    CMPB    #15,(R4)
4190  024752  001410                            BEQ     4$
4191  024754  006305                            ASL     R5              ;X2
4192  024756  010502                            MOV     R5,R2           ;SAVE X2
4193  024760  006305                            ASL     R5              ;X4
4194  024762  006305                            ASL     R5              ;X8
4195  024764  060205                            ADD     R2,R5           ;TIMES 10
4196  024766  000754                            BR      1$
4197  024770  104404                  3$:       INSTER
4198  024772  000744                            BR      2$
4199
4200                  †B                        ;TEST TO SEE IF NUMBER IS WITHIN LIMITS
4201
4202  024774  020537  025042          4$:       CMP     R5,7$
4203  025000  101373                            BHI     3$
4204  025002  020537  025040                    CMP     R5,6$
4205  025006  103770                            BLO     3$
4206  025010  133705  025046                    BITB    9$,R5
4207  025014  001365                            BNE     3$
4208
4209                                            ;STORE NUMBER AT SPECIFIED ADDRESS
4210
4211  025016  013704  025044                    MOV     8$,R4
4212  025022  010524                  5$:       MOV     R5,(R4)+
4213  025024  062705  000002                    ADD     #2,R5
4214  025030  105337  025047                    DECB    10$
```

```
4215  025034  001372                          BNE     5$
4216  025036  000002                          RTI
4217  025040  000000                  6$:
4218  025042  000000                  7$:     0
4219  025044  000000                  8$:     0
4220  025046     000                  9$:     .BYTE 0
4221  025047     000                  10$:    .BYTE 0
4222
4223
4224                                          ;COMPARE THE FIRST CHARACTER IN THE TELETYPE INPUT
4225                                          ;BUFFER TO THE CHARACTERS "E" AND "C".
4226                                          ;IF THE CHARACTER IS "E" CLEAR THE FLAG
4227                                          ;IF THE CHARACTER IS "C" SET THE FLAG
4228
4229  025050  017605  000000          .PAWCH: MOV     @(SP),R5
4230  025054  142737  000040  010502          BICB    #40,INBUF       ;SET FOR LOWER CASE INPUT
4231  025062  122737  001B0105        010502          CMPB    #'E,INBUF       ;IS IT "E" ?
4232  025070  001002                          BNE     1$
4233  025072  105015                          CLRB    (R5)            ;000
4234  025074  000406                          BR      2$
4235  025076  122737  000103  010502  1$:     CMPB    #'C,INBUF       ;IS IT "C" ?
4236  025104  001005                          BNE     3$
4237  025106  112715  177777                  MOVB    #-1,(R5)        ;3177
4238  025112  062716  000002          2$:     ADD     #2,(SP)
4239  025116  000002                          RTI
4240  025120  104404                  3$:     INSTER                  ;RETRY
4241  025122  000752                          BR      .PAWCH
4242
4243
4244
4245                                          ;THIS ROUTINE CONVERTS LINE SPEED (LINESP) AND
4246                                          ;LINE NUMBER (SAVLIN) FOR DZLPR, DZTCR AND DZCSR
4247                                          ;REGISTER USAGE.
4248
4249  01B25124        013737  001372  025342  SET:    MOV     SAVLIN,NUMLIN   ;SAVE SAVLIN
4250  025132  013700  001372          XTCR0:  MOV     SAVLIN,R0       ;COPY THE LINE NUMBER FOR LOOP CONTROL
4251  025136  005037  025344                  CLR     NUMTCR          ;SET A DEFAULT OF LINE 0 OR NO LINES
4252  025142  012702  000001                  MOV     #1,R2           ;SET A BIT POINTER TO THE FIRST LINE
4253  025146  005300                  XTCR1:  DEC     R0              ;REDUCE THE INDICATOR.IS IT MINUS YET?
4254  025150  100402                          BMI     SET1            ;IF SO, R2 POINTS TO THE RIGHT LINE
4255  025152  006302                          ASL     R2              ;IF NOT, MOVE THE POINTER TO THE NEXT LINE
4256  025154  000774                          BR      XTCR1           ;GO SEE IF THIS LINE IS THE ONE
4257  025156  012701  025220          SET1:   MOV     #TABLE2,R1
4258  025162  010237  025344                  MOV     R2,NUMTCR       ;COPY THE CORRECT BIT POINTER
4259  025166  022137  025336          1$:     CMP     (R1)+,LINESP
4260  025172  001407                          BEQ     2$
4261  025174  005721                          TST     (R1)+           ;IS IT THE END OF TABLE?
4262  025176  001373                          BNE     1$              ;NO
4263  025200  104402  025446                  TYPE    ,MINVAL         ;INVALID BAUD RATE,BEGIN AGAIN
4264  025204  012705  023406                  MOV     #BAUD,R5        ;JUMP TO BAUD THRU R5
4265  025210  000402                          BR      3$
4266  025212  011137  025340          2$:     MOV     (R1),SPEED      ;SET UP BAUD RATE
4267  025216  000205                  3$:     RTS     R5
4268
4269
4270
```

```
 4271                                          ;THE FOLLOWING IS A TABLE OF LEGAL BAUD RATES (8 BITS/CHAR,
 4272  025220  000062                TABLE2: .WORD   50.             ;50 BAUD
 4273  025222  010070                        .WORD   10070           ;
 4274  025224  000113                        .WORD   75.             ;75 BAUD
 4275  025226  010470                        .WORD   10470           ;
 4276  025230  000156                        .WORD   110.            ;110 BAUD
 4277  025232  011070                        .WORD   11070           ;TWO STOP BITS
 4278  025234  000207                        .WORD   135.            ;134.5 BAUD
 4279  025236  011470                        .WORD   11470           ;TWO STOP BITS
 4280  025240  000226                        .WORD   150.            ;150 BAUD
 4281  025242  012070                        .WORD   12070           ;TWO STOP BITS
↑B4282 025244  000454                        .WORD   300.            ;300 BAUD
 4283  025246  012470                        .WORD   12470           ;ONE STOP BIT
 4284  025250  001130                        .WORD   600.            ;600 BAUD
 4285  025252  013070                        .WORD   13070           ;ONE STOP BIT
 4286  025254  002260                        .WORD   1200.           ;1200 BAUD
 4287  025256  013470                        .WORD   13470           ;ONE STOP BIT
 4288  025260  003410                        .WORD   1800.           ;1800 BAUD
 4289  025262  014070                        .WORD   14070           ;ONE STOP BIT
 4290  025264  003720                        .WORD   2000.           ;2000 BAUD
 4291  025266  014470                        .WORD   14470           ;ONE STOP BIT
 4292  025270  004540                        .WORD   2400.           ;2400 BAUD
 4293  025272  015070                        .WORD   15070           ;ONE STOP BIT
 4294  025274  007020                        .WORD   3600.           ;3600 BAUD
 4295  025276  015470                        .WORD   15470           ;ONE STOP BIT
 4296  025300  011300                        .WORD   4800.           ;4800 BAUD
 4297  025302  016070                        .WORD   16070           ;ONE STOP BIT
 4298  025304  016040                        .WORD   7200.           ;7200 BAUD
 4299  025306  016470                        .WORD   16470           ;ONE STOP BIT
 4300  025310  022600                        .WORD   9600.           ;9600 BAUD
 4301  025312  017070                        .WORD   17070           ;
 4302  025314  177777  000000               .WORD   -1,0            ;TABLE TERMINATOR
 4303
 4304
 4305  025320  000000                WCHFLG:0                        ;ECHO OR CABLE FLAG
 4306  025322  000000                STFLG:  0                       ;PROGRAM START FLAG
 4307  025324  000000                LOCKUP: 0                       ;TIMEOUT FLAG
 4308  025326  000000                LAST:   0                       ;LAST ERROR PC
↑B4309 025330  000000                TDATA:  0
 4310  025332  000000                RDATA:  0
 4311  025334  000000                BYTCNT: 0
 4312  025336  000156                LINESP: 110.                    ;DEFAULT BAUD RATE
 4313  025340  006307                SPEED:  6307                    ;DEFAULT 110 BAUD, 8 BITS/CHAR,
 4314                                                                ;FDX, 2 STOP BITS
 4315  025342  000100                NUMLIN: 100                     ;DEFAULT VALUE, REC. INTERRUPT ENABLED
 4316
 4317  025344  000001                NUMTCR: 1                       ;DEFAULT VALUE,TCR BIT 0
 4318  025346  000240                PRIO:   240                     ;DEFAULT DEVICE PRIORITY 5
 4319  025350  000000                RECDAT: 0
 4320  025352  000000                TBUF:   0
 4321  025354  053200  041505  047524  MVECTO: .ASCIZ  <200>/VECTOR ADDRESS- /
       025376  041600  047117  05112↑B4       MREGAD: .ASCIZ  <200>/CONTROL REGISTER ADDRESS- /
       025432  050200  051501  020123  MPASS:  .ASCIZ  <200>/PASS DONE./
       025446  044600  053116  046101  MINVAL: .ASCIZ  <200>/INVALID BAUD RATE - /
       025474  046200  047111  035105  MLINE:  .ASCIZ  <200>/LINE: /
       025504  041200  052501  020104  MSPEED: .ASCIZ  <200>/BAUD RATE - /
```

```
025522  052200  050131  020105  MCHAR:  .ASCIZ  <200>/TYPE A CHAR. ON DZ11 TERMINAL /
025562  053600  044510  044103  MWHICH: .ASCIZ  <200>/WHICH TEST ? ECHO OR CABLE (E OR C) /
025630  052200  051105  044515  MTERM:  .ASCIZ  <200>/TERMINAL ECHO TEST /
025655     200  040503  046102  MCABLE: .ASCIZ  <200>/CABLE TEST /
025672  006777  177777  177412  MQUICK: .ASCII  <377><15><377><377><12><377><377>
025701     124  042510  050440          .ASCII  /THE QUICK BROWN FOX JUMPED OVER THE LAZY DOGS BACK 0123456789/
025776  006777  177777  177412          .ASCII  <377><15><377><377><12><377><377><377><0>
        026010                  .EVEN
                        ;;*****************************************************************
                                ;UTILITIES
                        ;;*****************************************************************

                        ;THIS UTILITY CALCULATES PRIORITY LEVEL,SETS UP CSR'S,SETS UP VECTORS.
026010  006337  026216  DZLEV:  ASL     DZPRT           ;BUILD PRIORITY IN THIS LOCATION
026014  006337  026216          ASL     DZPRT           ;USING ARITHMETIC SHIFTS, ROTATE
026020  006337  026216          ASL     DZPRT           ;       THE PRIORITY LEVEL PAST
026024  006337  026216          ASL     DZPRT           ;       THE BIT POSITIONS CORRE-
026030  006337  026216          ASL     DZPRT           ;       SPONDING TO THE CONDITION CODES
026034  013737  026216  026220  MOV     DZPRT,LESS1     ;MOVE THIS TO LESS1
026042  162737  000001  026220  SUB     #1,LESS1        ;CREATE THE NEXT LOWEST PRIORITY
026050  042737  000C37  026220  BIC     #37,LESS1       ;INSURE THAT THE  TNZVC BITS ARE CLEAR
026056  013700  002072          MOV     DZRIV,R0        ;PLACE THE BASE VECTOR ADDRESS IN R0
026062  062700  000002          ADD     #2,R0           ;CALCULATE THE RECEIVER INTERRUPT STATUS ADDR.
026066  010037  002074          MOV     R0,DZRIS        ;STORE IT HERE
026072  062700  000002          ADD     #2,R0           ;CALCULATE THE TRANSMITTER INTERRUPT VECTOR
026076  010037  002076          MOV     R0,DZTIV        ;STORE IT HERE
026102  062700  000002          ADD     #2,R0           ;CALCULATE THE TRANSMITTER VECTOR STATUS ADDRESS
026106  010037  002100          MOV     R0,DZTIS        ;STORE IT HERE

                        ;THIS SEGMENT SETS UP POINTERS FOR THE GIVEN DZ11. $BASE IS THE BASE ADDRESS
                        ;OF THE DEVICE
026112  013700  001310          MOV     $BASE,R0        ;COPY THE ADDRESS BEING LOADED
026116  010037  002042          MOV     R0,DZCSR        ;XXX0
026122  005200                  INC     R0
026124  010037  002044          MOV     R0,HDZCSR       ;XXX1
026130  005200                  INC     R0
026132  010037  002046          MOV     R0,DZRBUF       ;XXX2
026136  010037  002052          MOV     R0,DZLPR        ;XXX2
026142  005200                  INC     R0
026144  010037  002050          MOV     R0,HDZRBUF      ;XXX3
026150  010037  002054          MOV     R0,HDZLPR       ;XXX3
026154  005200                  INC     R0
026156  010037  002056          MOV     R0,DZTCR        ;XXX4
026162  005200                  INC     R0
026164  010037  002060          MOV     R0,↑BHDZTCR     ;XXX5
026170  005200                  INC     R0
026172  010037  002062          MOV     R0,DZMSR        ;XXX6
026176  010037  002066          MOV     R0,DZTDR        ;XXX6
026202  005200                  INC     R0
026204  010037  002064          MOV     R0,HDZMSR       ;XXX7
026210  010037  002070          MOV     R0,HDZTDR       ;XXX7
026214  000207                  RTS     PC
026216  000240  DZPRT:  PR5
026220  000200  LESS1:  PR4     ;LEVEL TO ALLOW INTERRUPTS
```

```
4368                                            ;ERROR ERROR TABLE
4369  026222  000000                .ERRTAB:      0!B     ;ERROR 0
4370  026224  000000                              0
4371  026226  000000                              0
4372
4373  026230  026434                              EM1     ;ERROR
4374  026232  027634                              DH1
4375  026234  030032                              DT1
4376
4377  026236  026507                              EM2     ;ERROR 2
4378  026240  027657                              DH2
4379  026242  030044                              DT2
4380
4381  026244  026535                              EM3     ;ERROR 3
4382  026246  027712                              DH3
4383  026250  030062                              DT3
4384
4385  026252  026574                              EM4     ;ERROR 4
4386  026254  027712                              DH3
4387  026256  030062                              DT3
4388
4389  026260  026623                              EM5     ;ERROR 5
4390  026262  027724                              DH4
4391  026264  030070                              DT4
4392
4393  026266  026652                              EM6     ;ERROR 6
4394  026270  027724                              DH4
4395  026272  030070                              DT4
4396
4397  026274  026710                              EM7     ;ERROR 7
4398  026276  027712                              DH3
4399  026300  030062                              DT3
4400
4401  026302  026751                              EM8     ;ERROR 10
4402  026304  027712                              DH3
4403  026306  030062                              DT3
4404
4405  026310  027013                              EM9     ;ERROR 11
4406  026312  027712                              DH3
4407  026314  030062                              DT3
4408
4409  026316  027051                              EM10    ;ERROR 12
4410  026320  027712                              DH3
4411  026322  030062                              DT3
4412
4413  026324  027110                              EM13    ;ERROR 13
4414  026326  027712                              DH3
4415  026330  030062                              DT3
4416
4417  026332  027141                !B            EM14    ;ERROR 14
4418  026334  027712                              DH3
4419  026336  030062                              DT3
4420
4421  026340  027173                              EM15    ;ERROR 15
4422  026342  000000                              0
4423  026344  000000                              0
```

```
4424
4425  026346  027235                          EM16
4426  026350  027712                          DH3
4427  026352  030062                          DT3
4428
4429  026354  027306                          EM17    ;ERROR 17
4430  026356  027712                          DH3
4431  026360  030062                          DT3
4432
4433  026362  027344                          EM20
4434  026364  027712                          DH3
4435  026366  030062          ↑B              DT3
4436
4437  026370  027405                          EM21    ;ERROR 21
4438  026372  027753                          DH5
4439  026374  030106                          DT5
4440
4441  026376  027435                          EM22    ;ERROR 22
4442  026400  027724                          DH4
4443  026402  030070                          DT4
4444
4445  026404  027477                          EM23    ;ERROR 23
4446  026406  027712                          DH3
4447  026410  030062                          DT3
4448
4449  026412  027527                          EM24
4450  026414  027712                          DH3
4451  026416  030062                          DT3
4452
4453  026420  027555                          EM25
4454  026422  027712                          DH3
4455  026424  030062                          DT3
4456
4457  026426  027605                          EM26
4458  026430  027712                          DH3
4459  026432  030062                          DT3
```

```
                                                    ;ERROR MESSAGES
026434  047200  020117  046123  EM1:    .ASCIZ  <200>/NO SLAVE SYNC RESPONSE FROM DZ11 REGISTER/
026507     200  042522  044507  EM2:    .ASCIZ  <200>?REGISTER R/W FAILURE?
026535     200  051124  047101  EM3:    .ASCIZ  <200>/TRANSMIT READY (TRDY) NOT SET/
026574  051200  041505  044505  EM4:    .ASCIZ  <200>/RECEIVER DONE NOT SET/
026623     200  040504  040524  EM5:    .ASCIZ  <200>/DATA COMPARISON ERROR/
026652  042200  030532  020061  EM6:    .ASCIZ  <200>/DZ11 *RECEIVER BUFFER* ERR↑BOR/
026710  052200  040522  051516  EM7:    .ASCIZ  <200>/TRANSMITTER FAILED TO INTERRUPT/
026751     200  047125  054105  EM8:    .ASCIZ  <200>/UNEXPECTED TRANSMITTER INTERRUPT/
027013     200  042522  042503  EM9:    .ASCIZ  <200>/RECEIVER FAILED TO INTERRUPT/
027051     200  047125  054105  EM10:   .ASCIZ  <200>/UNEXPECTED RECEIVER INTERRUPT/
027110  051600  046111  020117  EM13:   .ASCIZ  <200>/SILO ALARM SET TOO SOON/
027141     200  044523  047514  EM14:   .ASCIZ  <200>/SILO ALARM FAILED TO SET/
027173     200  041501  044524  EM15:   .ASCIZ  <200>/ACTION DETECTED ON INVALID LINE./
027235     200  042522  042101  EM16:   .ASCIZ  <200>/READING DZRBUF DID NOT CLEAR SILO ↑BALARM/
027306  042200  052101  020101  EM17:   .ASCIZ  <200>/DATA VALID SHOULD NOT BE SET/
027344  051200  041505  044505  EM20:   .ASCIZ  <200>/RECEIVER DONE SHOULD NOT BE SET/
027405     200  042522  040514  EM21:   .ASCIZ  <200>/RELATIVE TIMING ERROR./
027435     200  047515  042504  EM22:   .ASCIZ  <200>/MODEM SIGNAL ERROR ON CABLE TEST/
027477     200  040504  040524  EM23:   .ASCIZ  <200>/DATA VALID IS NOT SET!/
027527     200  040504  040524  EM24:   .ASCIZ  <200>/DATA OVERRUN IS SET!/
027555     200  051106  046501  EM25:   .ASCIZ  <200>/FRAMING E  OR OCCURRED/
027605     200  040520  044522  EM26:   .ASCIZ  <200>/PARITY ERROR OCCURRED/

027634  052200  040522  020120  DH1:    .ASCIZ  <200>/TRAP PC  DZ11 REG/
027657     200  054105  042520  DH2:    .ASCIZ  <200>/EXPECTED  FOUND  REGISTER/
027712  046200  047111  020105  DH3:    .ASCIZ  <200>/LINE NO./
027724  042600  050130  041505  DH4:    .ASCIZ  <200>/EXPECTED  FOUND  LINE/
027753     200  054124  046040  DH5:    .ASCIZ  <200>/TX LINE PREVIOUS TIME  ACTUAL TIME  PARAMETER/

                                .EVEN
                                ;DATA TABLES FOR ERROR MESSAGES
030032  000002          DT1:    2
030034     006  003             .BYTE   6,3
030036  001204                  $REG1
030040     006  001             .BYTE   6,1
030042  001202                  $REG0

030044  000003          DT2:    3
030046     006  004             .BYTE   6,4
030050  001214                  $REG5
030052     001↑B6  001                     .BYTE   6,1
030054  001212                  $REG4
030056     006  001             .BYTE   6,1
030060  001202                  $REG0

030062  000001          DT3:    1
030064     003  001             .BYTE   3,1
030066  001372                  SAVLIN

030070  000003          DT4:    3
030072     006  004             .BYTE   6,4
030074  001214                  $REG5
030076     006  001             .BYTE   6.1
030100  001212                  $REG4
030102     003  001             .BYTE   3,1
```

```
030104  001372                          SAVLIN

030106  000004                  DTS:    4
030110     003      005                 .BYTE   3,5
030112  001372                  ↑B      SAVLIN
030114     006      011                 .BYTE   6,9.
030116  001214                          $REGS
030120     006      007                 .BYTE   6,7
030122  001220                          $TMP1
030124     006      001                 .BYTE   6,1
030126  001400                          REGIST
                                        ;TABLE OF DELAY TIMES FOR INDIVIDUAL BAUD RATES
                                        ;---------------------------------------------

030130  002450                  DLYTBL: 2450                    ;TIME FOR   50 BAUD
030132  001560                          1560                    ;TIME FOR   75 BAUD
030134  001120                          1120                    ;TIME FOR  110 BAUD
030136  000750                           750                    ;TIME FOR  134 BAUD
030140  000660                           660                    ;TIME FOR  150 BAUD
030142  000330                           330                    ;TIME FOR  300 BAUD
030144  000150                           150                    ;TIME FOR  600 BAUD
030146  000060                            60                    ;TIME FOR 1200 BAUD
030150  000040                            40                    ;TIME FOR 1800 BAUD
030152  000030                            30                    ;TIME FOR 2000 BAUD
030154  000020                            20                    ;TIME FOR 2400 BAUD
030156  000010                            10                    ;TIME FOR 3600 BAUD
030160  000001                             1                    ;TIME FOR 4800 BUAD
030162  000001                             1                    ;TIME FOR 7200 BAUD
030164  000001                             1                    ;TIME FOR 9600 BAUD
030166  000001                             1                    ;TIME OF DELAY FOR 19200 BAUD

                                ;DELAYS WERE COMPUTED TO ALLOW MAXIMUM TIME AT EACH BAUD RATE
                                ;FOR ALL TESTS TO FUNCTION CORRECTLY ON A PDP11/45 WITH BIPOLAR
                                ;MEMORY. THE TIMES WERE ALSO TESTED ON AN 11/40 AND 11/10.

030170                          C↑BORMAX:
        000001                  .END
```

```
ABASE = 160010          AUTO.S  011462          CO5   = 020000          DZCR4   001560          EIGHTS= 000070
ACDW1 = 000000          AVECT = 000300          CO6   = 040000          DZCR5   001574          EMTVEC= 000030
ACDW2 = 000000          AVECT1= 000000          CO7   = 100000          DZCR6   001610          EM1     026434
ACPUOP= 000000          AVECT2= 000000          CR    = 000015          DZCR7   001624          EM10    027051 ↑B
ACTIVE  001412          BAUD    023406          CRLF  = 000200          DZCSR   002042          EM13    027110
ADDW0 = 000000          BINWRD  006510          CSRMAP  011470          DZLEV   026010          EM14    027141
ADDW1 = 000000          BIT0  = 000001          CYCLE   010752          DZLPR   002052          EM15    027173
ADDW10= 000000          BIT00 = 000001          DATABP  007102          DZLV0   001504          EM16    027235
ADDW11= 000000          BIT01 = 000002          DATAHD  007070          DZLV1   001520          EM17    027306
ADDW12= 000000          BIT02 = 000004          DCLASM= 104417          DZLV10  001644          EM2     026507
ADDW13= 000000          BIT03 = 000010          DCLR  = 000020          DZLV11  001660          EM20    027344
ADDW14= 000000          BIT04 = 000020          DDISP = 177570          DZLV12  001674          EM21    027405
ADDW15= 000000          BIT05 = 000040          DELAY = 104414          DZLV13  001710          EM22    027435
ADDW2 = 000000          BIT06 = 000100          DEVADR  006232          DZLV14  001724  ↑B      EM23    027477
ADDW3 = 000000          BIT07 = 000200          DEVICE= 104413          DZLV15  001740          EM24    027527
ADDW4 = 000000          BIT08 = 000400          DH1     027634          DZLV16  001754          EM25    027555
ADDW5 = 000000          BIT09 = 001000          DH2     027657          DZLV17  001770          EM26    027605
ADDW6 = 000000          BIT1  = 000002          DH3     027712          DZLV2   001534          EM3     026535
ADDW7 = 000000          BIT10 = 002000          DH4     027724          DZLV3   001↑B550          EM4     026574
ADDW8 = 000000          BIT11 = 004000          DH5     027753          DZLV4   001564          EM5     026623
ADDW9 = 000000          BIT12 = 010000          DISPLA  001162          DZLV5   001600          EM6     026652
ADEVCT= 000000          BIT13 = 020000          DISPRE  000174          DZLV6   001614          EM7     026710
ADEVM = 000000          BIT14 = 040000          DLYCNT  006604          DZLV7   001630          EM8     026751
ADRCNT  006235          BIT15 = 100000          DLYTBL  030130          DZMSR   002062          EM9     027013
ADVANC= 104400          BIT2  = 000004          DONFLG  001420          DZNUM   001410          ERRMSG  007056
AENV  = 000000          BIT3  = 000010          DSWR  = 177570          DZPRT   026216          ERRVEC= 000004
AENVM = 000000          BIT4  = 000020          DTR0  = 000400          DZRBUF  002046          ERTABO  007226
AFATAL= 000000          BIT5  = 000040          DTR1  = 001000          DZRIS   002074          EVEPAR= 000000
AMADR1= 000000          BIT6  = 000100          DTR2  = 002000  ↑B        DZRIV   002072          EXITER  007162
AMADR2= 000000          BIT7  = 000200          DTR3  = 004000          DZTCR   002056          FINI    020770
AMADR3= 000000          BIT8  = 000400          DTR4  = 010000          DZTDR   002066          FIVE  = 000000
AMADR4= 000000          BIT9  = 001000          DTR5  = 020000          DZTIS   002100          FIVES = 000040
AMAMS1= 000000          BPTVEC= 000014          DTR6  = 040000          DZTIV   002076          FRMERR= 020000
AMAMS2= 000000          BRK0  = 000400          DTR7  =↑B 100000          DZVC0   001502          HALTS   007106
AMAMS3= 000000          BRK1  = 001000          DT1     030032          DZVC1   001516          HDRFLG  001416
AMAMS4= 000000          BRK2  = 002000          DT2     030044          DZVC10  001642          HDZCSR  002044
AMSGAD= 000000          BRK3  = 004000          DT3     030062          DZVC11  001656          HDZLPR  002054
AMSGLG= 000000          BRK4  = 010000          DT4     030070          DZVC12  001672          HDZMSR  002064
AMSGTY= 000000          BRK5  = 020000          DT5     030106          DZVC13  001706          HDZRBU  002050
AMTYP1= 000000          BRK6  = 040000          DVALID= 100000          DZVC14  001722          HDZTCR  002060
AMTYP2= 000000          BRK7  = 100000          DZACTV  001404          DZVC15  001736          HDZTDR  002070
AMTYP3= 000000          BRW     005114          DZCR0   001500          DZVC16  001752          HILIM   006230
AMTYP4= 000000          BUILD   022676          DZCR1   001514          DZVC17  001766          HT    = 000011
APASS = 000000          BYTCNT  02533↑B4          DZCR10  001640          DZVC2   001532          INBUF   010502
APRIOR= 000000          CHRCNT  006506          DZCR11  001654          DZVC3   001546          INIFLG  001415
APTCSU= 000040          CNVRT = 104412          DZCR12  001670          DZVC4   001562          INIT    020250
APTENV= 000001          CONVRT= 104411          DZCR13  001704          DZVC5   001576          INITI   020274
APTSIZ= 000200          CORMAX  030170          DZCR14  001720          DZVC6   001612          INSTER= 104404
APTSPO= 000100          CO0↑B   = 000400          DZCR15  001734          DZVC7   001626          INSTR = 104403
ASWREG= 000000          CO1   = 001000          DZCR16  001750          DZ.END  002000          INSTR2  006030
ATESTN= 000000          CO2   = 002000          DZCR17  001764          DZ.MAP  001500          INTRAN  024614
AUNIT = 000000          CO3   = 004000          DZCR2   001530          EIAFLG  001414          INTREC  024434
AUSWR = 000000          CO4   = 010000          DZCR3   001544          EIGHT = 000030          INTSVC  024014
```

```
IOTVEC= 000020
LAST    025326
LESS1   026220
LF    = 000012
LIMITS  006156
LINE    001364
LINESP  025336
LINEX   023424
LINE0   001506
LINE1   001522
LINE10  001646
LINE11  001662
LINE12  001676
LINE13  001712
LINE14  001726
LINE15  001742
LINE16  001756
LINE17  001772
LINE2   001536
LINE3   001552
LINE4   001566
LINE5   001602
LINE6   001616
LINE7   001632
LOBITS  006234
LOCK    001362
LOCKUP  025324
LOLIM   006226
LP0   = 000000
LP1   = 000001
LP2   = 000002
LP3   = 000003
LP4   = 000004
LP5   = 000005
LP6   = 000006
LP7   = 000007
MAINT = 000010
MANT0   001512
MANT1   001526
MANT10  001652
MANT11  001666
MANT12  001702
MANT13  001716
MANT14  001732
MANT15  001746
MANT16  001762
MANT17  001776
MANT2   001542
MANT3   001556
MANT4   001572
MANT5   001606
MANT6   001622
MANT7   001636
MASTEK  010177
MBADLN  010306
MCABLE  025655
MCHAR   025522
MCSRX   010127  †B
MDATA   010606
MEPASS  007745
MERRPC  010254
MERRX   010154
MERR2   010005  †B
MERR3   010054
MINVAL  025446
MLINE   025474
MLOCK   010100
MNEW    010202
MNTFLG  001417
MODE    001370
MPASS   025432
MPASSX  010143
MPFAIL  007702
MQUICK  025672
MR      007771
MREGAD  025376
MSENAB= 000040
MSPEED  025504
MTERM   025630
MTITLE  001000
MTSTN   010165
MVECTO  025354
MVECX   010135
MWHICH  025562
NEXT    001360
NUMLIN  025342
NUMTCR  025344
ODDPAR= 000200
OFFSET  023140
ONESTO= 000000
OTHER   023366
OUT     020716
OVRRUN= 040000
PAR     001366
PARAM = 104405
PARAM1  006076
PARER = 010000
PARERR  006152
PARITY= 000100
PARMD = 104415
PAR0    001510
PAR1    001524
PAR10   001650
PAR11   001664
PAR12   001700
PAR13   001714
PAR14   001730
PAR15   001744
PAR16   001760
PAR17   001774
PAR2    001540
PAR3    001554
PAR4    001570
PAR5    001604
PAR6    001620
PAR7    001634
PAWCH = 104416
PIRQ  = 177772
PIRQVE= 000240
POPR0 = 012600
POP1SP= 005726
POP2SP= 022626
PRIO    025346
PR0   = 000000
PR1   = 000040
PR2   = 000100
PR3   = 000140
PR4   = 000200
PR5   = 000240
PR6   = 000300
PR7   = 000340
PS    = 177776
PSW   = 177776
PUSHR0= 010046
PUSH1S= 005746
PUSH2S= 024646
PWRVEC= 000024
QUITS   024426
RCVON = 010000
RDATA   025332
RDONE = 000200
RECDAT  025350
REGIST  001400
RESREG  007104
RESTAR  011304
RESVEC= 000010
RESOS = 104410
RIE   = 000100
RING0 = 000001
RING1 = 000002
RING2 = 000004
RING3 = 000010
RING4 = 000020
RING5 = 000040
RING6 = 000100  †B
RING7 = 000200
RL0   = 000000
RL1   = 000400
RL2   = 001000
RL3   = 001400
RL4   = 002000
RL5   = 002400
RL6   = 003000
RL7   = 003400
RSTART  020240
RSTRT   024650
RUN     001406
RXISR1  022724
RXSVC   020542
RXTCR   021016
R6    =%000006
R7    =%000007
SAVLIN  001372
SAVNUM  001411
SAVPC   001402
SAVOS = 104407
SCOP1 = 104401
SERV.G  007242
SET     025124
SETAPT  011310
SETFLG= 104406
SET.PS  010650
SET1    025156
SEVEN = 000020
SEVENS= 000060
SILOAL= 020000
SILOEN= 010000
SIX   = 000010
SIXS  = 000050
SNAP    020370
SPACNT  006507
SPEED   025340
SPIN    024374
STACK = 001120
STFLG   025322
STKLMT= 177774
STOP    001462
SVOS    006244  †B
SWR     001160
SWREG   000176
SW0   = 000001
SW00  = 000001
SW01  = 000002
SW02  = 000004
SW03  = 000010
SW04  = 000020
SW05  = 000040
SW06  = 000100  †B
SW07  = 000200
SW08  = 000400
SW09  = 001000
SW1   = 000002
SW10  = 002000
SW11  = 004000
SW12  = 010000
SW13  = 020000
SW14  = 040000
SW15  = 100000
SW2   = 000004
SW3   = 000010
SW4   = 000020
SW5   = 000040
SW6   = 000100
SW7   = 000200
SW8   = 000400
SW9   = 001000
S110  = 001000
S1200 = 003400
S134  = 001400
S150  = 002000
S1800 = 004000
S19200= 007400
S2000 = 004400
S2400 = 005000
S300  = 002400
S3600 = 005400  †B
S4800 = 006000
S50   = 000000
S600  = 003000
S7200 = 006400
S75   = 000400
S9600 = 007000
TABLE2  025220
TBITVE= 000014
TBUF    025352
TCR0  = 000001  †B
TCR1  = 000002
TCR2  = 000004
TCR3  = 000010
TCR4  = 000020
TCR5  = 000040
TCR6  = 000100
TCR7  = 000200
TDATA   025330
TD0     001422
TD1     001424
TD2     001426
TD3     001430
TD4     001432
TD5     001434
TD6     001436
TD7     001440
TEIGHT  002140
TEMP    010544
TEST1   023554
```

```
TEST2   024176          TST5    012656          $ATY4   005462          $FILLS  001175          $SCOPE  004654
TFIVE   002146          TST6    012750          $AUTOB  001154          $GDADR  001140          $SETUP= 000000
TIE   = 040000          TST7    013042          $BASE   001310          $GDDAT  001144          $SVLAD  005042
TKVEC = 000060          TTST    004672          $BDADR  001142          $GET42  004600          $SVPC = 000040
TLAST = 022146          TWOSTO= 000040          $BDDAT  001146          $HD   = 000001          $SWR  = 164000
TLO   = 000000          TXSVC   020442          $CDW1   001314          $HIBTS  001462          $SWREG  001256
TL1   = 000400          TYPDAT  007072          $CDW2   001316          $ICNT   001124          $SWRMK= 000000
TL2   = 001000          TYPE  = 104402          $CHARC  005440          $ILLUP  007674          $TESTN  001240
TL3   = 001400          TYPMSG  006762          $CMTAG  001120          $INTAG  001155          $TIMES  001226
TL4   = 002000          T110    002106          $CM1  = 000006 ↑B         $ITEMB  001134          $TKB    001166
TL5   = 002400          T1200   002120          $CM2  = 000014          $LF     001232          $TKS    001164
TL6   = 003000          T134    002110          $CM3  = 000006          $LFLG   005707          $TMPO   001216
TL7   = 003400          T150    002112          $CM4  = 000004          $LPADR  001126          $TMP1   001220
TMTBL   002102          T1800   002122          $CPUOP  001262          $LPERR  001130          $TMP2   001222
TPVEC = 000054          T2000   002124          $CRAP↑B = 177777          $MADR1  001266          $TMP3   001224
TRAPVE= 000034          T2400   002126          $CRLF   001231          $MADR2  001272          $TN   = 000035
TRDY  = 100000          T300    002114          $DDWO   001320          $MADR3  001276          $TPB    001172
TRTVEC= 000014          T3600   002130          $DDW1   001322          $MADR4  001302          $TPFLG  001177
TRO     001442          T4800   002132          $DDW10  001344          $MAIL   001234          $TPS    001170
TR1     001444          T50     002102          $DDW11  001346          $MAMS1  001264          $TSTM   001466
TR2     001446          T600    002116          $DDW12  001350          $MAMS2  001270          $TSTNM  001122
TR3     001450          T7200   002134          $DDW13  001352          $MAMS3  001274          $TYPE   005162
TR4     001452          T75     002104          $DDW14  001354          $MAMS4  001300          $TYPEC  005374
TR5     001454          T9600   002136          $DDW15  001356          $MBADR  001464          $TYPEX  005442
TR6     001456          VECMAP  012↑B026          $DDW2   001324          $MFLG   005706          $UNIT   001246
TR7     001460          VEC1    023204          $DDW3   001326          $MSGAD  001250          $UNITM  001472
TSEVEN  002142          VEC2    023214          $DDW4   001330          $MSGLG  001252          $USWR   001260
TSIX    002144          WCHFLG  025320          $DDW5   001332          $MSGTY  001234          $VECT1  001304
TST1    012216          WRDCNT  006504          $DDW6   001334          $MTYP1  001265          $VECT2  001306
TST10   013134          W↑BTBS.F  007060          $DDW7   001336          $MTYP2  001271          $XTSTR  004720
TST11   013272          XBEGIN  023454          $DDW8   001340          $MTYP3  001275          $Y    = 000020
TST12   013446          XBX     006650          $DDW9   001342          $MTYP4  001301          $$GET4= 000000
TST13   013564          XCSR    004624          $DEVCT  001244          $MXCNT  005116          .     = 030170
TST14   013650          XEOP    024634          $DEVM   001312          $N    = 000034          .ADVAN  006606
TST15   013740          XERR    004646          $DOAGN  004620          $NULL   001174          .BEGIN  004356
TST16   014024          XHEAD   010261          $E    = 000036          $NWTST= 000000          .CNVRT  006334
TST17   014214          XMTCNT  001376          $ENDAD  004610          $OVER   005060          .CONVR  006330
TST2    012406          XMTLIN  001374          $ENDCT  004574          $PASS   001242          .DCLAS  006554
TST20   014352          XMTSRV  022600          $ENV    001254          $PASTM  001470          .DELAY  006566
TST21   ↑B 014466         XPASS   004640          $ENVM   001255          $PWRAD  00767           .DEVIC  006534
TST22   015002          XSTART  023142          $EOP    004444          $PWRDN  007530          .ERRTA  026222
TST23   015330          XSTATQ  010350          $EOPCT  004566          $PWRMG  007664          .INSTE  006016
TST24   015606          XTCRO   025132          $ERFLG  001123          $PWRUP  007602          .INSTR  005712
TST25   016114          XTCR1   025146          $ERMAX  001135          $QUES   001230          .INST1  005732          ↑B
TST26   016450          XTSTN   007234          $ERROR  006620          $REGAD  001200          .MSG    005734
TST27   017102          XVEC    004632          $ERRPC  001136          $REGO   001202          .PARAM  006036
TST3    012472          XX    = 160210          $ERRTB  001360          $REG1   001204          .PARMD  024654
TST30   017630          YY    = 000500          $ERTTL  001132          $REG2   001206          .PAWCH  025050
TST31   020212          ZZ    = 000020          $ETABL  001254          $REG3   001210          .RESOS  006276
TST32   021020          $APTHD  001462          $ETEND  001360          $REG4   001212          .SAVOS  006236
TST33   021514          $ATYC   005470          $FATAL  001236          $REG5   001214          SCOPE   004654
TST34   022146          $ATY1   005444          $FFLG   005710          $RTNAD  004622          .SCOP1  005120
TST4    012564          $ATY3   005452          $FILLC  001176          $SAVR6  007700          .SETFL  010362
```

B10


```
.$BSTART  002150        .TRPSR  006512        .TRPTA  002002        .TYPE   005144        .$X   = 001462

. ABS.  030170    000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DZDZAC,DZDZAC/SOL=SYSMAC.SML[400,1066],DZDZAC.P11[400,26701
 RUN-TIME:  57 74 2 SECONDS
 RUN-TIME RATIO: 292/135=2.1
 CORE USED:  50K  (100 PAGES)
```

Spooler runtime 20 Seconds, 84 KCS, 5WW disk reads, 3 disk writes, 118 pages