

LA36 DL11 KL11

LA36 TERMINAL (DL11 + KL11)
MD-11-DZLAC-D

EP-DZLAC-D-DL

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MADE IN USA

IDENTIFICATION

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Product Name LA36 Terminal (DL11 & KL11 INTERFACE)
Date Created August 1977
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1 0 ABSTRACT

This diagnostic is divided into three basic sections:

- 1 A check of the console terminal interface logic
- 2 A check of the printing characteristics and control logic
- 3 An echo portion designed to check the keyboard and to aid in the diagnosis of terminal problems

Patterns used by the printing tests were chosen for ease of visual verification. The echo tests were designed for maximum flexibility, with Test 24 allowing any desired pattern to be used.

2 0 EQUIPEMENTS

2 1 EQUIPMENT AND ASSIGNMENTS

The diagnostic is written to run on all models of the PDF11 computer with either a KL11 or DL11 console terminal interface. The diagnostic is preset to test up to 16 additional terminals (on DL11'S) assigned between addresses 776500 and 776676. This preset quantity (16) and preset address (776500) can be changed by depositing the quantity in DLNR and the starting address in DLADR. For example, to allow for up to 31 additional terminals, the address 775610 could be placed into DLADR and the octal equivalent of 31, i.e., (37) would be placed into DLNR. The number of additional DL11'S actually tested will be adjusted automatically downward based upon the first DL11 address (within the implied range) found to be unresponsive. Thus if there is no DL11 present to match the address in DLADR only the console terminal will be tested. Therefore, all DL11'S in excess of the console terminal must have contiguous address assignments with the lowest address corresponding to the value in DLADR.

The console terminal (assigned standard) can be reassigned by placing the address of its receiver status register into CONADD and its receiver interrupt vector into CONVEC. This reassignment can be made to a terminal within the set of terminals implied by DLNR and DLADR without adverse effect. Note that a terminal with a slower speed (if any) will determine the speed at which all of the terminals are tested. Such a terminal should generally be excluded from the test, or tested separately. (Refer to the symbol definitions in the listing for the above mentioned locations.)

2 2 STORAGE

The diagnostic program uses all of 4k of memory with exception of the area used by the absolute loader.

2 3 PRELIMINARY PROGRAMS

Any applicable PDP-11 diagnostics should be run on the processor. If any errors are encountered during the interface check, refer to the appropriate interface diagnostic for further help in locating the problem if needed.

2 4 ADDITIONAL PROGRAMS

THIS DIAGNOSTIC IS FOR VERIFICATION OF BASIC TERMINAL FUNCTIONS ONLY. IF THE TERMINALS UNDER TEST HAVE HARDWARE OPTIONS INSTALLED RUN DIAGNOSTIC MDEC-11-DZLAF-A, the LA36 TERMINAL OPTIONS TEST.

2 0 LOADING PROCEDURE AND INITIALIZATION

Load the LA36 diagnostic program tape following normal procedures. Before starting the program, refer to the description of the routine "DLY". Time delays used by the program are a function of the CPU model and memory type and should be set-up before running the diagnostic. The routine is preset for a PDP-11/05 with core memory. Refer to Section 2.1 for non-standard terminal addresses and for testing multiple DL11 interfaces.

If a hardware switch register does not exist, the program will use the contents of location 176 as the value of the switches. Therefore, be sure to load location 176 with the switch value before starting the program when not using hardware switches.

If the CPU is an LSI-11, 11/03 be sure to set switch register bit 9 to a 1. Special tests are run on the DLV11 interface.

4 0 STARTING PROCEDURE

4 1 STARTING ADDRESSES

- 200(S) = Run with switch register Control
 - perform console terminal I/O tests
- 204(S) = Run with switch register Control
 - skip console terminal I/O tests
- 210(S) = Run with Keyboard Control
 - perform Console Terminal I/O tests
- 214(S) = Run with Keyboard Control
 - skip console Terminal I/O tests

4 2 Switch Register Control With I/O Tests

- A Set the switch register to 200(8) and press the load address switch
- B Set switch register bit 9 to a 1 if the processor is an LSI-11, 11/03. Refer to Section 5 1 5
- C Set the switch register bits 7-0 equal to the paper width in terms of the number of columns (octal) Refer to Section 5 1 8
- D Set the switch register bit 8 equal to 1 or 0 and press the start switch. A message will be printed indicating the number of DL11's being tested. Refer to Section 5 1 6
- E If bit 8 were zero when starting, the Printer tests are executed sequentially, after the entire series of I/O tests are executed
- F If bit 8 was set when the start switch was pressed, the entire series of I/O tests will be executed and The program will then be waiting for control via the switch register the CPU will halt at location SELHLT

4 3 Switch Register Control - Without I/O Tests

Same as Section 4 2 except in step A, set the switch register to 204(8)

4 4 Keyboard Control - With I/O Tests

- A Set the switch register to 210(8) and press the load address switch
- B Set the switch register bits 7-0 equal to the paper width in terms of the number of columns (octal) Refer to Section 5 1 8
- C Set switch register bit 9 to a 1 if the processor is an LSI-11, 11/03 Refer to Section 5 1 5
- D Set switch 8 and Press the Start switch A message will be printed indicating the number of DL11's being tested Refer to Section 5 1 6
- E If bit 8 was zero when starting, the printer tests are executed sequentially after the entire series of I/O tests are executed
- F If bit 8 were set when the start switch was pressed, the entire series of I/O tests will be executed followed by the select test message The program will then be waiting for a test selection via any terminal keyboard Refer to Section 5 2

4 5 Keyboard Control - Without I/O Tests

Same as Section 4 4 except in step A set the switch register to 214 (8)

5 0 OPERATING PROCEDURE

The program can be controlled in either of two methods by the console switch register or from the keyboard of the terminal's under test

5 1 SWITCH REGISTER CONTROL

The various switches and their functions are listed below. Switches may be changed and set as desired except as noted in the specific switch descriptions. Refer to the detailed switch descriptions for further, more complete information.

SWITCH NUMBER	DESCRIPTION
15	1(up) = HALT AT END OF TEST 0(down) = CONTINUE TEST SEQUENCE
14	1(up) = CONTINUE ON ERROR 0(down) = HALT ON ERROR
13	1(up) = DRIVE ONLY CONSOLE TERMINAL 0(down) = DRIVE ALL TERMINALS
11	1(UP) = LOOP ON INDIVIDUAL TEST 0(down) = NORMAL TEST SEQUENCE
9	1(up) = CPU TYPE IS AN LSI-11, 11/03 0(down) = ALL OTHER PDP-11'S
8	1(up) = RUN TEST ONCE AND HALT 0(DOWN) = LOOP ON TEST SEQUENCE
5-0	TEST NUMBER SELECTION
7-0	NUMBER OF COLUMNS AT START-UP

5 1 1 Switch 15

With switch 15 in the up position, the program will halt at the end of the current test. Replacing switch 15 to the down position and pressing CONTINUE will continue the normal test operation. During the halt, any of the control switches may be changed or set as desired.

5 1 2 Switch 14

Placing switch 14 in the up position will cause the program to continue on errors during any of the I-O tests only. With switch 14 down, the program will halt (at ERRHLT) on any errors during the I-O tests with the location of the error in RD. Pressing CONTINUE will cause the program to continue if switch 14 is down. With switch 14 up, pressing continue will cause the program to loop on the error.

NOTE

Error halts can occur only during the I/O tests. The terminal is connected to a serial line and there is no error information returned to the program from the terminal. Therefore the program cannot report errors occurring in the terminal. Errors detected during the interface tests will result in halts as described above.

5 1 3 Switch 13

Placing switch 13 in the down position will cause the driving of all multiple terminals during the Printer tests only. If switch 13 is up, only the console terminal is driven.

** Note Switch 13 should only be changed when the program is waiting for a test selection.

5 1 4 Switch 11

Placing switch 11 up at any time will cause the program to loop on the current test as long as switch 11 remains up. Replacing switch 2 down will cause the program to resume normal operation at the completion of the test.

5 1 5 Switch 9

Placing switch 9 up at the start of the test will cause an automatic change in the DELAY timing, and the execution of special DLV11 I/O tests. The DLV11 has no maintenance mode and will cause the program to hang if tested as a DL11.

5 1 6 Switch 8

With switch 8 in the down position the program will continue to loop through the present test sequence. Placing switch 8 up will cause the program to halt (at SELHLT) at the completion of the current test. After the halt set the control switches as desired and set switches 5 to 0 to the next desired test number then press CONTINUE to start the test.

When starting the diagnostic the operator can select a specific test rather than automatically starting the printing test sequence by setting switch 8 up before starting the diagnostic. Upon completion

of the I/O test sequence (if being run) the program will either halt at SELHLT waiting for a test selection via the switch register or print the select test message and wait for a test selection from any keyboard. Refer to Section 4 for further information.

5.1.7 Switches 5 to 0

Switches 5 to 0 are used to select specific tests when under switch register control. Test numbers are always in octal.

5.1.8 Switches 7 to 0 (at start-up only)

At start-up only, switches 7 to 0 are used to set the desired maximum number of columns the diagnostic is to test. If the number set is greater than 132(10) or less than 30(10), the program will default to 132(10). The value set must be in octal form. Thus, for normal operation - testing the full 132(10) columns - leave switches 7 - 0 down.

5 2 KEYBOARD CONTROL

The program will be under keyboard control whenever the diagnostic is started at location 210 or 214. Switches on the console switch register will have no effect when under terminal control except for switch 15. The I/O tests cannot be selected when under keyboard control.

To stop a test at any time, type the "RUBOUT" or "DELETE" key on any keyboard. Any terminal may stop the test and select the next test if switch 13 is down. When a test is stopped by typing a "RUBOUT" or "DELETE", the test will terminate and the following message will be printed:

SELECT TEST NUMBER

At this time type the desired test number followed by any one of the following control characters:

- (period) = Run the selected test once and return for another test selection
- L = Loop on the selected test until a "RUBOUT" is typed
- S = Start the test sequence with the selected test. Continue to loop on the printing test sequence until a "RUBOUT" is typed

The "L" or "S" may be either upper or lower case, but the test number must always be a 2 digit octal number. The test number and terminator are echoed by the program, thus each character will be printed twice if the terminal is in half duplex. For all echo tests, the "L" and "S" will only run the test once (the same as if typing a period). For all option tests, the "S" will only run the test once (the same as if typing a period), however, typing an "L" will cause the program to loop on the selected test. If an error is detected in the test selection (illegal test number or control character) a question mark is printed and the message will be repeated.

6 0 TEST DESCRIPTIONS

6 1 PRINTING TESTS

These tests are designed as a test of the printing mechanism and the associated control logic. At the beginning of each test, the test number will be printed indicating which test is being executed and, if the test is a function of the number of columns, the number of columns being tested will be indicated. A detailed description and sample patterns for each printing test follows.

6 1 1 Test 0 - Data Path Test

This test is used to test the data lines to and through the interface and to the terminal. An alternating bit pattern is sent which will print alternating X's and U's in a checkerboard pattern to the maximum column width. The starting character for each line is alternated and a total of four lines are printed.

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, there will be a blank line between each printed line.

EXAMPLE

```
XUXUXUXUXUXUXUXUXUXUXUXUXUXUXUXUX
UXUXUXUXUXUXUXUXUXUXUXUXUXUXUXUX
XUXUXUXUXUXUXUXUXUXUXUXUXUXUXUXUX
UXUXUXUXUXUXUXUXUXUXUXUXUXUXUXUX
```

6 1 2 Test 1 - Printable Character Test

This test produces a check of all 94(10) printable characters. The characters are printed in groups of three with three groups per line, separated by three spaces between groups. The first column will contain all ASCII codes from 040 to 077. Column two will contain all ASCII codes from 100 to 137 - primarily the capital letter set. The last column will contain all ASCII codes from 140 to 176 - primarily the small letter set.

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, there will be a blank line between each printed line.

EXAMPLE

...	AAA	aaa
....	BBB	bbb
###	CCC	ccc
SSS	DDD	ddd
???	EEE	eee
888	FFF	fff
'''	GGG	ggg
(((	HHH	hhh
)..	III	iii
***	JJJ	jjj
+++	KKK	kkk
...	LLL	lll
---	MMM	mmm
...	NNN	nnn
.	OOO	ooo
000	PPP	ppp
111	QQQ	qqq
222	RRR	rrr
333	SSS	sss
444	TTT	ttt
555	UUU	uuu
666	VVV	vvv
777	WWW	www
888	XXX	xxx
999	YYY	yyy
.	ZZZ	zzz
...		
<<<		
===		
>>>		
???		

6 1 3 Test 2 - Non-printable Character Test

This test checks all non-printable characters that have no control function in the LA36 terminal or the LA36 options (such as CR, LF, BS, & BEL). First the ASCII code will be printed followed by the mnemonic after a few separating spaces. Following the mnemonic, the actual control character will be sent three times and nothing should happen at the printer. This pattern is repeated, three times on a line, until all of the non-printing characters have been tested.

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, there will be a blank line between each printed line.

EXAMPLE

001	SOH	002	STX	006	ACK
020	DLE	021	DC1	022	DC2
023	DC3	024	DC4	025	NAK
026	SYN	027	ETB	030	CAN
031	EM	032	SUB	034	FS
035	GS	036	RS	037	US
177	DEL				

6.1.4 Test 3 - Carriage Return Test

This test checks the carriage return from all even numbered columns and the spacing of the solenoid head from the left margin. It is also a good check for proper operation of the position decoder.

The test prints a full line of alternating 0's and spaces, starting with a 0. At the end of the line the print head is returned to the left margin with a carriage return. The spaces are then filled in by spacing the print head out from the left margin to the first space, printing an "X", and executing a carriage return. This pattern is repeated until the line is completed. Check to see that all X's are in the middle of the space between the two zeroes on either side of it.

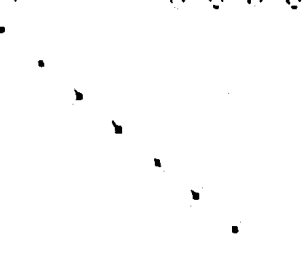
EXAMPLE

OXOXOXOXOXOXOXOXOXOXOXOXOXOXOX

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, this test will print a line of 0's and spaces, then print a diagonal line of X's. To correctly check the encoder, the Auto Line Feed Option should be disabled.

EXAMPLE

000000



6 1 6 Test 5 - Single Line Feed Test

This test is designed to check the timing of single line feeds and the capability of doing line feeds in all columns. Two reference lines are used by this test (and Test 6) which also can be used to easily check the number of columns the printer is printing.

The first reference line contains 130(10) zeroes followed by two 2's if testing 132(10) columns. If less than 132 columns, the line will contain 0's for two less than the maximum number of columns followed by the two 2's. This reference line is a quick check for 132(10) columns if testing the full 132(10) columns. The second reference line prints a string of numbers (1 to 9 & 0) repeated to the maximum column. This line, again, can be used as a quick check of the number of columns.

The line feed test is accomplished by printing the first reference line of 0's and two 2's, then either sending 60(10) 3's, if testing 132(10) columns, or waiting 1.8 seconds for an LCV, if testing less than 132(10) columns. If testing 132(10) columns, nothing should happen, except for an LCV, at the end of the line. The 3's should be lost and never printed. After the LCV, with the print head at the extreme right, a carriage return - line feed will be sent followed by repeated backslashes " " and linefeeds to print a diagonal line down the paper. When a backslash is printed in the maximum column, a carriage return will be sent immediately after the line feed and the second reference line of sequential numbers will be printed. After completing the line, a carriage return - line feed will be sent and the program will wait one second for the carriage return function to complete. After the delay, the reference line will be repeated, the last line being guaranteed to be correct. Any timing problems during the line feeds will show as miss prints or missing characters during the first 16(10) characters of the middle reference line. Also, any paper feed problems will cause miss-alignment of the slashes forming the diagonal line.

EXAMPLE

00000000000000000000000000000022

123456789012345678901234567890
123456789012345678901234567890

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return there will be a blank line every place a carriage return is executed

EXAMPLE

0000000022

1234567890

1234567890

6 1 7 Test b - Backspace Test

This test is designed to test the print timing as in Test 5 as well as the backward and forward movement of the print solenoid head

The test consists of the same first reference line as in Test 5 then a carriage return-line feed. A full line is then printed using the following pattern

Forward Slash "."
Backspace "
Back Slash "

This pattern produces a line of all X's. The two slashes should cross exactly at the middle, producing the X character. When the line is completed a carriage return-line feed is sent and the last two reference lines are printed as in Test 5. Any timing problems will show in the first 16(10) characters of the middle reference line, again as in Test 5.

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, there will be a blank line between each printed line.

EXAMPLE

000000000000000000000000000022
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
123456789012345678901234567890
123456789012345678901234567890

6 1 3 Test 7 - Overprint Test

This test is designed to check the spacing and repeatable printing characteristics of the printer. Three rows of characters are each overprinted two times. The rows consist of the following characters alternated across the line

Row 1	M-SP
Row 2	SP-@
Row 3	&-SP

The resulting pattern will be a checkerboard pattern and the overprinted characters should be aligned properly with the initial characters

EXAMPLE

```
M M M M M M M M M M M M M M M M
@ @ @ @ @ @ @ @ @ @ @ @ @ @ @ @
& & & & & & & & & & & & & &
```

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, the lines will not be overprinted. There will be three lines of each character with a blank line between each group of characters. The characters in each group should be in the same columns

EXAMPLE

```
M M M M M M M M M M
M M M M M M M M M M
M M M M M M M M M M

@ @ @ @ @ @ @ @ @ @
@ @ @ @ @ @ @ @ @ @
@ @ @ @ @ @ @ @ @ @

& & & & & & & &
& & & & & & & &
& & & & & & & &
```


6 1 11 Test 12 - Printer Bell Test

This test checks the printer bell buffer to insure that eight bells are distinctly heard, even when sent at the maximum transfer rate. The program sends 8 bell codes at the maximum rate to the printer then waits 2.5 seconds to allow the operator to hear the bells.

6 1 12 Test 17 - Life Test

This test runs continuously and is run as an individual, special test. It is not part of the standard printing test sequence.

This test prints 2 lines of each printable character and then repeats continuously. The second line of each character is overprinted 4 times to conserve paper. At the end of each complete pass through the character set a message is printed indicating the number of passes executed. If any character (except "Rubout") is typed on the keyboard during this test, the pattern will change and restart with the typed character. This will only happen if keyboard control is in use.

EXAMPLE

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAAAAAAAAAAAAAA  
BBBBBBBBBBBBBBBBBBBBBBBBBB  
BBBBBBBBBBBBBBBBBBBBBBBBBB
```

If the Auto Line Feed Option is set to produce an automatic line feed after every received carriage return, the test will print six lines of each character with a blank line between the first and second lines as well as between each group of characters.

EXAMPLE

```
AAAAAAAAAAAAAAAA  
  
AAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAA  
AAAAAAAAAAAAAAAA  
  
BBBBBBBBBBBBBBBB  
  
BBBBBBBBBBBBBBBB  
BBBBBBBBBBBBBBBB  
BBBBBBBBBBBBBBBB  
BBBBBBBBBBBBBBBB  
BBBBBBBBBBBBBBBB
```

6.2 ECHO TESTS

These tests are designed as a test of the keyboard and an aid in isolating troubles within the terminal. At the beginning of each test, the test number will be printed indicating which test is being executed. Typing a "RUBOUT" or "DELETE" at any time, whether in keyboard control or not, will exit the current Echo test and print a test termination message. If in keyboard control, the select test message will be printed and the program will await a test selection as usual. In switch register control, the program will halt (at SELHLT) awaiting for control via the switch register. A detailed description of each test follows:

6.2.1 Test 20 - Character Echo Test

This test is designed to operate the terminal in a simulated local mode. Any character typed on the keyboard (except a "rubout") will be echoed to the printer.

If the LA36 terminal is in half duplex with the Auto Line Feed Option available, typing a carriage return may cause a garbled response on the terminal during this test.

6.2.2 Test 21 - Line Echo Test Fast Rate

This test continually sends full lines of any character up to the maximum column width. The test prints a "0" character when started until a key is typed on the keyboard. The program will then send the typed character until another character is typed or the test is terminated by typing a "rubout". The characters are transmitted at the maximum rate with a carriage return-line feed inserted after every 132(10) printable characters.

If the LA36 is in half duplex when running this test, characters may be lost or garbled whenever a character is typed on the keyboard.

With the Auto Line Feed Option set to produce an automatic line feed after every carriage return, there will be a blank line between each printed line.

6.2.3 Test 22 - Line Echo Test Slow Rate

This test is identical to Test 21 except a delay of 1.8 seconds is inserted between each character to allow the print head to perform an LCR between characters.

6 2 4 Test 23 - Character/Code Echo Test

This test will print the octal code received by the processor followed by the character or the mnemonic of the character every time a key is pressed on the keyboard. The parity of the received code will be indicated as either odd or even. Allow sufficient time between characters for the line to be printed.

With the Auto Line Feed Option set to produce an automatic line feed after every received carriage return, there will be a blank line between each printed line.

EXAMPLE

201	A	ODD
263	3	ODD
215	CR	EVEN
240	SP	EVEN

6 2 5 Test 24 - Selected Pattern Echo Test

This test is designed to give maintenance the flexibility to choose their own patterns for isolating any specific problems which may arise in the field.

Type any characters (except control-C and rubout) and each character will be echoed as typed. A maximum of 256(10) characters may be inputted. No carriage returns or line feeds are inserted by the program, all characters must be inputted by the operator. To terminate the input string type a control-C, the program will then continually echo the inputted pattern. To stop the printing, type control-C. The program will stop printing the pattern and will wait for either another pattern input terminated by a control-C, or the same pattern may be used again by typing control-C. To exit the test at any time, type a "rubout".

When any options are available, be careful what characters or character sequences are selected.

6 2 6 Test 25 - Bell Echo Test

This test is designed to test the bell on column 64 if typing has occurred on the line. The test prints a message.

TYPE ANY PRINTABLE CHARACTER AND LISTEN FOR BELL

After the test message is printed, type any printable character on the keyboard. The character will be echoed and the bell should ring. The message will then be typed again. Type the "rubout" key to terminate the test at any time.

6.4 STANDARD I-O TESTS

These tests are designed as a brief check of the console terminal interface logic. Each check is structured as an independent test and the switch register controls may be used. A description of each test is given in the program listing. Any errors encountered during the I/O tests will cause a halt at location "ERRHLT" if switch 14 is down.

NLIST
ENDP
LIST

15	01400	SWITCH REGISTER OPTIONS
41	04000	SPECIAL OPERATIONAL INFORMATION
63	06100	SYSTEM EQUATES
131	13000	TRAP CATCHER & STARTING ADDRESSES
186	18500	SYMBOL DEFINITIONS
235	00100	PROGRAM INITIALIZATION & CONTROL
697	46300	COMMON ROUTINES USED BY LA36 TESTS
1222	00100	I/O LOGIC TESTS
1786	00100	LA36 PRINTER TESTS
2397	00100	LA36 ECHO TESTS
2692	00100	MISC. DIAGNOSTIC MESSAGES

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```
00400 TITLE MAINDEC-11-DZLAC-D
00500
00600 ; LA36 DIAGNOSTIC (DL11 & KL11 INTERFACE)
00700 ;
00800 ;
00900 ; AUTHOR: ROBERT W. BAKER
00950 ; RALPH A. SCHAUBER
01000 ; COPYRIGHT 1974, 1977 DIGITAL EQUIPMENT CORP , MAYNARD, MASS 01754
01100
01200
01300
01400 SBTTL SWITCH REGISTER OPTIONS
01500 ;
01600 ; SWITCH POSITION FUNCTION
01700 ;
01800 ; 15 UP (1) HALT AT COMPLETION OF CURRENT TEST
01900 ; DOWN (0) CONTINUE NORMAL TEST SEQUENCE
02000 ;
02100 ; 14 UP (1) CONTINUE ON ERROR
02200 ; DOWN (0) HALT ON ERROR
02300 ;
02400 ; 13 UP (1) DRIVE ONLY CONSOLE TERMINAL
02500 ; DOWN (0) DRIVE ALL TERMINALS
02600 ;
02700 ; 11 UP (1) LOOP ON INDIVIDUAL TEST
02800 ; DOWN (0) NORMAL TEST SEQUENCE
02900 ;
03000 ; 09 UP (1) CPU TYPE IS AN LSI-11, 11/03
03100 ; DOWN (0) ALL OTHER 11 CPU'S
03200 ;
03300 ; 08 UP (1) HALT TO SELECT TEST AT END OF CURRENT TEST
03400 ; DOWN (0) LOOP ON TEST SEQUENCE
03500 ;
03600 ; 05-00 TEST # SELECTION
03700 ;
03800 ; 07-00 # OF COLUMNS AT START-UP
```


41	04000	.	SBTTL	SPECIAL OPERATIONAL INFORMATION
42	04100	.		
43	04200	: 1 --		THE STANDARD CONSOLE TERMINAL INTERRUPT VECTOR AND REGISTER
44	04300	:		ADDRESSES ARE USED TO REDEFINE THE LOCATION OF THE CONSOLE
45	04400	:		TERMINAL THE SYMBOLIC LOCATIONS "CONADD" AND "CONVEC" SHOULD
46	04500	:		BE CHANGED BEFORE START UP
47	04600	:		
48	04700	: 2 --		BEFORE START UP REFER TO THE DESCRIPTION OF THE ROUTINE "DLY"
49	04800	:		TIMING IS A FUNCTION OF THE PDP11 MODEL AND MEMORY TYPE AND
50	04900	:		SHOULD BE SET UP BEFORE RUNNING THE DIAGNOSTIC
51	05000	:		
52	05100	: 3 --		IF CPU IS AN 11/03, LSI-11 SET SWITCH REGISTER
53	05200	:		BIT 09 TO A 1 SPECIAL TESTS ARE RUN ON THE DLV11
54	05300	:		
55	05400	: 4 --		SYSTEMS WITHOUT A HARDWARE SWITCH REGISTER SHOULD USE
56	05500	:		MEMORY LOCATION 176 AS A SOFTWARE SWITCH REGISTER
57	05600	:		
58	05700	: 5 --		THIS DIAGNOSTIC IS FOR VERIFICATION OF BASIC TERMINAL
59	05800	:		FUNCTIONS ONLY IF THE TERMINAL UNDER TEST HAS HARDWARE
60	05900	:		OPTIONS INSTALLED RUN DIAGNOSTIC MDEC-11-DZLAF-A, THE
61	06000	:		L436 TERMINAL OPTIONS TEST

63		06100	SBTTL SYSTEM EQUATES
64		06200	
65		06300	
66		06400	REGISTER EQUATES
67		06500	
68	000000	06600	R0=%0
69	000001	06700	R1=%1
70	000002	06800	R2=%2
71	000003	06900	R3=%3
72	000004	07000	R4=%4
73	000005	07100	R5=%5
74	000006	07200	SP=%6
75	000007	07300	PC=%7
76	177776	07400	PSW=177776
77		07500	
78		07600	SYSTEM EQUATES
79		07700	
80	000001	07800	BIT0=1
81	000002	07900	BIT1=2
82	000004	08000	BIT2=4
83	000010	08100	BIT3=10
84	000020	08200	BIT4=20
85	000040	08300	BIT5=40
86	000100	08400	BIT6=100
87	000200	08500	BIT7=200
88	000400	08600	BIT8=400
89	001000	08700	BIT9=1000
90	002000	08800	BIT10=2000
91	004000	08900	BIT11=4000
92	010000	09000	BIT12=10000
93	020000	09100	BIT13=20000
94	040000	09200	BIT14=40000
95	100000	09300	BIT15=100000
96	000000	09400	OPEN=0
97	040000	09500	SCOPSW=BIT14
98	004000	09600	NITRSW=BIT11
99	005726	09700	POPSP=5726
100	022626	09800	POPSP2=22626
101	000340	09900	PRTY7=340
102	000200	10000	PRTY4=200
103	000200	10100	ACRLF=200
104	001000	10200	LSI11=BIT9
105		10300	
106		10400	PROGRAM TRAP EQUATES
107		10500	
108	104000	10600	TYPE=EMT+0
109	104001	10700	ERROR=EMT+1
110	104002	10800	EHALT=EMT+2
111	104003	10900	STRDRV=EMT+3
112	104004	11000	STPCHV=EMT+4
113	104005	11100	CHAIN=EMT+5
114	104006	11200	CHALT=EMT+6
115	104007	11300	TYPEN=EMT+7
116	104010	11400	DELAY=EMT+10
117	104011	11500	TTYCTL=EMT+11
118	104012	11600	CRLF=EMT+12

.SCOPE SWITCH
 .TEST LOOP SWITCH
 .POP STACK ONCE
 .POP STACK TWICE
 .PRIORITY LEVEL DEFINITIONS
 .FLAG FOR LSI-11-11-03

119	104013	11700	SCRLF=EMT+13
120	104014	11800	LF=EMT+14
121	104015	11900	PRINTC=EMT+15
122	104016	12000	PRTHDR=EMT+16
123	104017	12100	PRNT=EMT+17
124	104020	12200	READ=EMT+20
125	104021	12300	AREAD=EMT+21
126	104022	12400	CR=EMT+22
127	104023	12500	BTOASC=EMT+23
128	104024	12600	FORWD=EMT+24
129	104025	12700	READC=EMT+25

186			18500	SBTTL	SYMBOL DEFINITIONS
187			18600	,	
188			18700	,	
189			18800	,	
190	000602	177560	18900	CONADD	177560
191	000604	000060	19000	CONVEC	60
192	000606	176500	19100	DLADR	176500
193			19200		
194			19300		
195			19400		
196			19500		
197	000610	000020	19600	DLNP	16
198	000612	177560	19700	TKS	177560
199	000614	177562	19800	TKB	177562
200	000616	177564	19900	TPS	177564
201	000620	177566	20000	TPB	177566
202	000622	000060	20100	TKVTR	60
203	000624	000200	20200	TKLVL	PRTY4
204	000626	000064	20300	TPVTR	64
205	000630	000200	20400	TPLVL	PRTY4
206	000632	000000	20500	FSTD	OPEN
207	000634	000000	20600	CNTLSW	OPEN
208	000636	000000	20700	RTNNO	OPEN
209	000640	000000	20800	NXTST	OPEN
210	000642	000000	20900	SCOPT	OPEN
211	000644	000000	21000	PRGID	OPEN
212	000646	000000	21100	CRBUF	OPEN
213	000650	000000	21200	CTRA	OPEN
214	000652	000000	21300	WIDTH	OPEN
215	000654	000000	21400	LEVEL	OPEN
216	000656	000000	21500	DLCNT	OPEN
217	000660	000000	21600	ICTR	OPEN
218	000662	000000	21700	REPT	OPEN
219	000664	000000	21800	BRCTR	OPEN
220	000666	000000	21900	COUNT3	OPEN
221	000670	000000	22000	XCSR	OPEN
222	000672	000251	22100	TIMER	251
223	000674	000000	22200	SPCNT	OPEN
224	000676	000000	22300	CURTST	OPEN
225	000700	000000	22400	TEMPCH	OPEN
226	000702	000000	22500	PARITY	OPEN
227	000704	000000	22600	PCHAR	OPEN
228	000706	000000	22700	LCFNT	OPEN
229	000710	000000	22800	INCHK	OPEN
230	000712	000000	22900	TEMP	OPEN
231	000714	177570	23000	SP	177570
232	000716	000000	23100	CONTR	OPEN

, ADDR OF CONSOLE RECEIVER STATUS REG
 ; CONSOLE TERMINAL INTERRUPT VECTOR
 , ADDRESS OF FIRST DL11, DEFAULT TO DL11-A, B
 , IF DL11-C, D, E,, THEN
 , SET TO 175610 FOR FIRST 16 (OF 31) OR
 , SET TO 176000 FOR LAST 16 (OF 31)
 , OR SET OTHER DESIRED START ADDRESS
 , # OF DL11'S TO BE INITIALLY ASSUMED
 , CONSOLE RECEIVER STATUS REG
 , CONSOLE RECEIVER BUFFER
 , CONSOLE TRANSMITTER STATUS REG
 , CONSOLE TRANSMITTER BUFFER
 , C T RECEIVER INTERRUPT VECTOR
 , C T RECEIVER PRIORITY LEVEL
 , C T TRANSMITTER INTERRUPT VECTOR
 , C T TRANSMITTER PRIORITY LEVEL
 , ADDRESS OF FIRST ACTIVE DL11
 , CONSOLE TERMINAL CONTROL SWITCH
 , CONTAINS CURRENT TEST NUMBER
 , CONTAINS ADDRESS OF NEXT TEST
 , CONTAINS ADDRESS OF TEST SCOPE ENTRY
 , CONTAINS TEST PROGRAM INDICATORS

 , CURRENT PAPER WIDTH, BINARY
 , LEVEL OF EXECUTION
 , # OF MULTIPLE DL11S
 , I/O TEST ITERATION COUNT
 , TEMP STORAGE FOR TESTS E021 & E022
 , COUNTER FOR ROUTINE "AREAD"
 , COUNTER FOR ROUTINE "PRINTC"
 , ADDRESS OF MULTIPLE DL11 STATUS
 , 1 MSEC COUNTER FOR ROUTINE "DELAY"
 , COUNTER FOR TEST ROUTINE "PT3"
 , ADDRESS OF CURRENT TEST
 , TEMP STOR FOR ECHO TESTS
 , PARITY FLAG FOR RECEIVED CHAR
 , CHAR CODE WITH PARITY BIT
 , COUNTER FOR TEST ROUTINE "PT4"
 , CHECK FOR INPUT FLAG
 , TEMPORARY WORKING STORAGE
 , SW REG ADDRESS
 , TIME COUNTER FOR DL11 TESTS

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235          00100          SBT'L PROGRAM INITIALIZATION & CONTROL
236          00200
237          00300          ,*****
238          00400          ,COMMON HALT---WHEN IN SWITCH REGISTER CONTROL THE CPU
239          00500          ,          WILL BE ADVANCED TO THIS COMMON HALT WHERE
240          00600          ,          A NEW TEST WILL BE EXPECTED TO BE STARTED
241          00700          ,*****
242          00800
243 000720 005737 000654 00900 CHLT TST LEVEL ,TEST CURRENT LEVEL
244 000724 001403 01000 BEQ SELHLT ,BRANCH IF 0, DO NOT HALT
245 000726 011600 01100 MOV @SP,R0 ,PUT ADDRESS OF CALLER INTO R0
246 000730 005740 01200 TST -(PC)
247 000732 000000 01300 HALT
248 000734 000002 01400 SELHLT RTI ,RETURN FROM INTERRUPT
249 000736 012737 177777 005300 01500 START1 MOV #177777,ATOX ,FORCE END OF I/O TESTS
250 000744 012737 104006 001700 01600 MOV #CHALT,WAIF ,FORCE SR CONTROL
251 000752 000424 01700 BP STARTX
252 000754 012737 104011 001700 01800 START2 MOV #TTYCTL,WAIF ,FORCE TERMINAL CONTROL
253 000762 012737 005330 005300 01900 MOV #AT1,ATOX ,FORCE ALL I/O TESTS
254 000770 000415 02000 BP STARTX
255 000772 012737 104011 001700 02100 START3 MOV #TTYCTL,WAIF ,FORCE TERMINAL CONTROL
256 001000 012737 177777 005300 02200 MOV #177777,ATOX ,FORCE END OF I/O TESTS
257 001006 000406 02300 BP STARTX
258 001010 012737 005330 005300 02400 START MOV #AT1,ATOX ,FORCE ALL I/O TESTS
259 001016 012737 104006 001700 02500 MOV #CHALT,WAIF ,FORCE SR CONTROL
260 001024 012706 000600 02600 STARTX MOV #SPBOT,SP ,SET STACK POINTER
261 001030 013746 000006 02700 MOV 6,-(SP) ,SAVE CURRENT VECTOR
262 001034 013746 000004 02800 MOV 4,-(SP)
263 001040 012737 001054 000004 02900 MOV #105,4 ,SET UP TIMEOUT VECTOR
264 001046 005777 177642 03000 TST @SR ,TRY TO REFERENCE HARDWARE SW REG
265 001052 000411 03100 BR 115 ,BRANCH IF NO TIMEOUT TRAP OCCURS
266 001054 012737 000176 000714 03200 105 MOV #SWREG,SR ,POINT TO SOFTWARE SWITCH REGISTER
267 001062 022626 03300 CMP (SP)+,(SP)+ ,RESTORE STACK
268 001064 104000 03400 TYPE ,TELL OPERATOR TO USE SOFTWARE
269 001066 014407 03500 NOSW ,SWITCH REG AT LOC 176
270 001070 012737 000202 000672 03600 MOV #202,TIMER ,ADJUST TIMER FOR LSI-11
271 001076 012637 000004 03700 115 MOV (SP)+,4 ,RESTORE TIMEOUT VECTOR
272 001102 012637 000006 03800 MOV (SP)+,6
273 001106 005037 000710 03900 CLP INCHK ,ALLOW INPUT CHECKING
274 001112 012737 000006 000004 04000 MOV #6,MACHEP ,CLEAN UP
275 001120 005037 000644 04100 CLP PRGID ,INITIALIZE PROGRAM FLAGS
276 001124 005037 000634 04200 CLP CNTLSW ,INITIALIZE TERMINAL CONTROL SWITCH
277 001130 005037 000654 04300 CLP LEVEL ,INITIALIZE LEVEL
278 001134 012737 007450 000024 04400 MOV #PFAIL,24 ,SET ACP POWER FAIL ROUTINE
279 001142 004737 002700 04500 JSP PC,CONIT ,SET A CONSOLE TERMINAL ADDRESS
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281				04700		,*****		
282				04800		,READ THE PAPER WIDTH, NUMBER OF COLUMNS,		
283				04900		,FROM SWITCH REGISTER POSITIONS 0-7 SAVE AND		
284				05000		,CONVERT TO 3 ASCII CHARACTERS. A WIDTH GT132		
285				05100		,OR LT30 COLUMNS (DECIMAL) WILL BE ABORTED TO 132		
286				05200		,THE SWITCHES MAY BE CHANGED ONCE THE PROGRAM TITLE OR THE DL11 COUNT		
287				05300		,MESSAGE HAS STARTED TO PRINT		
288				05400		,*****		
289				05500				
290	001146	017701	177542	05600		MOV	@SP,R1	,PUT (SR) INTO R1
291	001152	042701	177400	05700		BIC	#177400,R1	,SAVE ONLY BITS 0-7
292	001156	020127	000204	05800		CMR	R1,#204	,TEST NO COLUMN GT132
293	001162	003003		05900		BGT	25	,COLUMNS GT132, DEFAULT TO 132
294	001164	020127	000035	06000	15	CMR	R1,#35	,CHECK IF NO COLUMNS LT 30
295	001170	101002		06100		BHI	35	,NOT LT 30 NOR GT 132
296	001172	012701	000204	06200	25	MOV	#204,R1	,COLUMNS LT 30 OR GT 132, DEFAULT
297	001176	010137	000652	06300	35	MOV	R1,WIDTH	,SAVE NO COLUMNS IN WIDTH
298	001202	012700	014112	06400		MOV	#ADDR,PO	,ADDR TO STORE ASCII COLUMN VALUE
299	001206	012702	000000	06500		MOV	#3,R2	,DO A 3 CHAR CONVERSION
300	001212	104023		06600		BTOASC		,CONVERT NO COLUMNS TO ASCII
301	001214	000401		06700	45	BR	55	
302	001216	000410		06800		BR	65	
303	001220	012700	000000	06900	55	MOV	#0,PO	TRANSMIT A
304	001224	104015		07000		PRINTC		,NUL CODE
305	001226	104007		07100		TYPEM		,TYPE PROGRAM TITLE & PST TIME RUN
306	001230	013676		07200		STARTM		
307	001232	012757	000000	07300		MOV	#NOP,45	

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309 07500 ,*****
310 07600 ,THIS NEXT PART CHECKS THE PRESENCE OF DL11-A OR DL11-C
311 07700 ,STARTING AT 776500 A MESSAGE WILL BE PRINTED INDICATING THE NUMBER
312 07800 ,PRESENT THE PRINTER DIAGNOSTIC WILL ADDRESS EACH OF
313 07900 ,THE MULTIPLE DL11S IN THE SYSTEM IF SWITCH 13 IS DOWN (0)
314 08000 ,*****
315 08100
316 001240 012737 001320 000004 08200 65 MOV #END2A,MACHER ,INITIALIZE TIME OUT TRAP
317 001246 013700 000606 08300 MOV DLADR,R0 ,ADDRESS OF FIRST DL11 TO R0
318 001252 013701 000610 08400 MOV DLNR,R1 ,SET DL CHECK COUNT
319 001256 005037 000656 08500 CLR DLCNT ,INITIALIZE DLCNT
320 001262 005710 08600 ENDC3 TST (R0) ,IS DL PRESENT?
321 001264 012737 001332 000004 08700 MOV #END2,MACHER ,YES, RESET TIME OUT TRAP
322 001272 010037 000632 08800 MOV R0,FSTDL ,STORE ADDRESS OF FIRST DL11
323 001276 000401 08900 BP 25 ,CONTINUE
324 001300 005710 09000 15 TST (R0) ,IS DL11 PRESENT
325 001302 062700 000010 09100 25 ADD #10,R0 ,POINTER AND DL11 ADDRESS
326 001306 005237 000656 09200 INC DLCNT ,INCREMENT COUNT OF DL11'S
327 001312 005301 09300 DEC R1 ,DECREMENT DL CHECK COUNT, DONE?
328 001314 001407 09400 BEQ END4 ,BRANCH IF DONE
329 001316 000770 09500 BF 15 ,CHECK PRESENCE OF NEXT DL11
330 001320 005301 09600 ENDC2A DEC R1 ,DONE DL CHECK?
331 001322 001404 09700 BEQ END4 ,YES, EXIT
332 001324 062700 000010 09800 ACD #10,R0 ,NO, CHECK NEXT DL
333 001330 000754 09900 BP END3 ,CONTINUE
334 001332 022626 10000 ENDC2 POPSP2 ,DL11 NOT PRESENT
335 001334 013701 000656 10100 ENDC4 MOV DLCNT,R1 ,GET # DL11'S
336 001340 012700 014047 10200 MOV #DL11S1,R0 ,ADR OF ASCII CHAR STORAGE
337 001344 012702 000002 10300 MOV #2,R2 ,# OF ASCII CHARS
338 001350 104023 10400 BTOASC ,CONVEPT NUMBER
339 001352 104007 10500 T,PEM ,TYPE MESSAGE
340 001354 014034 10600 DL11S
341 10700
342 10800 ,*****
343 10900 ,EXECUTE THE STRING OF CONSOLE TERMINAL I/O TESTS
344 11000 ,THEN EITHER HALT AT LOCATION SELHLT OR CONTINUE WITH
345 11100 ,PRINTER TESTS AS A FUNCTION OF SP BIT 8
346 11200 ,*****
347 11300
348 001356 005037 000636 11400 CLR RTNNO ,SET ROUTINE NO = 0
349 001362 005037 000654 11500 CLR LEVEL ,SET LEVEL = 0
350 001366 023727 005300 177777 11600 CMP ATOX,#177777 ,SEE IF I/O IS TO BE SKIPPED
351 001374 001515 11700 BEQ SKIP
352 001376 012737 005276 000640 11300 MOV #ATO,NXTST ,ADDRESS OF FIRST I/O TEST
353 001404 104024 11900 FOPWD ,SET UP TEST PARAMETERS
354 001406 000177 177264 12000 JMP @CUPST ,GO TO I/O TEST ROUTINE

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356 12200 ,*****
357 12300 ,CHAINN-- THIS PORTION IS THE COMMON RETURN
358 12400 , FOR ALL THREE CLASSES OF TESTS.
359 12500 ,
360 12600 , 1-- IF AN ERROR OCCURED DURING AN I/O TEST THE
361 12700 , OPERATOR CAN CAUSE THAT TEST TO BE LOOPED
362 12800 , WITHOUT ANY FURTHER ERROR HALTS BY
363 12900 , SETTING THE "SCOPE" BIT (#14) ON THE SR=1
364 13000 , RESETTING SR BIT 14 TO 0 WILL ALLOW THE
365 13100 , ERROR HALT TO OCCUR AGAIN IF IT STILL EXISTS
366 13200 ,
367 13300 , 2-- IF THE OPERATOR IS IN THE MAINTENANCE
368 13400 , MODE (BIT 8 SET = 1 AT START UP TIME), THE
369 13500 , SELECTED PROGRAM WILL LOOP CONTINUOUSLY
370 13600 , IF SR BIT 11 IS SET=1. IF BIT 11 IS = 0
371 13700 , THEN THE PROGRAM WILL BE ADVANCED TO
372 13800 , THE NEXT TEST IN IT'S CLASS IF BIT 8=0
373 13900 , AS LONG AS BIT 11 AND
374 14000 , BIT 8 ARE 0, THE CLASS OF TESTS SELECTED
375 14100 , WILL BE CONTINUOUSLY SEQUENCED THROUGH
376 14200 , IF BIT 11 IS 0 AND BIT 8=1, THEN THE CPU
377 14300 , WILL HALT AT LOCATION SELHLT AND WAIT FOR THE
378 14400 , NEXT TEST NUMBER TO BE SET IN THE
379 14500 , SWITCH REGISTER
380 14600 ,*****
381 14700 ,
382 001412 032737 000001 000634 14800 CHAINN BIT #1,CNTLSW ,CHECK IF TERMINAL CONTROL
383 001420 001401 14900 BEQ 15 ,BRANCH IF NOT
384 001422 104011 15000 TTYCTL ,GO TO TERMINAL CONTROL
385 001424 005737 000644 15100 15 TST PRGID ,TEST ERROR BIT IN PRGID
386 001430 100016 15200 BPL 35 ,BRANCH IF ERROR BIT NOT SET
387 001432 032777 040000 177254 15300 BIT #SCOPSW,@SR ,ERR, CHECK IF SCOPE OPTION ON
388 001440 001407 15400 BEQ 25 ,BRANCH IF NO SCOPING
389 001442 022737 177777 000642 15500 CMP #-1,SCOPTR ,YES, CHECK IF OK TO SCOPE THIS TEST
390 001450 001403 15600 BEQ 25 ,BRANCH IF NOT OK
391 001452 017716 177164 15700 MOV @SCOPTR,@SP ,PUT ADDR OF SCOPE ENTRY INTO STACK
392 001456 000002 15800 RTI ,GO TO SCOPE ENTRY IN TEST
393 001460 042737 100000 000644 15900 25 BIC #BIT15,PRGID ,CLEAR ERROR IND IN PRGID
394 001466 005737 000654 16000 35 TST LEVEL ,CHECK LEVEL
395 001472 001405 16100 BEQ 45 ,BRANCH IF LEVEL=0
396 001474 032777 004000 177212 16200 BIT #NITRSW @SR ,TEST LOOP SWITCH ON (=1)
397 001502 001405 16300 BEQ 55 ,BRANCH IF NO LOOP TEST
398 001504 000002 16400 RTI ,GO BACK TO TEST
399 001506 005337 000660 16500 45 DEC ICTR ,DECREMENT TEST ITERATION COUNT
400 001512 001407 16600 BEQ 65 ,BRANCH IF COUNT=0
401 001514 000002 16700 RTI ,NOT ZERO, REPEAT TEST
402 001516 032777 000400 177170 16800 55 BIT #BITS,@SR ,TEST IF SEQUENCE TEST (BIT8)
403 001524 001402 16900 BEQ 65 ,BRANCH TO NEXT TEST IF BIT8=0
404 001526 000137 001700 17000 JMP WAITF ,GO WAIT FOR MORE INPUT
405 001532 022626 17100 65 POPSP2 ,POP 2 OFF STACK
406 001534 000240 17200 CHAINY NOP ,THIS FORMERLY WAS RESET
407 001536 005777 177152 17300 TST @SR ,CHECK SR
408 001542 100003 17400 BPL 15 ,BRANCH IF NO HALT WANTED
409 001544 113700 000636 17500 MOVB RTNNO,RO ,CURRENT TEST NUMBER TO RO
410 001550 000000 17600 HALT ,HALT (NOT FOR TEST SELECTION)
411 001552 005737 000654 17700 15 TST LEVEL ,TEST THE CURRENT LEVEL
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412	001556	001420			17800		BEQ	3\$, BRANCH IF 0
413	001560	012737	000006	000004	17900		MOV	#6, MACHER	, CLEAN UP
414	001566	012706	000600		18000		MOV	#SPBOT, SP	, SET UP STACK POINTER
415	001572	104024			18100		FORWD		, SET UP VALUES FOR NEXT TEST
416	001574	022737	177777	000640	18200		CMP	#-1, NXTST	, END OF I/O TESTS (=-1)
417	001602	001004			18300		BNE	2\$	, BRANCH IF NOT END
418	001604	012737	005276	000640	18400		MOV	#ATO, NXTST	, RESET NXTST TO FIRST I/O TEST
419	001612	104024			18500		FORWD		, SET UP VALUES FOR NEXT TEST
420	001614	000177	177056		18600	2\$	JMP	@CURTST	, GO TO TEST
421	001620	022737	177777	000640	18700	3\$	CMP	#-1, NXTST	, END OF I/O TESTS (=-1)
422	001626	001012			18800		BNE	NEXT	, BRANCH IF NOT
423	001630	032777	000400	177056	18900	SKIP	BIT	#BIT8, @SR	, TEST IF WANT TEST SELECTION RIGHT AWAY
424	001636	001016			19000		BNE	NEXT1	, BRANCH IF NOT
425	001640	052737	000200	000644	19100		BIS	#BIT7, PRGID	, BYPASS SCOPING
426	001646	012737	007402	000640	19200		MOV	#PTO, NXTST	, PROD TESTING, GO TO PRINTER TESTS
427	001654	012737	000006	000004	19300	NEXT	MOV	#6, MACHER	, CLEAN UP
428	001662	012706	000600		19400		MOV	#SPBOT, SP	, SET UP STACK POINTER
429	001666	104024			19500		FORWD		, SET UP NEXT TEST PARAMETERS
430	001670	000177	177002		19600		JMP	@CURTST	, GO TO ROUTINE
431	001674	005237	000654		19700	NEXT1	INC	LEVEL	
432					19800				
433					19900				, *****
434					20000				, WAIT FOR FURTHER INSTRUCTIONS
435					20100				, -LOAD PROGRAM NUMBER INTO BITS 0-5 OF THE SR
436					20200				, -SET SR BIT 11=1 TO LOOP ON SELECTED TEST
437					20300				, -SET SR BIT 11=0 AND BIT 8=0 TO LOOP THROUGH
438					20400				, SEQUENCE OF SELECTED TESTS
439					20500				, -SET SR BIT 11=0 AND BIT 8=1 TO HALT AGAIN AFTEP
440					20600				, EXECUTING TEST ONCE
441					20700				, *****
442					20800				
443	001700	104006			20900	WAITF	CHALT		, OR TTYCTL IF START WAS AT 206
444	001702	012737	000006	000004	21000		MOV	#6, MACHER	, CLEAN UP
445	001710	012706	000600		21100		MOV	#SPBOT, SP	, SET UP STACK POINTER
446	001714	017700	176774		21200		MOV	@SR, RO	, GET CURRENT SW REG
447	001720	042700	177700		21300		BIC	#177700, RO	
448	001724	020027	000037		21400		CMP	RO, #37	, TEST IF PROG NO IS I/O TEST
449	001730	101403			21500		BLOS	1\$	, BRANCH IF EQ OR LT 37 AN ECHO OR PRINTER
450	001732	005037	000644		21600		CLP	PRGID	, I/O TEST, CLEAR PRGID
451	001736	000403			21700		BR	2\$	
452	001740	052737	000200	000644	21800	1\$	BIS	#BIT7, PRGID	, BYPASS SCOPING
453	001746	000241			21900	2\$	CLC		, CLEAR C BIT
454	001750	006100			22000		ROL	RO	, GET PROGRAM ADDRESS OUT OF
455	001752	016037	002522	000640	22100		MOV	PRGTAB(RO), NXTST	, PROGRAM ADDRESS TABLE
456	001760	023727	000640	001700	22200		CMP	NXTST, #WAITF	, TEST IF LEGAL TEST NO
457	001766	001744			22300		BEQ	WAITF	, BRANCH IF ILLEGAL
458	001770	104024			22400		FORWD		, SET UP TEST PARAMETERS
459	001772	000177	176700		22500		JMP	@CURTST	, GO TO TEST

```

461 22700 ,*****
462 22800 ,TTY1-- THIS SECTION IS USED WHEN THE DIAGNOSTIC IS BEING CONTROLLED BY
463 22900 , THE CONSOLE TERMINAL. IT IS EFFECTIVE ONLY WHEN THE DIAGNOSTIC
464 23000 , STARTING ADDRESS IS 210 AND SR BIT 2 WAS SET AT START TIME
465 23100 , THE RESPONSE TO THE MESSAGE "SELECT TEST NO " MUST BE THE 2
466 23200 , DIGIT OCTAL TEST NUMBER FOLLOWED BY ,
467 23300 , "L" TO LOOP ON TEST
468 23400 , "S" TO LOOP ON SEQUENCE
469 23500 , "." TO EXECUTE TEST ONCE
470 23600 , ALL SPACES WILL BE IGNORED. AN ILLEGAL INPUT WILL BE FLAGED BY A "?"
471 23700 , AND THE RETYPING OF THE ABOVE MESSAGE
472 23800 ,*****
473 23900
474 001776 022626 24000 TTY1. POPSP2 ,POP 2 FROM STACK
475 002000 105777 176606 24100 TSTB @TKS ,TEST IF ANY INPUT
476 002004 100013 24200 BPL 15 ,BRANCH IF NOT
477 002006 017705 176602 24300 MOV @TKB,R5 ,GET CHAR
478 002012 042705 177600 24400 BIC #177600,R5 ,MASK BITS
479 002016 020527 000177 24500 CMP R5,#177 ,CHECK IF RUBOUT
480 002022 001004 24600 BNE 15 ,BRANCH IF NOT
481 002024 042737 004400 000634 24700 BIC #4400,CNTLSW ,CLEAR LOOP BITS
482 002032 000413 24800 BR TTY1B
483 002034 032737 004000 000634 24900 15 BIT #NITRSW,CNTLSW ,CHECK IF LOOP ON TEST
484 002042 001401 25000 BEQ 25 ,BRANCH IF NO LOOP ON TEST
485 002044 000002 25100 RTI ,LOOP ON TEST
486 002046 032737 000400 000634 25200 25 BIT #BIT8,CNTLSW ,TEST IF LOOP ON SEQUENCE
487 002054 001402 25300 BEQ TTY1B ,BRANCH IF NO LOOP ON SEQUENCE
488 002056 000137 001534 25400 JMP CHAINY ,CHAIN TO NEXT TEST
489 002062 012737 177777 000710 25500 TTY1B MOV #-1,INCHK ,STOP INPUT CHECKING
490 002070 012700 000036 25600 MOV #30,RO ,DELAY FOR HALF DUPLEX
491 002074 104010 25700 DELAY
492 002076 104007 25800 TYPEM
493 002100 014324 25900 MSG3 ,TYPE MESSAGE
494 002102 005037 000710 26000 CLR INCHK ,ALLOW INPUT CHECKING AGAIN
495 002106 104020 26100 15 READ ,WAIT FOR INPUT
496 002110 023727 000700 000040 26200 CMP TEMPCH,#40 ,TEST IF CHAR IS A SPACE
497 002116 001773 26300 BEQ 15 ,BRANCH IF YES
498 002120 012700 000036 26400 MOV #30,RO ,DELAY FOR HALF DUPLEX
499 002124 104010 26500 DELAY
500 002126 104017 26600 PRNT ,READY?
501 002130 117777 176460 176462 26700 MOV @TKB,@TPB ,ECHO CHAR
502 002136 004737 002460 26800 JSR PC,TESTC ,CHECK IF CHAR IS OK
503 002142 000541 26900 BR 85 ,NO. ERROR
504 002144 010005 27000 MOV RO,P5 ,OK. PUT CHAR INTO P5
505 002146 006305 27100 ASL P5 ,SHIFT INTO POSITION 5-3
506 002150 006305 27200 ASL P5
507 002152 006305 27300 ASL R5
508 002154 104020 27400 25 READ ,WAIT FOR NEXT CHAR
509 002156 023727 000700 000040 27500 CMP TEMPCH,#40 ,CHECK IF A SPACE
510 002164 001773 27600 BEQ 25 ,BRANCH IF SPACE
511 002166 012700 000036 27700 MOV #30,RO ,DELAY FOR HALF DUPLEX
512 002172 104010 27800 DELAY
513 002174 104017 27900 PRNT ,READY?
514 002176 117777 176412 176414 28000 MOV @TKB,@TPB ,ECHO CHAR
515 002204 004737 002460 28100 JSR PC,TESTC ,CHECK IF CHAR IS OK
516 002210 000516 28200 BR 85 ,ERROR IN CHAR

```

517	002212	060005			28300		ADD	R0,R5	,OK,R5 NOW = OCTAL TEST NO
518	002214	104020			28400	35	READ		,WAIT FOR TERMINATION CHARACTER
519	002216	023727	000700	000040	28500		CMP	TEMPCH #40	,CHECK IF SPACE
520	002224	001773			28600		BEQ	35	,BRANCH IF SPACE
521	002226	012700	000036		28700		MOV	#30 ,R0	,DELAY FOR HALF DUPLEX
522	002232	104010			28800		DELAY		
523	002234	104017			28900		PRNT		,READY?
524	002236	117777	176352	176354	29000		MOVB	@TKB,@TPB	,ECHO CHAR
525	002244	012737	004001	000634	29100		MOV	#4001,CNTLSW	,SET BITS 11 & 0
526	002252	023727	000700	000114	29200		CMP	TEMPCH,#114	,NO, IS IT AN "L" ?
527	002260	001427			29300		BEQ	55	,BRANCH IF YES
528	002262	023727	000700	000154	29400		CMP	TEMPCH,#154	,CHECK LOWER CASE
529	002270	001423			29500		BEQ	55	
530	002272	023727	000700	000123	29600		CMP	TEMPCH,#123	,NO, IS IT AN "S"
531	002300	001414			29700		BEQ	45	,BRANCH IF YES
532	002302	023727	000700	000163	29800		CMP	TEMPCH,#163	,CHECK LOWER CASE
533	002310	001410			29900		BEQ	45	
534	002312	023727	000700	000056	30000		CMP	TEMPCH,#56	,NO, IS IT A " " ?
535	002320	001052			30100		BNE	85	,NO, ERROR
536	002322	012737	000001	000634	30200		MOV	#1,CNTLSW	,YES SET ONLY BIT 0 IN CONTROL WD
537	002330	000403			30300		BF	55	
538	002332	012737	000401	000634	30400	45	MOV	#401,CNTLSW	,SET BITS 8 & 0
539	002340	012737	000006	000004	30500	55	MOV	#6,MACHER	,CLEAN UP
540	002346	012706	000600		30600		MOV	#SPBOT,SP	,INIT SP
541	002352	020527	000040		30700		CMP	R5,#40	,IS THIS AN I/O TEST
542	002356	103033			30800		BHIS	85	,BRANCH IF YES
543	002360	020527	000030		30900		CMP	R5,#30	,IS THIS AN OPTION TEST?
544	002364	103007			31000		BHIS	65	,SKIP IF YES
545	002366	020527	000020		31100		CMP	R5,#20	,IS THIS AN ECHO TEST
546	002372	103404			31200		BLO	65	,BRANCH IF NOT
547	002374	012737	000001	000634	31300		MOV	#1,CNTLSW	,FORCE ECHO TEST TO A SINGLE RUN
548	002402	000402			31400		BR	75	,LEAVE THIS TERMINAL AS CONSOLE
549	002404	004737	003700		31500	65	JSR	PC,CONIT	,RESET CONSOLE TERMINAL ADDRESS
550	002410	052737	000200	000644	31600	75	BIS	#BIT7,PRGIC	,BYPASS SCOPING
551	002416	000241			31700		CLC		,CLEAR C BIT
552	002420	006105			31800		ROL	P5	
553	002422	016537	002522	000640	31900		MOV	PRGTAB(R5),NXTST	,ADDR OF TEST TO NXTST
554	002430	023727	000640	001700	32000		CMP	NXTST,#WAITF	,CHECK IF TEST EXISTS
555	002436	001403			32100		BEQ	55	,BRANCH IF NOT
556	002440	104024			32200		FORWD		,SET UP TEST PARAMETERS
557	002442	000177	176230		32300		JMP	@CURTST	,GO TO TEST
558	002446	104017			32400	85	PPNT		,CHECK IF PRINTER IS READY
559	002450	112777	000077	176142	32500		MOVB	#77,@TPB	,SEND A "?"
560	002456	000601			32600		BF	TTY18	,TRY AGAIN

```
562          32800 ;TESTC--CHECKS THAT THE INPUTTED CHARACTER IS BETWEEN 0 AND 7 INCLUSIVE
563          32900
564 002460 023727 000700 000060 33000 TESTC.  CMP      TEMPCH,#60 ;CHECK IF NUMERIC AND EQ OR GT 0
565 002466 103001          33100      BHIS    1$      ,BRANCH IF OK
566 002470 000207          33200      RTS     PC      ,ERROR RETURN
567 002472 023727 000700 000067 33300 1$     CMP      TEMPCH,#67 ;CHECK IF EQ OR LT 7
568 002500 101401          33400      BLOS   2$      ,BRANCH IF OK
569 002502 000207          33500      RTS     PC      ,ERROR RETURN
570 002504 062716 000002          33600 2$     ADD     #2, @SP ,SET UP RETURN ADDRESS
571 002510 013700 000700          33700      MOV     TEMPCH,R0 ,GET CHAR
572 002514 042700 177770          33800      BIC     #177770,R0 ,SAVE ONLY THE DIGIT
573 002520 000207          33900      RTS     PC      ,NORMAL RETURN
```


575	002522	007402	34100	PRGTAB	PT0	. DATA PATH TEST
576	002524	007456	34200		PT1	. PRINTER CHARACTER TEST
577	002526	007600	34300		PT2	. NON-PRINTING CHARACTER TEST
578	002530	010164	34400		PT3	. CARRIAGE RETURN TEST
579	002532	010304	34500		PT4	. MULTIPLE LINE FEED TEST
580	002534	010462	34600		PT5	. SINGLE LINE FEED TEST
581	002536	010666	34700		PT6	. BACKSPACE TEST
582	002540	011054	34800		PT7	. OVERPRINT TEST
583	002542	011266	34900		PT10	. PRINTING FREQUENCY SWEEP TEST
584	002544	011424	35000		PT11	. RIBBON FEED TEST
585	002546	011456	35100		PT12	. PRINTER BELL TEST
586	002550	001700	35200		WAITF	. SPARE
587	002552	001700	35300		WAITF	. SPARE
588	002554	001700	35400		WAITF	. SPARE
589	002556	001700	35500		WAITF	. SPARE
590	002560	011546	35600		PT17	. LIFE TEST
591	002562	012116	35700		E020	. CHARACTER ECHO TEST
592	002564	012166	35800		E021	. LINE ECHO TEST, FAST RATE
593	002566	012224	35900		E022	. LINE ECHO TEST, SLOW RATE
594	002570	012476	36000		E023	. CHARACTER/CODE ECHO TEST
595	002572	013020	36100		E024	. SELECTIVE PATTERN ECHO TEST
596	002574	013566	36200		E025	. BELL ECHO TEST
597	002576	001700	36300		WAITF	. SPARE
598	002600	001700	36400		WAITF	. SPARE
599	002602	001700	36500		WAITF	. SPARE
600	002604	001700	36600		WAITF	. SPARE
601	002606	001700	36700		WAITF	. SPARE
602	002610	001700	36800		WAITF	. SPARE
603	002612	001700	36900		WAITF	. SPARE
604	002614	001700	37000		WAITF	. SPARE
605	002616	001700	37100		WAITF	. SPARE
606	002620	001700	37200		WAITF	. SPARE
607	002622	005276	37300		AT0	. I/O TEST NO 40
608	002624	005330	37400		AT1	. I/O TEST NO 41
609	002626	005362	37500		AT2	. I/O TEST NO 42
610	002630	005414	37600		AT3	. I/O TEST NO 43
611	002632	005446	37700		AT4	. I/O TEST NO 44
612	002634	005536	37800		AT5	. I/O TEST NO 45
613	002636	005614	37900		AT6	. I/O TEST NO 46
614	002640	005704	38000		AT7	. I/O TEST NO 47
615	002642	005754	38100		AT10	. I/O TEST NO 50
616	002644	006012	38200		AT11	. I/O TEST NO 51
617	002646	006052	38300		AT12	. I/O TEST NO 52
618	002650	006126	38400		AT13	. I/O TEST NO 53
619	002652	006206	38500		AT14	. I/O TEST NO 54
620	002654	006272	38600		AT15	. I/O TEST NO 55
621	002656	006372	38700		AT16	. I/O TEST NO 56
622	002660	006440	38800		AT17	. I/O TEST NO 57
623	002662	006510	38900		AT20	. I/O TEST NO 60
624	002664	006602	39000		AT21	. I/O TEST NO 61
625	002666	006702	39100		AT22	. I/O TEST NO 62
626	002670	007010	39200		AT23	. I/O TEST NO 63
627	002672	007122	39300		AT24	. LSI TEST NO 64
628	002674	007222	39400		AT25	. LSI TEST NO 65
629	002676	007300	39500		AT26	. LSI TEST NO 66
630	002700	001700	39600		WAITF	. SPARE

631	002702	001700		39700	WAITF		, SPARE
632	002704	001700		39800	WAITF		, SPARE
633	002706	001700		39900	WAITF		, SPARE
634	002710	001700		40000	WAITF		, SPARE
635	002712	001700		40100	WAITF		, SPARE
636	002714	001700		40200	WAITF		, SPARE
637	002716	001700		40300	WAITF		, SPARE
638	002720	001700		40400	WAITF		, SPARE
639				40500			
640				40600	, *****		
641				40700	, EMTINT	-----SERVICE ROUTINE FOR TRAPS THROUGH	
642				40800		LOCATION 30	
643				40900	, *****		
644				41000			
645	002722	011646		41100	EMTINT MOV	@SP, -(SP)	, PUSH STACKED PC TO GET A WORK COPY (Q)
646	002724	162716	000002	41200	SUB	#2, @SP	, SUB 2 TO POINT TO CALLING TRAP INSTR
647	002730	017616	000000	41300	MOV	@(SP), @SP	, PLACE TRAP INSTR INTO THIS STACK WORK AREA
648	002734	121627	000035	41400	CMPB	@SP, #35	, EXAMINE ITS RIGHT SIDE (Q)
649	002740	101402		41500	BLOS	25	, BRANCH IF WITHIN RANGE OF ESTABLISHED TABLE
650	002742	000000		41600	15 HALT		, ELSE HALT
651	002744	000776		41700	BF	15	
652	002746	006116		41800	25 ROL	@SP	, MULT INSTR BY 2 TO GET WORD DISPLACEMENT
653	002750	042716	177001	41900	BIC	#177001, @SP	, STRIP OFF OP CODE AND LS BIT
654	002754	062716	002776	42000	ADD	#EMTTAB, @SP	, ADD IN STARTING ADDRESS OF TABLE
655	002760	017616	000000	42100	MOV	@(SP), @SP	, FROM TABLE GET OUT DESIRED POINTER
656	002764	005046		42200	CLR	-(SP)	, PUSH A ZERO PSW
657	002766	012746	002774	42300	MOV	#35, -(SP)	, PUSH A PC = TO #35 OF THIS ROUTINE
658	002772	000002		42400	RTI		, DO RTI (POP-POP) TO ESTABLISH THE ZERO PSW
659	002774	000136		42500	35 JMP	@(SP)+	, JMP TO ROUTINE LEAVING STACK AS FOUND
660				42600			
661	002776	003076		42700	EMTTAB TYP		, MESSAGE OUTPUT ROUTINE
662	003000	003310		42800	ERR		, I/O TEST ERROR ROUTINE
663	003002	003336		42900	EHLT		, UNCONDITIONAL HALT
664	003004	003346		43000	STLSRV		, KEYBOARD VECTOR/PRIORITY SETUP
665	003006	003376		43100	STLSPV		, PRINTER VECTOR/PRIORITY SETUP
666	003010	001412		43200	CHAINN		, COMMON TEST EXIT
667	003012	000720		43300	CHLT		, SR BIT 15 HALT
668	003014	003154		43400	TYFM		, MESSAGE OUTPUT ROUTINE, MULTI DEVICES
669	003016	003426		43500	DLY		, DELAY ROUTINE
670	003020	001776		43600	TTY1		, CONSOLE TERMINAL CONTROL
671	003022	003204		43700	SCRLF		, CARRIAGE RETURN-LINE FEED TO ALL DL11'S
672	003024	003132		43800	SSCRLF		, CARRIAGE RETURN-LINE FEED TO CONSOLE
673	003026	003206		43900	SLF		, LINE FEED ONLY (TO ALL)
674	003030	004314		44000	SPRTC		, PRINT CHAR
675	003032	003226		44100	SPHCR		, PRINT TEST HEADER
676	003034	004304		44200	SPRNT		, PRINTER READY
677	003036	004102		44300	SREAD		, READ CHAR
678	003040	003630		44400	SAREAD		, I/O TEST READ ROUTINE
679	003042	003216		44500	SCR		, CARRIAGE RETURN ONLY (TO ALL)
680	003044	003776		44600	SBTASC		, BINARY TO ASCII CONVERSION
681	003046	003552		44700	SFORWD		, FORWARD ROUTINE (BETWEEN TESTS)
682	003050	004174		44800	SREADC		, READ CONSOLE KYBD ONLY
683	003052	003072		44900	SPARET		, SPARE EMT
684	003054	003072		45000	SPARET		, SPARE EMT
685	003056	003072		45100	SPARET		, SPARE EMT
686	003060	003072		45200	SPARET		, SPARE EMT

687	003062	003072	45300	SPARET		. SPARE EMT
688	003064	003072	45400	SPARET		. SPARE EMT
689	003066	003072	45500	SPARET		. SPARE EMT
690	003070	003072	45600	SPARET		. SPARE EMT
691	003072	000000	45700	SPARET HALT		. HALT IF TRAP TO UNDEFINED
692	003074	000776	45800	BR	SPARET	. EMT IS ATTEMPTED

693			45900
694			46000
695			46100
696			46200
697			46300
698			46400
699			46500
700			46600
701			46700
702			46800
703			46900
704			47000
705			47100
706			47200
707			47300
708			47400
709			47500
710			47600
711			47700
712			47800
713			47900
714			48000
715			48100

SBTTL COMMON ROUTINES USED BY LA36 TESTS

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*****
THIS SECTION CONTAINS MOST ROUTINES CALLED BY
THE VARIOUS TESTS EITHER BY TRAPPING THROUGH LOCATION
30 OR BY SUBROUTINE CALLS (JSR PC,**)
*****
TYPE-- A COMMON ROUTINE USED TO TYPE MESSAGES ON THE
CONSOLE TERMINAL ONLY THE NULL CHARACTER TERMINATES
THE MESSAGE CALLED THROUGH AN EMT TRAP
CALLING SEQUENCE
TYPE
MSG      ADDRESS OF MESSAGE
*****
TYP      MOV      (SP),R1      .GET POINTER TO ADDR OF MSG
          ADD      #2,@SP
          MOV      (R1),R1      .ADDR OF MSG TO R1
          MOVB    (R1)+,PO      .GET CHAR
          BMI     25           .BRANCH IF WANT AUTO CR-LF
          BNE     35           .PRINT CHAR IF NOT NULL
          RTI
          SCRLF  25           .YES, SEND CR-LF
          BP      15           .GET NEXT CHAR
          PRNT   35           .PRINTER READY?
          MOVB   RO @TPB      .LOAD PRINTER BUFFER WITH CHAR
          BR     15           .GO GET NEXT CHAR
          SSCRFL PPNT         .PRINTER READY?
          MOVB   #15,@TPB     .SEND CR
          PPNT   .PRINTER READY?
          MOVB   #12,@TPB     .SEND LF
          RTI                .RETURN TO CALLEP

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735 50100 ,XXXXXXXXXX
736 50200 ,
737 50300 ,TYPM---MULTI TYPE-A COMMON ROUTINE TO OUTPUT
738 50400 , A MESSAGE ON ALL DL11S IF THE MULTI TEST
739 50500 , SWITCH (BIT 13) IS SET. THIS ROUTINE IS USED BY
740 50600 , THE PRINTER TESTS TO TYPE HEADINGS IF A UNIT
741 50700 , IS NOT READY, THE CHARACTER WILL NOT BE TYPED
742 50800 ,
743 50900 ;XXXXXXXXXX
744 51000
745 003154 011601 51100 TYPM MOV (SP),R1 ,GET POINTER TO ADDR OF MMSG
746 003156 062716 000002 51200 ADD #2,@SP
747 003162 011101 51300 MOV (R1),R1 ,ADDR OF MMSG TO R1
748 003164 112100 51400 15 MOVB (R1)+,R0 ,GET CHAR
749 003166 100402 51500 BMI 25 ,BRANCH IF WANT AUTO CR-LF
750 003170 001003 51600 BNE 35 ,CONTINUE IF NOT NULL
751 003172 000002 51700 RTI ,RETURN
752 003174 104012 51800 25 CRLF ,YES, SEND CR-LF
753 003176 000772 51900 BR 15 ,NEXT CHAR
754 003200 104015 52000 35 PRINTC ,PRINT CHAR
755 003202 000770 52100 BF 15 ,GO GET NEXT CHAR
756 52200
757 003204 104022 52300 SCRLF CR ,SEND CR
758 003206 012700 000012 52400 SLF MOV #12,R0 ,SET LF CHAR
759 003212 104015 52500 PRINTC ,SEND IT
760 003214 000002 52600 RTI ,RETURN TO CALLER
761 52700
762 003216 012700 000015 52800 SCR MOV #15,R0 ,SET CR CHAR
763 003222 104015 52900 PRINTC ,SEND IT
764 003224 000002 53000 RTI ,RETURN
765 53100
766 53200 ,*****
767 53300 ,
768 53400 ,ROUTINE TO PRINT TEST HEALP
769 53500 ,
770 53600 ,*****
771 53700
772 003226 012700 000000 53800 SPRHDR MOV #0,R0 ,TRANSMIT
773 003232 104015 53900 PRINTC ,NUL CODE
774 003234 104007 54000 TYPM ,PRINT MESSAGE
775 003236 014076 54100 HDRMSG
776 003240 013700 000636 54200 MOV RTNNO,R0 ,GET TEST NUMBER
777 003244 006200 54300 ASR R0 ,GET FIRST DIGIT
778 003246 006200 54400 ASR R0
779 003250 006200 54500 ASR R0
780 003252 042700 177770 54600 BIC #177770,R0 ,MASK FIRST DIGIT
781 003256 062700 000060 54700 ADD #60,R0 ,MAKE ASCII
782 003262 104015 54800 PRINTC ,PRINT DIGIT
783 003264 013700 000636 54900 MOV RTNNO,R0 ,GET TEST NUMBER AGAIN
784 003270 042700 177770 55000 BIC #177770,R0 ,MASK LAST DIGIT
785 003274 062700 000060 55100 ADD #60,R0 ,MAKE ASCII
786 003300 104015 55200 PRINTC ,PRINT DIGIT
787 003302 104012 55300 CRLF ,CP-LF
788 003304 104014 55400 LF ,BLANK LINE
789 003306 000002 55500 RTI ,RETURN

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791 55700 ,*****
792 55800 ,
793 55900 ,ERRA-- COMMON ERROR RETURN FROM I/O TESTS HALTS
794 56000 , WITH ADDRESS OF ERROR IN RO TO CONTINUE
795 56100 , ON SAME TEST BUT NOT HALTING ON ERROR,
796 56200 , SET THE SCOPE BIT (14) = 1 AND PRESS CONTINUE
797 56300 ,
798 56400 ,*****
799 56500 ,
900 003310 032777 040000 175376 56600 ERR BIT #SCOPSW,@SR ,CHECK SCOPE SWITCH
801 003316 001404 56700 BEQ 15 ,BRANCH IF NO SCOPE
802 003320 005737 000644 56800 TST PRGID ,SCOPING WANTED, FIRST ERROR?
803 003324 100001 56900 BPL 15 ,BRANCH AND HALT ON FIRST ERROR
804 003326 000002 57000 RTI ,SCOPE EXIT
805 003330 052737 100000 000644 57100 15 BIS #BIT15,PRGID ,SET ERROR INDICATOR
806 003336 011600 57200 EHLT MOV @SP,RO
807 003340 005740 57300 TST -(RO) ,ADDRESS OF CALL INTO RO
808 003342 000000 57400 HALT
809 003344 000002 57500 ERRHLT RTI ,RETURN TO TEST FOLLOWING CALL
810 57600 ,
811 57700 ,*****
812 57800 ,
813 57900 ,STLSPV--- THIS ROUTINE SETS UP KEYBOARD INTERRUPT
814 58000 , VECTOR AND PRIORITY CALLING SEQUENCE
815 58100 ,
816 58200 , STRDRV
817 58300 , AT20C ,LOCATION OF NEW INTERRUPT VECTOR
818 58400 ,
819 58500 ,*****
820 58600 ,
821 003346 017637 000000 003366 58700 STLSPV MOV @SP,STPPA+2 ,SET RETURN ADDR AND VECTOR
822 003354 062716 000002 58800 ADD #2,@SP
823 003360 013701 000622 58900 MOV TKVTR,R1
824 003364 012721 000000 59000 STPPA MOV #0,(R1)+
825 003370 013721 000624 59100 MOV TPLVL,(P1)+
826 003374 000002 59200 RTI
827 59300 ,
828 59400 ,*****
829 59500 ,
830 59600 ,STLSPV-- THIS ROUTINE SETS UP PRINTER INTERRUPT
831 59700 ,
832 59800 , VECTOR AND PRIORITY CALLING SEQUENCE
833 59900 , STPLHV
834 60000 , AT35E ,LOCATION OF NEW INTERRUPT VECTOR
835 60100 ,
836 60200 ,*****
837 60300 ,
838 003376 017637 000000 003416 60400 STLSPV MOV @SP,STPPA+2 ,SET RETURN ADDR AND VECTOR
839 003404 062716 000002 60500 ADD #2,@SP
840 003410 013701 000626 60600 MOV TPVTR,R1
841 003414 012721 000000 60700 STPPA MOV #0,(R1)+
842 003420 013721 000630 60800 MOV TPLVL,(P1)+
843 003424 000002 60900 RTI ,RETURN TO CALLER

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845 61100 ,*****
846 61200 ,
847 61300 , DELAY--A COMMON ROUTINE TO DELAY PROCESSING
848 61400 , A GIVEN NUMBER OF MSEC
849 61500 , CALLING SEQUENCE,
850 61600 , MOV #5,R0 ,R0 CONTAINS THE NUMBER OF MSEC DELAY DESIRED
851 61700 , DELAY
852 61800 ,
853 61900 , THE DELAY IS EFFECTED BY THE EXECUTION OF THE LOOP,
854 62000 , 1$ DEC R1
855 62100 , BNE 1$
856 62200 ,
857 62300 , SINCE THE EXECUTION TIMES OF THE PDP11 LINE DOES VARY FROM
858 62400 , MACHINE TO MACHINE, THE VALUE AT SYMBOLIC LOCATION
859 62500 , "TIMER" MUST BE CHANGED TO THE APPROPRIATE VALUE AS SHOWN BELOW
860 62600 , BEFORE STARTING THE DIAGNOSTIC "TIMER" IS INITIALIZED
861 62700 , FOR AN 11/05, 11/10(=251)
862 62800 ,
863 62900 , MACHINE 05&10 35&40 15&20 LS1&03 11/45 & 11/70
864 63000 , BIPOLAR MOS CORE
865 63100 ,
866 63200 , LOOP DEC R1 3 4 99 2 3 30 51 90
867 63300 , BNE LOOP 2 5 1 76 2 6 60 98 1 13
868 63400 , TIME= 5 9USEC 2 75 4 9 7 7 90USEC 1 49USEC
869 63500 , SET TIMER 251 554 314 202 2127 1237 755
870 63600 ,
871 63700 ,XXXXXXXXXX
872 63800 ,
873 003426 010146 63900 DLY MOV R1,-SP; .SAVE R1
874 003430 013701 000672 64000 1$ MOV TIMER R1 ;MOV 1 MSEC LOOP CNT TO R1
875 003434 005301 64100 2$ DEC R1 ;DECREMENT COUNT
876 003436 001376 64200 BNE 2$ ;BRANCH IF NOT ZERO
877 003440 005300 64300 DEC R0 ;DEC NO OF MSEC DELAY
878 003442 001372 64400 BNE 1$ ;DELAY AGAIN IF NOT ZERO
879 003444 012601 64500 MOV #SP,R1 ;ALL DONE PESTORE R1
880 003446 030002 64600 PTI

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822 64800 ,*****
823 64900 ,
824 65000 ,PFAIL--POWER FAIL ROUTINE
825 65100 ,   SAVE ALL REGISTERS AND SET RESTART ADDRESS
826 65200 ,   INTO LOCATION 24
827 65300 ,
828 65400 ,RESTART--POWER FAIL RECOVERY
829 65500 ,   RESTORE ALL REGISTERS AND GO TO START
830 65600 ,
831 65700 ,*****
832 65800 ,
833 003450 010046 65900 PFAIL  MOV  R0,-(SP)
834 003452 010146 66000      MOV  R1,-(SP)
835 003454 010246 66100      MOV  R2,-(SP)
836 003456 010346 66200      MOV  R3,-(SP)
837 003460 010446 66300      MOV  R4,-(SP)
838 003462 010546 66400      MOV  R5,-(SP)
839 003464 013746 000024 66500      MOV  24,-(SP)
840 003470 010637 003504 66600      MOV  SP,SAVR6      .SAVE STACK POSITION
841 003474 012737 003506 000024 66700      MOV  #RESTR,24    .STORE RESTART ADDRESS
842 003502 000000 66800      HALT
843 003504 000000 66900 SAVR6  WORD  0
844 003506 104007 67000 RESTR  TYPEM
845 003510 003542 67100      IS
846 003512 013706 007504 67200      MOV  SAVR6,SP      RESTORE STACK POINTER
847 003516 012637 000024 67300      MOV  (SP)+,24     RESTORE PFAIL ADDRESS
848 003522 012605 67400      MOV  (SP)+,R5
849 003524 012604 67500      MOV  (SP)+,R4
850 003526 012603 67600      MOV  (SP)+,R3
851 003530 012602 67700      MOV  (SP)+,R2
852 003532 012601 67800      MOV  (SP)+,R1
853 003534 012600 67900      MOV  (SP)+,R0
854 003536 000137 001010 68000      JMP  START
855 003542 050200 053517 051105 68100      IS  ASCII <ACRLF> POWER ACRLF
856 003550 000200 68200
857 68300      EVEN

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919 68500 ,*****
920 68600 ,
921 68700 ,FORWARD--THIS ROUTINE TRANSFERS THE 2 OR 4 ARGUMENTS
922 68800 , FROM THE TEST ROUTINE. THEY ARE,
923 68900 ,
924 69000 , 1- ROUTINE NUMBER
925 69100 , 2- ADDRESS OF NEXT TEST
926 69200 , 3- ITERATION COUNT (I/O TESTS ONLY)
927 69300 , 4- SCOPE ENTRY ADDRESS (I/O TESTS ONLY)
928 69400 ,
929 69500 ,*****
930 69600
931 003552 013705 000640 69700 SFORWD MOV NXTST,R5 ,ADDR OF NEXT TEST TO R5
932 003556 012537 000636 69800 MOV (R5)+,RTNNO ,GET NUMBER OF NEXT TEST
933 003562 012537 000640 69900 MOV (R5)+,NXTST ,GET ADDR OF FOLLOWING TEST
934 003566 105737 000644 70000 TSTB PRGID ,CHECK IF I/O TEST
935 003572 100407 70100 BMI FORWDB ,SKIP THE FETCH OF ITER CNT AND SCOPE
936 003574 012537 000660 70200 MOV (R5)+,ICTR ,GET ITERATION COUNT
937 003600 012537 000642 70300 MOV (R5)+,SCOPTR ,GET SCOPE ENTRY POINT
938 003604 010537 000676 70400 FORWDA MOV R5,CURTST ,ENTRY POINT TO TEST IN CUR TST
939 003610 000002 70500 RTI ,EXIT
940 003612 012737 177777 000642 70600 FORWDB MOV #-1,SCOPTR ,FORCE NO SCOPE
941 003620 012737 000001 000660 70700 MOV #1,ICTR ,FORCE INTERPATION COUNT OF 1
942 003626 000766 70800 BR FORWDA
    
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944 71000 ,*****
945 71100 ,
946 71200 ,AREAD--A ROUTINE WHICH, THROUGH THE FACILITY OF
947 71300 , THE MAINTENANCE BIT, OUTPUTS TO THE
948 71400 , PRINTER BUFFER AND READS THE KEYBOARD
949 71500 , STATUS DONE. IF THE DONE IS NOT SET
950 71600 , WITHIN 200 MSEC, THE CPU WILL HALT WITH
951 71700 , THE LOCATION OF THE ERROR IN RO PRESS
952 71800 , CONTINUE TO CONTINUE WITH TESTS
953 71900 ,
954 72000 ,*****
955 72100 ,
956 003630 012737 000200 000664 72200 SAREAD MOV #200, BRCTR ,SET UP 200 MSEC DELAY
957 003636 052777 000004 174752 72300 BIS #4, @TPS ,SET MAINTENANCE BIT
958 003644 005077 174750 72400 CLR @TPB ;LOAD PRINTER BUFFER
959 003650 105777 174736 72500 15 TSTB @TKS ,CHECK DONE BIT
960 003654 100410 72600 BMI 25 ,BRANCH IF DONE
961 003656 012700 000001 72700 MOV #1, RO ,ONE TO RO
962 003662 104010 72800 DELAY ,DELAY 1 MSEC
963 003664 005337 000664 72900 DEC BRCTR ,200 MSEC OVER
964 003670 001367 73000 BNE 15 ,BRANCH IF NO
965 003672 104002 73100 EHALT
966 003674 000755 73200 BR SAREAD ,TRY AGAIN
967 003676 000002 73300 25 RTI ,RETURN TO TEST
968 73400
969 73500 ,*****
970 73600 ,
971 73700 ,CONIT--THIS ROUTINE SETS UP THE DEVICE ADDRESSES
972 73800 , AND INTERRUPT VECTORS FOR THE CONSOLE
973 73900 , TERMINAL
974 74000 ,
975 74100 ,*****
976 74200 ,
977 003700 013700 000602 74300 CONIT MOV CONADD, RO ,CONSOLE KEYBOARD STATUS ADDR TO RO
978 003704 010037 000612 74400 CONSET MOV RO, TKS ,KEYBOARD STATUS ADDRESS (777560) TO TKS
979 003710 005720 74500 TST (RO)+ ,INCREMENT RO BY TWO
980 003712 010037 000614 74600 MOV RO, TKB ,KEYBOARD DATA ADDR (777562) TO TKB
981 003716 005720 74700 TST (RO)+ ,INCREMENT RO BY TWO
982 003720 013737 000616 003772 74800 MOV TPS, TPSS ,SAVE TPS OF LAST TERMINAL
983 003726 010037 000616 74900 MOV RO, TPS ,PRINTER STATUS ADDR(777564) TO TPS
984 003732 005720 75000 TST (RO)+ ,INCREMENT RO BY TWO
985 003734 013737 000620 003774 75100 MOV TPB, TPBS ,SAVE TPS OF LAST TERMINAL
986 003742 010037 000620 75200 MOV RO, TPB ,PRINTER DATA ADDR (777566) TO TPB
987 003746 013737 000604 000622 75300 MOV CONVEC, TKVTR ,KEYBOARD INTERRUPT VECTOR (60) TO TKVTR
988 003754 013737 000604 000626 75400 MOV CONVEC, TPVTR
989 003762 062737 000004 000626 75500 ADD #4, TPVTR ,PRINTER INTERRUPT VECTOR (64) TO TPVTR
990 003770 000207 75600 RTS PC
991 75700
992 003772 000000 75800 TPSS WORD 0 ,LAST TERM STATUS REG ADR
993 003774 000000 75900 TPBS WORD 0 ,LAST TERM BUFFER REG ADR
  
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995      76100 ,*****
996      76200 ;
997      76300 , BINARY TO ASCII CONVERSION (1 TO 5 ASCII CHARACTERS)
998      76400 , CALLING SEQUENCE
999      76500 ,     MOV     ADDRESS OF LOC TO STORE FIRST ASCII CHAR INTO R0
1000     76600 ,     MOV     BINARY NUMBER TO BE CONVERTED INTO R1
1001     76700 ,     MOV     NUMBER TO BE CONVERTED AS A POWER OF TEN INTO R2
1002     76800 ,     BTOASC
1003     76900 ;
1004     77000 ,*****
1005     77100 ;
1006     003776 010237 004062 77200 SBTASC MOV R2,CNVCTR , SAVE TEN POWER
1007     004002 006302 77300 ASL R2 , R2*2
1008     004004 062702 004070 77400 ADD #ADTENP,R2 , CALCULATE ADDRESS OF
1009     77500 ; STARTING TEN POWER
1010     004010 014237 004066 77600 15 MOV -(R2),TENPWR , POWER OF TEN VALUE TO TEN PWR
1011     004014 005037 004064 77700 CLR DIGIT , CLEAR CURRENT DIGIT
1012     004020 163701 004066 77800 25 SUB TENPWR,R1 , SUBTRACT TEN POWER FROM BINARY VALUE
1013     004024 103403 77900 BCS 3$ , BRANCH IF END
1014     004026 005237 004064 78000 INC DIGIT
1015     004032 000772 78100 BF 2$
1016     004034 063701 004066 78200 35 ADD TENPWR,R1 , RESTORE SUBTRACTED VALUE
1017     004040 062737 000060 004064 78300 ADD #60,DIGIT , CONVERT (DIGIT) TO ASCII
1018     004046 113720 004064 78400 MOVB DIGIT,(R0)+ , PUT ASCII CHAR INTO USER BUFFER
1019     004052 005337 004062 78500 DEC CNVCTR , FINISHED ALL CHARS CALLED FOR
1020     004056 001354 78600 BNE 1$ , BRANCH IF NOT FINISHED
1021     004060 000002 78700 RTI , YES, EXIT
1022     004062 000000 78800 CNVCTR WORD 0 , CONVERSION CHARACTER COUNT
1023     004064 000000 78900 DIGIT WORD 0 , CONVERTED CHARACTER
1024     004066 000000 79000 TENPWR WORD 0 , CURRENT TEN POWER
1025     004070 000001 000012 000144 79100 ADTENP WORD 1 , 10 , 100 , 1000 10000
         004076 001750 023420

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1027 79300 ,XXXXXXXXXX
1028 79400
1029 79500 ,READ-- A COMMON ROUTINE WHICH CHECKS THE KEYBOARD
1030 79600 , DONE FLAG & SETS A FLAG INDICATING CHAR PARITY
1031 79700
1032 79800 ,XXXXXXXXXX
1033 79900
1034 004102 004737 003700 80000 $READ JSR PC,CONIT ,RESET CONSOLE ADR AND VECTORS
1035 004106 005737 000656 80100 TST DLCNT ,CHECK IF MULTI DL11'S AVAILABLE
1036 004112 001430 80200 BEQ $READC ,NONE, WAIT FOR CONSOLE INPUT
1037 004114 013737 000656 000666 80300 1$ MOV DL11,COUNT3 ,SET DL11 COUNT
1038 004122 013737 000632 000670 80400 MOV FSTDL,XCSR ,ADDRESS OF FIRST DL11 INTO XCSR
1039 004130 105777 174534 80500 2$ TSTB @XCSR ,TEST IF ANY INPUT
1040 004134 100005 80600 BPL 3$ ,CONTINUE IF NO INPUT
1041 004136 013700 000670 80700 MOV XCSR,RO ,SET THIS DL11 AS CONSOLE
1042 004142 004737 003704 80800 JSR PC,CONSET
1043 004146 000415 80900 BR READ1 ,READ CHAR AND RETURN
1044 004150 005337 000666 81000 3$ DEC COUNT3 ,DECREMENT DL11 COUNT
1045 004154 001404 81100 BEQ 4$ ,TEST CONSOLE WHEN DONE DL11'S
1046 004156 062737 000610 000670 81200 ADD #10,XCSR ,NEXT DL11 ADDRESS
1047 004164 000761 81300 BR 2$ CONTINUE
1048 004166 105777 174420 81400 4$ TSTB @TKS ,CHECK CONSOLE
1049 004172 100350 81500 BPL 1$ ,WAIT, NO INPUT
1050 004174 105777 174412 81600 $READC TSTB @TKS ,CHECK KEYBOARD DONE FLAG
1051 004200 100375 81700 BPL $READC ,BRANCH IF NOT SET
1052 004202 117737 174406 000700 81800 READ1 MOVB @TKB,TEMPCH ,SAVE CHARACTER
1053 004210 113737 000700 000704 81900 MOVB TEMPCH,PCHAR ,SAVE CODE WITH PARITY BIT
1054 004216 042737 177400 000704 82000 BIC #177400,PCHAR ,MASK UNWANTED BITS
1055 004224 113737 000700 000703 82100 MOVB TEMPCH,PARITY+1 ,SAVE CHAR WITH PARITY BIT
1056 004232 042737 177600 000700 82200 BIC #177600,TEMPCH ,MAKE IT 7 BIT ASCII
1057 004240 023727 000700 000004 82300 CMP TEMPCH,#4 ,DISREGARD EOT
1058 004246 001715 82400 BEQ $READ
1059 004250 012700 000011 82500 MOV #11,RO ,SET SHIFT COUNT
1060 004254 042737 000377 000702 82600 BIC #377,PARITY ,CLEAR PARITY FLAG
1061 004262 005300 82700 1$ DEC RO ,DECREMENT SHIFT COUNT
1062 004264 001406 82800 BEQ 2$ ,EXIT IF DONE
1063 004266 106337 000703 82900 ASLB PARITY+1 ,SHIFT CODE
1064 004272 103373 83000 BCC 1$ ,CONTINUE IF BIT WAS ZERO
1065 004274 105137 000702 83100 COMB PARITY ,CHANGE PARITY FLAG IF BIT WAS ONE
1066 004300 000770 83200 BR 1$ ,CONTINUE
1067 004302 000002 83300 2$ RTI ,SET, RET TO CALLER
1068 83400
1069 83500 ,XXXXXXXXXX
1070 83600
1071 83700 ,PRINT-- A COMMON ROUTINE TO CHECK THE PRINTER READY FLAG
1072 83800
1073 83900 ,XXXXXXXXXX
1074 84000
1075 004304 105777 174206 84100 $PRNT TSTB @TPS ,CHECK PRINTER READY FLAG
1076 004310 100375 84200 BPL $PPNT ,BRANCH IF NOT SET
1077 004312 000002 84300 RTI ,SET, RETURN

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1079      84500  ,*****
1080      84600  ,
1081      84700  ,PRINTC--SENDS A CHARACTER AT A TIME FIRST TO THE
1082      84800  ,      CONSOLE DL11 THEN TO ALL MULTIPLE DL11S IF
1083      84900  ,      SR BIT 13 IS = 0 IF THE REFERENCED PRINTER
1084      85000  ,      READY BIT IS NOT SET, THE CHARACTER WILL NOT BE
1085      85100  ,      SENT TO THAT PRINTER ENTER WITH CHARACTER IN RO
1086      85200  ,      CALL. PRINTC
1087      85300  ,
1088      85400  ,*****
1089      85500  ,
1090      004314 013737 000602 000712 85600  SPRTC  MOV      CONADD,TEMP  ,SET CONSOLE ADR
1091      004322 062737 000004 000712 85700      ADD      #4,TEMP
1092      004330 105777 174356      85800      15      TSTB     @TEMP
1093      004334 100375      85900      BPL      15      ,WAIT FOR CONSOLE READY
1094      004336 062737 000002 000712 86000      ADD      #2,TEMP  ,SET ADR
1095      004344 010077 174342      86100      MOV      RO,@TEMP  ,LOAD CONSOLE PRINT BUFFER
1096      004350 032777 020000 174336 86200      BIT      #BIT13,@SR  ,CHECK SW 13
1097      004356 001003      86300      BNE      25      ,SEND ALL TERMS IF SW13 DOWN
1098      004360 005737 000656      86400      TST      DLCNT    ,CHECK IF MULTIPLE DL11 S
1099      004364 001002      86500      BNE      35      ,CHECK FOR INPUT IF THERE
1100      004366 000137 005034      86600      25      JMP      185
1101      004372 013737 000656 000666 86700      35      MOV      DLCNT,COUNT3  ,PUT NO. DL11'S INTO COUNT3
1102      004400 013737 000632 000670 86800      MOV      FSTDL,XCSR  ,ADDR OF FIRST DL INTO XCSR
1103      004406 023727 000636 000032 86900      45      CMP      RTNNO,#32  ,CHECK IF TEST 32
1104      004414 001543      87000      BEQ      135      ,DON'T CHECK FOR INPUT IF TEST 32
1105      004416 005737 000710      87100      TST      INCHK     ,CHECK FOR INPUT?
1106      004422 001140      87200      BNE      135
1107      004424 023727 000636 000020 87300      CMP      RTNNO,#20  ,PRINTING TEST?
1108      004432 002004      87400      BGE      55      ,BRANCH IF NOT
1109      004434 022737 104011 001700 87500      CMP      #TTYCTL,WAITF ,KEYBOARD CONTROL?
1110      004442 001130      87600      BNE      135      ,SKIP INPUT CHECK IF NOT
1111      004444 105777 174220      87700      55      TSTB     @XCSR     ,TEST IF ANY INPUT
1112      004450 100125      87800      BPL      135      ,CONTINUE IF NO INPUT
1113      004452 062737 000002 000670 87900      ADD      #2,XCSR     ,SET BUFFER ADDRESS
1114      004460 017737 174204 000700 88000      MOV      @XCSR,TEMPCH
1115      004466 042737 177600 000700 88100      BIC      #177600,TEMPCH
1116      004474 023727 000700 000003 88200      CMP      TEMPCH,#3  ,CHECK IF CONTROL-C
1117      004502 001006      88300      BNE      65      ,CONTINUE IF NOT
1118      004504 023727 000636 000024 88400      CMP      RTNNO,#24  ,CHECK IF TEST 24
1119      004512 001002      88500      BNE      65      ,CONTINUE IF NOT CONTROL-C
1120      004514 000137 005150      88600      JMP      205
1121      004520 023727 000700 000177 88700      65      CMP      TEMPCH,#17? ,CHECK IF RUBOUT
1122      004526 001427      88800      BEQ      95      ,YES, CHECK TEST NUMBER
1123      004530 023727 000636 000017 88900      CMP      RTNNO,#17  ,TEST 17?
1124      004536 001003      89000      BNE      75      ,BRANCH IF NOT
1125      004540 013703 000700      89100      MOV      TEMPCH,R3  ,SAVE CHAR
1126      004544 000461      89200      BR       125      ,CONTINUE
1127      004546 023727 000636 000021 89300      75      CMP      RTNNO,#21  ,TEST 21?
1128      004554 001004      89400      BNE      85      ,BRANCH IF NOT
1129      004556 013737 000700 000662 89500      MOV      TEMPCH,REPT ,SAVE CHAR
1130      004564 000451      89600      BR       125      ,CONTINUE
1131      004566 023727 000636 000022 89700      85      CMP      RTNNO,#22  ,TEST 22?
1132      004574 001056      89800      BNE      145      ,CONTINUE IF NOT
1133      004576 013737 000700 000662 89900      MOV      TEMPCH,REPT ,SAVE CHAR
1134      004604 000441      90000      BR       125      ,CONTINUE
    
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1135	004606	023727	000636	000021	90100	9%	CMP	RTNNO, #21	;CHECK IF TEST 21
1136	004614	001011			90200		BNE	10%	,NO, CHECK IF TEST 22
1137	004616	022626			90300		POPSP2		;ASJUST STACK
1138	004620	012700	000036		90400		MOV	#30 ,RO	,DELAY FOR HALF DUPLEX
1139	004624	104010			90500		DELAY		
1140	004626	104007			90600		TYPEN		;YES, TEST 21
1141	004630	014255			90700		ECOEND		,PRINT TERMINATION MESSAGE
1142	004632	104005			90800		CHAIN		;CHAIN TO NEXT TEST
1143	004634	000137	012174		90900		JMP	E021A	,REPEAT TEST IF LOOP ON TEST SW SET
1144	004640	023727	000636	000022	91000	10%	CMP	RTNNO, #22	,CHECK IF TEST 22
1145	004646	001011			91100		BNE	11%	,NO, CHECK IF TEST 24
1146	004650	022626			91200		POPSP2		,ADJUST STACK
1147	004652	012700	000036		91300		MOV	#30 ,RO	,DELAY FOR HALF DUPLEX
1148	004656	104010			91400		DELAY		
1149	004660	104007			91500		TYPEN		,YES, PRINT TERMINATION MESSAGE
1150	004662	014255			91600		ECOEND		
1151	004664	104005			91700		CHAIN		,CHAIN TO NEXT TEST
1152	004666	000137	012232		91800		JMP	E022A	,REPEAT TEST IF LOOP ON TEST SW SET
1153	004672	023727	000636	000024	91900	11%	CMP	RTNNO, #24	,TEST 24?
1154	004700	001137			92000		BNE	22%	,WAIT FOR NEXT TEST IF NOT TEST 24
1155	004702	022626			92100		POPSP2		,RESET STACK
1156	004704	000137	013154		92200		JMP	TERM	,TERMINATE TEST
1157	004710	012700	000036		92300	12%	MOV	#30 ,RO	,DELAY FOR HALF DUPLEX
1158	004714	104010			92400		DELAY		
1159	004716	013700	000700		92500		MOV	TEMPCH,RO	,SET NEW CHAR
1160	004722	000403			92600		BR	14%	,CONTINUE
1161	004724	062737	000002	000670	92700	13%	ADD	#2, XCSR	,SET STATUS ADDRESS IN XCSR
1162	004732	062737	000002	000670	92800	14%	ADD	#2, XCSR	
1163	004740	013737	000602	000712	92900		MOV	CONADD,TEMP	,CHECK IF CONSOLE TERM
1164	004746	062737	000004	000712	93000		ADD	#4, TEMP	,IS THIS DL
1165	004754	023737	000712	000670	93100		CMP	TEMP, XCSR	
1166	004762	001420			93200		BEQ	17%	
1167	004764	105777	173700		93300	15%	TSTB	@XCSR	,TEST PRINTER READY
1168	004770	100375			93400		BPL	15%	,WAIT FOR READY
1169	004772	062737	000002	000670	93500		ADD	#2, XCSR	,SET XCSR TO PRINTER BUFFER
1170	005000	010077	173664		93600		MOV	RO, @XCSR	,LOAD CHARACTER INTO BUFFER
1171	005004	005337	000666		93700	16%	DEC	COUNT3	,DECREASE COUNT OF DL11'S
1172	005010	001411			93800		BEQ	18%	,ALL DONE,EXIT
1173	005012	062737	000002	000670	93900		ADD	#2, XCSR	,SET XCSR TO NEXT DL11 PRINTER STATUS
1174	005020	000137	004406		94000		JMP	4%	,GO TEST NEXT DL11 READY FLAG
1175	005024	062737	000002	000670	94100	17%	ADD	#2, XCSR	,SET XCSR TO PRINTER BUFFER
1176	005032	000764			94200		BR	16%	,DO NOT LOAD BUFFER
1177	005034	023727	000636	000032	94300	18%	CMP	RTNNO, #32	,CHECK IF TEST 32
1178	005042	001514			94400		BEQ	26%	,DON'T CHECK FOR INPUT IF TEST 32
1179	005044	005737	000710		94500		TST	INCHK	,WANT INPUT CHECK?
1180	005050	001111			94600		BNE	26%	,NO, BRANCH
1181	005052	023727	000636	000020	94700		CMP	RTNNO, #20	,PRINTING TEST?
1182	005060	002004			94800		BLE	19%	,BRANCH IF NOT
1183	005062	022737	104011	001700	94900		CMP	#TTYCTL, WAITF	,KEYBOARD CONTROL?
1184	005070	001101			95000		BNE	26%	,SKIP INPUT CHECK IF NCT
1185	005072	105777	173504		95100	19%	TSTB	@CONADD	,TEST IF ANY INPUT
1186	005076	100076			95200		BPL	26%	,BRANCH IF NONE
1187	005100	013737	000602	000712	95300		MOV	CONADD,TEMP	,SET ADP
1188	005106	062737	000002	000712	95400		ADD	#2, TEMP	
1189	005114	117737	173572	000700	95500		MOVB	@TEMP, TEMPCH	
1190	005122	042737	177600	000700	95600		BIC	#177600, TEMPCH	,MASK UNWANTED BIT

1191	005130	023727	000700	000003	95700		CMP	TEMPCH, #3	, CHAR = CONTROL-C?
1192	005136	001013			95800		BNE	21\$	, CONTINUE IF NOT
1193	005140	023727	000636	000024	95900		CMP	RTNNO, #24	, TEST 24?
1194	005146	001007			96000		BNE	21\$	, CONTINUE IF NOT
1195	005150	012700	000036		96100	20\$	MOV	#30, RO	, DELAY FOR HALF DUPLEX
1196	005154	104010			96200		DELAY		
1197	005156	104012			96300		CRLF		, SEND CR-LF
1198	005160	022626			96400		POPSP2		, RESET STACK
1199	005162	000137	013026		96500		JMP	E0248	, RETURN TO TEST
1200	005166	023727	000700	000177	96600	21\$	CMP	TEMPCH, #177	, CHECK IF RUBOUT
1201	005174	001006			96700		BNE	23\$	, BRANCH IF NO
1202	005176	000603			96800		BR	9\$	
1203	005200	012737	000001	000634	96900	22\$	MOV	#1, CNTLSW	, CLEAR LOOP AND SEQUENCE BITS
1204	005206	000137	002062		97000		JMP	TTY18	, GO WAIT FOR NEXT TEST
1205	005212	010046			97100	23\$	MOV	RO, -(SP)	, SAVE RO
1206	005214	012700	000036		97200		MOV	#30, RO	, DELAY FOR HALF DUPLEX
1207	005220	104010			97300		DELAY		
1208	005222	012600			97400		MOV	(SP)+, RO	, RESTORE RO
1209	005224	023727	000636	000017	97500		CMP	RTNNO, #17	, CHECK IF TEST 17
1210	005232	001002			97600		BNE	24\$	, BRANCH IF NOT TEST 17
1211	005234	013703	000700		97700		MOV	TEMPCH, R3	, STORE INPUTTED CHAR
1212	005240	023727	000636	000021	97800	24\$	CMP	RTNNO, #21	, CHECK IF TEST 21
1213	005246	001003			97900		BNE	25\$	, BRANCH IF NOT TEST 21
1214	005250	013737	000700	000662	98000		MOV	TEMPCH, REPT	, STORE INPUTTED CHAR
1215	005256	023727	000636	000022	98100	25\$	CMP	RTNNO, #22	, CHECK IF TEST 22
1216	005264	001003			98200		BNE	26\$	, BRANCH IF NOT TEST 22
1217	005266	013737	000700	000662	98300		MOV	TEMPCH, REPT	, STORE INPUTTED CHAR
1218	005274	000002			98400	26\$	RTI		, RETURN TO TEST
1219					98500				

1221

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1222      00100      SBTTL  I/O LOGIC TESTS
1223      00200
1224      00300      ,*****
1225      00400
1226      00500      , ONLY THE CONSOLE TERMINAL IS TESTED
1227      00600      , UPON COMPLETION, THE CPU WILL EITHER HALT IF SR
1228      00700      , BIT8 IS = 1 AND AWAIT FUTHER INSTRUCTIONS OR CONTINUE
1229      00800      , AND EXECUTE THE PRINTER TESTS CONTINUOUSLY
1230      00900      , IF AN I/O TEST FAILS, THE CPU WILL HALT AT ERHLT
1231      01000      , WITH THE ADDRESS OF THE ERROR IN RO (LOC 777700) PRESSING
1232      01100      , THE CONTINUE SWITCH WILL CAUSE THE I/O TEST TO
1233      01200      , CONTINUE WITH THE NEXT TEST HOWEVER IF SWITCH 14
1234      01300      , WERE SET, OR IS SET BEFORE THE CONTINUE SWITCH IS
1235      01400      , PRESSED, THE FAILED TEST WILL LOOP ON ITSELF
1236      01500      , WITHOUT FUTHER HALTS
1237      01600
1238      01700      ,*****
1239      01800      , ATO-- TEST #40--TESTS THE ABILITY TO REFERENCE THE
1240      01900      , RECEIVER STATUS WORD (TKS) WITHOUT TRAPPING
1241      02000      ,*****
1242      02100
1243      005276 000040 02200      ATO      40      , TEST NUMBER
1244      005300 005330 02300      ATOX     AT1     , NEXT TEST
1245      005302 000012 02400      , 10      , ITERATION COUNT
1246      005304 005314 02500      , 15      , SCOPE ENTRY
1247      005306 012737 005324 003004 02600      MOV      #35, MACHER , SET UP MACHINE ERROR TRAP
1248      005314 005777 173272 02700      15      TST      @TKS     , REFERENCE RECEIVER STATUS WORD
1249      005320 104005 02800      25      CHAIN   , CHAIN TO NEXT TEST
1250      005322 000774 02900      BR       15      , REPEAT TEST
1251      005324 104001 03000      35      ERROR   , ERROR TRAPPED WHEN REFERENCING
1252      005326 000774 03100      BR       25      , RECEIVER STATUS WOPD (TKS)
1253      03200
1254      03300      ,*****
1255      03400      , AT1--TEST #41--TESTS THE ABILITY TO REFERENCE THE
1256      03500      , RECEIVER BUFFER (T#B) WITHOUT TRAPPING
1257      03600      ,*****
1258      03700
1259      005330 000041 03800      AT1      41      , TEST NUMBER
1260      005332 005362 03900      , AT2     , NEXT TEST
1261      005334 000012 04000      , 10      , ITERATION COUNT
1262      005336 005346 04100      , 15      , SCOPE ENTRY
1263      005340 012737 005356 000004 04200      MOV      #35, MACHER , SET UP MACHINE ERROR TRAP
1264      005346 005777 173242 04300      15      TST      @TKB     , REFERENCE RECEIVER BUFFER
1265      005352 104005 04400      25      CHAIN   , CHAIN TO NEXT TEST
1266      005354 000774 04500      BR       15      , REPEAT TEST
1267      005356 104001 04600      25      ERROR   , TRAPPED WHEN REFERENCING
1268      005360 000774 04700      BR       25      , RECEIVER BUFFER (T#B)

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1270      04900 ;*****
1271      05000 ,AT2--TEST #42--TESTS THE ABILITY TO REFERENCE THE
1272      05100 ,      TRANSMITTER STATUS WORD (TPS) WITHOUT TRAPPING
1273      05200 ;*****
1274      05300
1275 005362 000042      05400 AT2      42      ,TEST NUMBER
1276 005364 005414      05500      AT3      ,NEXT TEST
1277 005366 000012      05600      10      ,ITERATION COUNT
1278 005370 005400      05700      1$      ,SCOPE ENTRY
1279 005372 012737 005410 000004 05800 MOV      #3$,MACHEP ,SET UP MACHINE ERROR TRAP
1280 005400 005777 173212 05900 1$ TST      @TPS ,REFERENCE TRANSMITTER STATUS
1281 005404 104005      06000 2$ CHAIN ,CHAIN TO NEXT TEST
1282 005406 000774      06100 BR      1$ ,REPEAT TEST
1283 005410 104001      06200 3$ ERROR ,TRAPPED WHEN REFERENCING
1284 005412 000774      06300 BR      2$ ,TRANSMITTER STATUS WORD
1285      06400
1286      06500 ;*****
1287      06600 ,AT3-- TEST #43--TESTS THE ABILITY TO REFERENCE THE
1288      06700 ,      TRANSMITTER BUFFER (TPB) WITHOUT TRAPPING
1289      06800 ;*****
1290      06900
1291 005414 000043      07000 AT3      43      ,TEST NUMBER
1292 005416 005446      07100      AT4      ,NEXT TEST
1293 005420 000012      07200      10      ,ITERATION COUNT
1294 005422 005432      07300      1$      ,SCOPE ENTRY
1295 005424 012737 005442 000004 07400 MOV      #3$,MACHEP ,SET UP ERROR TRAP
1296 005432 005777 173212 07500 1$ TST      @TPB ,REFERENCE TRANSMITTER BUFFER
1297 005436 104005      07600 2$ CHAIN ,CHAIN TO NEXT TEST
1298 005440 000774      07700 BR      1$ ,REPEAT TEST
1299 005442 104001      07800 3$ ERROR ,TRAPPED WHEN REFERENCING
1300 005444 000774      07900 BR      2$ ,TRANSMITTER BUFFER

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1302 08100 ,*****
1303 08200 ,AT4-- TEST #44--TESTS THE ABILITY TO SET AND CLEAR THE
1304 08300 , RECEIVER INTERRUPT ENABLE BIT
1305 08400 ,*****
1306 08500
1307 005446 000044 08600 AT4 44 , TEST NUMBER
1308 005450 005536 08700 , AT5 , NEXT TEST
1309 005452 000012 08800 10 , ITERATION COUNT
1310 005454 005470 08900 15 , SCOPE ENTRY
1311 005456 012746 000340 09000 MOV #PPTY7,-(SP) , SET PRIORITY 7
1312 005462 012746 005470 09100 MOV #15,-(SP)
1313 005466 000002 09200 RTI
1314 005470 052777 000100 173114 09300 15 BIS #BIT6,@TKS , SET INTERRUPT ENABLE BIT
1315 005476 032777 000100 173106 09400 BIT #BIT6,@TKS , CHECK IF BIT IS SET
1316 005504 001002 09500 BNE 35 , BRANCH IF SET
1317 005506 104001 09600 25 ERROR , NOT SET, ERROR
1318 005510 000410 09700 BR 55 , TRY AGAIN
1319 005512 042777 000100 173072 09800 35 BIC #BIT6,@TKS , CLEAR INTERRUPT ENABLE BIT
1320 005520 032777 000100 173064 09900 BIT #BIT6,@TKS , CHECK IF BIT IS CLEARED
1321 005526 001401 10000 BEQ 55 , BRANCH IF CLEARED
1322 005530 104001 10100 45 ERROR , NOT CLEARED, ERROR
1323 005532 104005 10200 55 CHAIN , CHAIN TO NEXT TEST
1324 005534 000755 10300 BR 15 , DO TEST AGAIN
1325 10400
1326 10500 ,*****
1327 10600 ,AT5-- TEST #45--CHECKS THAT THE RECEIVER INTERRUPT
1328 10700 , ENABLE BIT CAN BE CLEARED WITH RESET INSTRUCT'ON
1329 10800 ,*****
1330 10900
1331 005536 000045 11000 AT5 45 , TEST NUMBER
1332 005540 005614 11100 , AT6 , NEXT TEST
1333 005542 000012 11200 10 , ITERATION COUNT
1334 005544 005560 11300 15 , SCOPE ENTRY
1335 005546 012746 000340 11400 MOV #PPTY7,-(SP) , SET PRIORITY TO 7
1336 005552 012746 005560 11500 MOV #15,-(SP)
1337 005556 000002 11600 RTI
1338 005560 052777 000100 173024 11700 15 BIS #BIT6,@TKS , SET INTERRUPT ENABLE BIT
1339 005566 105777 173024 11800 35 TSTB @TPS , BE SURE PRINTER IS DONE WITH DL11S1 MESSAGE
1340 005572 001775 11900 BEQ 35 , BEFORE ALLOWING FOLLOWING RESET
1341 005574 000005 12000 RESET , RESET
1342 005576 032777 000100 173006 12100 BIT #BIT6,@TKS , TEST INTERRUPT ENABLE BIT
1343 005604 001401 12200 BEQ 25 , BRANCH IF CLEARED
1344 005606 104001 12300 ERROR , STILL SET, ERROR
1345 005610 104005 12400 25 CHAIN , CHAIN TO NEXT ROUTINE
1346 005612 000762 12500 BR 15 , REPEAT TEST

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1348      12700      ,*****
1349      12800      ,AT6-- TEST#46--TESTS THE ABILITY TO SET AND CLEAR
1350      12900      ,      TRANSMITTER INTERRUPT ENABLE BIT
1351      13000      ,*****
1352      13100
1353      005614  000046      13200      AT6      46      , TEST NUMBER
1354      005616  005704      13300      AT7      , NEXT TEST
1355      005620  000012      13400      10      , ITERATION COUNT
1356      005622  005636      13500      15      , SCOPE ENTRY
1357      005624  012746  000340      13600      MOV      #PPTY7,-(SP) , SET PRIORITY TO 7
1358      005630  012746  005636      13700      MOV      #15,-(SP)
1359      005634  000002      13800      RTI
1360      005636  052777  000100  172752      13900      15      BIS      #BIT6,@TPS , SET INTERRUPT ENABLE BIT
1361      005644  032777  000100  172744      14000      BIT      #BIT6,@TPS , CHECK THAT BIT IS SET
1362      005652  001002      14100      BNE      25      , BRANCH IF SET
1363      005654  104001      14200      ERROR    , NOT SET, ERROR
1364      005656  000410      14300      BR       35      , TRY AGAIN
1365      005660  042777  000100  172730      14400      25      BIC      #BIT6,@TPS , CLEAR INTERRUPT ENABLE BIT
1366      005666  032777  000100  172722      14500      BIT      #BIT6,@TPS , CHECK IF BIT IS CLEARED
1367      005674  001401      14600      BEQ      35      , BRANCH IF CLEARED
1368      005676  104001      14700      ERROR    , NOT CLEARED, ERROR
1369      005700  104005      14800      35      CHAIN    , CHAIN TO NEXT TEST
1370      005702  000755      14900      BR       15      , DO AGAIN
1371      15000
1372      15100      ,*****
1373      15200      ,AT7-- TEST #47--TESTS THE ABILITY TO CLEAR TRANSMITTER
1374      15300      ,      INTERRUPT ENABLE BIT WITH RESET INSTRUCTION
1375      15400      ,*****
1376      15500
1377      005704  000047      15600      AT7      47      , TEST NUMBER
1378      005706  005754      15700      AT10     , NEXT TEST
1379      005710  000012      15800      10      , ITERATION COUNT
1380      005712  005726      15900      15      , SCOPE ENTRY
1381      005714  012746  000340      16000      MOV      #PPTY7,-(SP) , SET PRIORITY TO 7
1382      005720  012746  005726      16100      MOV      #15,-(SP)
1383      005724  000002      16200      RTI
1384      005726  052777  000100  172662      16300      15      BIS      #BIT6,@TPS , SET INTERRUPT BIT
1385      005734  000005      16400      RESET    , RESET
1386      005736  032777  000100  172652      16500      BIT      #BIT6,@TPS , CHECK IF BIT IS CLEARED
1387      005744  001401      16600      BEQ      25      , BRANCH IF CLEARED
1388      005746  104001      16700      ERROR    , ERROR, RESET DID NOT CLEAR BIT
1389      005750  104005      16800      25      CHAIN    , CHAIN TO NEXT ROUTINE
1390      005752  000755      16900      BR       15      , REPEAT TEST
    
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1392 17100 ,*****
1393 17200 ,AT10-- TEST #50--CHECKS THAT RESET SETS THE TRANSMITTER
1394 17300 ,     READY BIT AND THAT THE READY BIT CAN BE READ RELIABLY
1395 17400 ,*****
1396 17500
1397 005754 000050 17600 AT10 50 , TEST NUMBER
1398 005756 006012 17700 AT11 , NEXT TEST
1399 005760 000012 17800 10 , ITERATION COUNT
1400 005762 005764 17900 15 , SCOPE ENTRY
1401 005764 032777 001000 172722 17920 15 BIT #LSI11,DSR , SKIP TEST IF AN LSI-11
1402 005772 001005 17940 BNE 25
1403 005774 000005 18000 RESET , RESET
1404 005776 105777 172614 18100 TSTB @TPS , CHECK TRANSMIT READY BIT
1405 006002 100401 18200 BMI 25 , BRANCH IF SET
1406 006004 104001 18300 ERROR , ERROR, RESET DID NOT SET READY BIT
1407 006006 104005 18400 25 CHAIN , CHAIN TO NEXT TEST
1408 006010 000765 18500 BR 15 , DO AGAIN
1409 18600
1410 18700 ,*****
1411 18800 ,AT11-- TEST #51--TESTS THAT THE TRANSMITTER READY RESETS
1412 18900 ,     BY LOADING THE TRANSMITTER BUFFER
1413 19000 ,*****
1414 19100
1415 006012 000051 19200 AT11 51 , TEST NUMBER
1416 006014 006052 19300 AT12 , NEXT TEST
1417 006016 000012 19400 10 , ITERATION COUNT
1418 006020 006022 19500 15 , SCOPE ENTRY
1419 006022 012700 300226 19600 15 MOV #226,PO
1420 006026 104010 19700 DELAY , DELAY 150 MSEC
1421 006030 000005 19800 PESET , RESET
1422 006032 005077 172562 19900 CLR @TPB , LOAD TRANSMITTER BUFFER
1423 006036 105777 172554 20000 TSTB @TPS , CHECK TRANSMIT READY BIT
1424 006042 100001 20100 BPL 25 , BRANCH IF CLEARED
1425 006044 104001 20200 EPROP , NOT CLEARED, EPROP
1426 006046 104005 20300 25 CHAIN , CHAIN TO NEXT TEST
1427 006050 0011764 20400 BR 15 , REPEAT TEST
  
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1429      20600 ;*****
1430      20700 ,AT12-- TEST #52--CHECKS THAT THE TRANSMIT READY BIT CAN
1431      20800 ,      CAUSE AN INTERRUPT
1432      20900 ;*****
1433      21000
1434      21100 AT12      52      , TEST NUMBER
1435      21200      AT13      , NEXT TEST
1436      21300      10      , ITERATION COUNT
1437      21400      1$      , SCOPE ENTRY
1438      21500      STPCHV    , SET UP TRANSMITTER INTERRUPT VECTOR
1439      21600      4$      , TO 3$
1440      21700      1$      RESET      , SEE CHAINY COMMENT
1441      21800      CLR      @TPS    , DISABLE TRANSMIT INTERRUPT
1442      21900      CLR      -(SP)   , SET PRIORITY TO ZERO
1443      22000      M'      #2$, -(SP)
1444      22100      RTI
1445      22200      B S      #BIT6, @TPS , ENABLE TRANSMIT INTERRUPT
1446      22300      NOP
1447      22400      ERROR    , TRANSMIT READY DID NOT CAUSE INTERRUPT
1448      22500      3$      CHAIN    , CHAIN TO NEXT TEST
1449      22600      BF      1$      , REPEAT TEST
1450      22700      4$      POPSP2   , INTERRUPT OCCURED, CLEAN STACK
1451      22800      BR      3$      , CHAIN TO NEXT TEST
1452      22900
1453      23000 ;*****
1454      23100 ,AT13-- TEST#53--TESTS THAT THE TRANSMIT READY DOES NOT CAUSE AN
1455      23200 ,      INTERRUPT WHEN THE PROCESSOR IS AT THE SAME LEVEL
1456      23300 ;*****
1457      23400
1458      23500 AT13      3$      , TEST NUMBER
1459      23600      AT14      , NEXT TEST
1460      23700      10      , ITERATION COUNT
1461      23800      1$      , SCOPE ENTRY
1462      23900      STPCHV    , SET UP TRANSMIT INTERRUPT
1463      24000      4$      , VECTOR TO 3$
1464      24100      1$      MOV      TPLVL -(SP) , SET PROCESSOR TO SAME LEVEL AS XMITTER
1465      24200      MOV      #2$, -(SP)
1466      24300      RTI
1467      24400      2$      CLP      @TPS    , DISABLE TRANSMITTER INTERRUPTS
1468      24500      BIS      #BIT6 @TPS , ENABLE TRANSMITTER INTERRUPTS
1469      24600      NOP
1470      24700      3$      CLR      @TPS    , OK, NO INTERRUPT OCCURED
1471      24800      CHAIN    , CHAIN TO NEXT TEST
1472      24900      BR      1$      , REPEAT TEST
1473      25000      4$      POPSP2   , INTERRUPT OCCURED, EPPCP CLEAN
1474      25100      EPPCP   , UP STACK
1475      25200      BR      3$      , CHAIN TO NEXT TEST
    
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1477      25400 ,*****
1478      25500 ,AT14-- TEST#54--TESTS THAT THE TRANSMIT READY DOES CAUSE AN
1479      25600 ,      INTERRUPT WHEN THE PROCESSOR IS AT A PRIORITY LEVEL
1480      25700 ,      ONE LOWER THAN THE TRANSMIT INTERRUPT REQUEST LEVEL
1481      25800 ,*****
1482      25900
1483 006206 000054 26000 AT14 54 , TEST NUMBER
1484 006210 006272 26100      AT15 , NEXT TEST
1485 006212 000012 26200      10 , ITERATION COUNT
1486 006214 006222 26300      1$ , SCOPE ENTRY
1487 006216 104004 26400      STPCHV , SET UP TRANSMIT INTERRUPT
1488 006220 006260 26500      3$ , VECTOR TO 2$
1489 006222 005077 172370 26600 1$ CLR @TPS , DISABLE TRANSMIT INTERPUPTS
1490 006226 013746 000630 26700      MOV TPLVL, -(SP) , SET PROCESSOR PRIORITY ONE
1491 006232 162716 000040 26800      SUB #40, (SP) , LEVEL LOWER THAN TRANSMITTER
1492 006236 012746 006244 26900      MOV #2$, -(SP)
1493 006242 000002 27000      RTI
1494 006244 052777 000100 172344 27100 2$ BIS #BIT6, @TPS , ENABLE TRANSMITTER INTEPRUPTS
1495 006252 000240 27200      NOP
1496 006254 104001 27300      ERROR , NO INTERRUPT, ERROR
1497 006256 000401 27400      BR 4$ , CHAIN TO NEXT TEST
1498 006260 022626 27500 3$ POPSP2 , INTERRUPT OCCURED, OK, CLEAN STACK
1499 006262 005077 172330 27600 4$ CLR @TPS , DISABLE TRANSMITTER INTERPUPTS
1500 006266 104005 27700      CHAIN , CHAIN TO NEXT TEST
1501 006270 000754 27800      BR 1$ , PEPEAT TEST

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1503      28000      ,*****
1504      28100      ,AT15-- TEST#55--TESTS THAT THE TRANSMIT READY DOES NOT
1505      28200      ,      REINTERRUPT AFTER AN RTI WHEN THE READY BIT HAS
1506      28300      ,      NOT BEEN RESET
1507      28400      ,*****
1508      28500
1509      006272  000055  28600      AT15      55      , TEST NUMBER
1510      006274  006372  28700      AT16      , NEXT TEST
1511      006276  000012  28800      10      , ITERATION COUNT
1512      006300  006302  28900      1$      , SCOPE ENTRY
1513      006302  104004      29000      1$      STPCHV      , SET TRANSMIT INTERRUPT VECTOR
1514      006304  006344      29100      4$      , TO 3$
1515      006306  005077  172304  29200      CLR      @TPS      , DISABLE TRANSMITTER INTERRUPTS
1516      006312  005046      29300      CLR      -(SP)      , SET PROCESSOR PRIORITY TO ZERO
1517      006314  012746  006322  29400      MOV      #2$, -(SP)
1518      006320  000002      29500      RTI
1519      006322  052777  000100  172266  29600      2$      BIS      #BIT6, @TPS      , ENABLE TRANSMITTER INTERRUPTS
1520      006330  000240      29700      NOP
1521      006332  104001      29800      ERROR      , ERROR1, TRANSMITTER FAILED TO INTERRUPT
1522      006334  005077  172456  29900      3$      CLR      @TPS      , DISABLE TRANSMITTER INTERRUPTS
1523      006340  104005      30000      CHAIN      , CHAIN TO NEXT TEST
1524      006342  000757      30100      BR      1$      , REPEAT TEST
1525      006344  012777  006364  172254  30200      4$      MOV      #6$, @TPVTR      , INTERRUPT OCCURED, CHANGE INTERRUPT
1526      006352  012716  006360  30300      MOV      #5$, @SP      , VECTOR TO 5$ AND RETURN TO 4$
1527      006356  000002      30400      RTI      , RETURN FROM INTERRUPT
1528      006360  000240      30500      5$      NOP
1529      006362  000764      30600      BR      3$      , CHAIN TO NEXT TEST
1530      006364  022626      30700      6$      POPSP2      , ERROR2, TRANSMITTER REINTERRUPTED
1531      006366  104001      30800      ERROR      , AFTER RTI WITH READY BIT LEFT ON
1532      006370  000761      30900      BR      3$      , CLEAN STACK, CHAIN TO NEXT TEST
1533      31000
1534      31100      ,*****
1535      31200      ,AT16--TEST#56--CHECKS THAT PESET CLEARS THE RECEIVER DONE BIT
1536      31300      ,*****
1537      31400
1538      006372  000056  31500      AT16      56      , TEST NUMBER
1539      006374  006440  31600      AT17      , NEXT TEST
1540      006376  000012  31700      10      , ITERATION COUNT
1541      006400  006402      31800      1$      , SCOPE ENTRY
1542      006402  032777  001000  172304  31900      1$      BIT      #LS11, @SP      , SKIP TEST IF LSI-11
1543      006410  001011      32000      BNE      3$
1544      006412  012700  000226  32100      MOV      #226, PD
1545      006416  104010      32200      DELAY      , DELAY 150 MSEC
1546      006420  104021      32300      2$      AREAD      , ENABLE RECEIVER
1547      006422  000005      32400      RESET      , RESET
1548      006424  105777  172162  32500      TSTB      @TKS      , TEST DONE BIT
1549      006430  100001      32600      BPL      3$      , BRANCH IF DONE IS CLEARED
1550      006432  104001      32700      ERROR      , NOT CLEARED, ERROR
1551      006434  104005      32800      3$      CHAIN      , CHAIN TO NEXT TEST
1552      006436  000770      32900      BR      2$      , REPEAT TEST

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1554 33100 ,*****
1555 33200 ,AT17-- TEST#57--CHECKS THAT REFERENCING THE RECEIVER BUFFER
1556 33300 ,      CLEARS THE DONE BIT
1557 33400 ,*****
1558 33500
1559 006440 000057 33600 AT17 57 , TEST NUMBER
1560 006442 006510 33700 AT20 , NEXT TEST
1561 006444 000012 33800 10 , ITERATION COUNT
1562 006446 006450 33900 1$ , SCOPE ENTRY
1563 006450 032777 001000 172236 34000 1$ BIT #LS11, @SR , CHECK FOR LSI-11
1564 006456 001012 34100 BNE 3$ , SKIP TEST IF SET
1565 006460 012700 000226 34200 MOV #226, R0
1566 006464 104010 34300 DELAY ; DELAY 150 MSEC
1567 006466 104021 34400 2$ AREAD , ENABLE RECEIVER
1568 006470 105777 172120 34500 TSTB @TKB ; REFERENCE RECEIVER BUFFER
1569 006474 105777 172112 34600 TSTB @TKS ; TEST DONE BIT
1570 006500 100001 34700 BPL 3$ , BRANCH IF NOT SET
1571 006502 104001 34800 ERROR , DONE BIT IS SET, ERROR
1572 006504 104005 34900 3$ CHAIN , CHAIN TO NEXT TEST
1573 006506 000767 35000 BR 2$ , REPEAT TEST
1574 35100
1575 35200 ,*****
1576 35300 ,AT20-- TEST#60--CHECK THAT THE RECEIVER DONE BIT IS ABLE TO
1577 35400 ,      CAUSE AN INTERRUPT
1578 35500 ,*****
1579 35600
1580 006510 000060 35700 AT20 60 , TEST NUMBER
1581 006512 006602 35800 AT21 , NEXT TEST
1582 006514 000012 35900 10 , ITERATION COUNT
1583 006516 006544 36000 2$ , SCOPE ENTRY
1584 006520 104003 36100 STRDRV , SET UP RECEIVER INTERRUPT
1585 006522 006574 36200 4$ , VECTOR TO 3$
1586 006524 032777 001000 172162 36300 1$ BIT #LS11, @SR , CHECK FOR LSI-11
1587 006532 001021 36400 BNE 5$ , SKIP TEST IF SET
1588 006534 012700 000226 36500 MOV #226, R0
1589 006540 104010 36600 DELAY , DELAY 150 MSEC
1590 006542 104021 36700 AREAD , ENABLE RECEIVER
1591 006544 005077 172042 36800 2$ CLR @TKS , DISABLE RECEIVER INTERRUPTS
1592 006550 005046 36900 CLP -(SP) , SET PROCESS STATUS TO ZERO
1593 006552 012746 006560 37000 MOV #3$ -(SP)
1594 006556 000002 37100 RTI
1595 006560 052777 000100 172024 37200 3$ BIS #BIT6, @TKS , ENABLE RECEIVER INTERRUPT
1596 006566 000240 37300 NOP
1597 006570 104001 37400 ERROR , ERR. RECEIVER FAILED TO INTERRUPT
1598 006572 000401 37500 BR 5$ , CHAIN TO NEXT TEST
1599 006574 022626 37600 4$ POPSP2 , OK. CLEAN STACK
1600 006576 104005 37700 5$ CHAIN , CHAIN TO NEXT TEST
1601 006600 000761 37800 BP 2$ , REPEAT TEST
    
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1603				38000					,*****
1604				38100					,AT21-- TEST#61--TESTS THAT THE RECEIVER DONE DOES NOT CAUSE AN
1605				38200					, INTERRUPT WHEN THE PROCESSOR IS AT THE SAME LEVEL AS
1606				38300					, THE RECEIVER'S INTERRUPT REQUEST LEVEL
1607				38400					,*****
1608				38500					
1609	006602	000061		38600	AT21	61			, TEST NUMBER
1610	006604	006702		38700		AT22			, NEXT TEST
1611	006606	000012		38800		10			, ITERATION COUNT
1612	006610	006636		38900		2\$			, SCOPE ENTRY
1613	006612	104003		39000		STRDRV			, SET RECEIVER VECTOR TO 4\$
1614	006614	006674		39100		5\$			
1615	006616	032777	001000	39200	1\$	BIT	#LS111,@SR		, CHECK FOR LSI-11
1616	006624	001017		39300		BNE	4\$		, SKIP TEST IF SET
1617	006626	012700	00022b	39400		MOV	#226,R0		
1618	006632	104010		39500		DELAY			, DELAY 150 MSEC
1619	006634	104021		39600		AREAD			, ENABLE RECEIVER
1620	006636	005077	171750	39700	2\$	CLR	@TKS		, DISABLE RECEIVER INTERRUPTS
1621	006642	013746	000b24	39800		MOV	TKLVL,-(SP)		, SET PROCESSOR TO SAME LEVEL AS RECEIVER
1622	006646	012746	006654	39900		MOV	#3\$,-(SP)		
1623	006652	000002		40000		RTI			
1624	006654	052777	000100	40100	3\$	BIS	#BIT6,@TKS		, ENABLE RECEIVER INTERPUPTS
1625	006662	000240		40200		NOP			
1626	006664	005077	171722	40300	4\$	CLR	@TKS		, OK, NO INTERRUPT OCCURED
1627	006670	104005		40400		CHAIN			, CHAIN TO NEXT TEST
1628	006672	000770		40500		BR	3\$		, REPEAT TEST
1629	006674	022626		40600	5\$	POPSP2			, ERROR, RECEIVER INTERRUPTED, CLEAN STACK
1630	006676	104001		40700		ERROR			
1631	006700	000771		40800		BR	4\$		, BRANCH 3\$

1633				41000	,*****		
1634				41100	,AT22--	TEST#62--TESTS THAT THE RECEIVER DONE DOES CAUSE AN	
1635				41200	,	INTERRUPT WHEN THE PROCESSOR IS AT A PRIORITY ONE	
1636				41300	,	LEVEL LOWER THAN THE RECEIVER'S INTERRUPT	
1637				41400	,	REQUEST LEVEL	
1638				41500	,*****		
1639				41600			
1640	006702	000062		41700	AT22	62	, TEST NUMBER
1641	006704	007010		41800		AT23	, NEXT TEST
1642	006706	000012		41900		10	, ITERATION COUNT
1643	006710	006736		42000		15	, SCOPE ENTRY
1644	006712	104003		42100		STRDRV	, SET RECEIVER INTERRUPT
1645	006714	006776		42200		35	, VECTOR TO 25
1646	006716	032777	001000	42300		BIT #LS11, @SR	, CHECK FOR LSI-11
1647	006724	001025		42400		BNE 45	, SKIP TEST IF SET
1648	006726	012700	000226	42500		MOV #226, R0	
1649	006732	104010		42600		DELAY	, DELAY 150 MSEC
1650	006734	104021		42700		AREAD	, ENABLE RECEIVER
1651	006736	005077	171650	42800	15	CLR @TKS	, DISABLE READER INTERRUPTS
1652	006742	013746	000624	42900		MOV TKLVL, -(SP)	, SET PROCESSOR ONE LEVEL
1653	006746	012746	006754	43000		MOV #25, -(SP)	
1654	006752	000002		43100		RTI	
1655	006754	162737	000040	43200	25	SUB #40, PSW	, LOWER THAN READERS
1656	006762	052777	000100	43300		BIS #BIT6, @TKS	, ENABLE INTERRUPTS
1657	006770	000240		43400		NOP	
1658	006772	104001		43500		ERROR	, FAILED TO INTERRUPT
1659	006774	000401		43600		BR 45	, CHAIN TO NEXT TEST
1660	006776	022626		43700	35	POPSP2	, OK, CLEAN STACK
1661	007000	005077	171606	43800	45	CLR @TKS	, DISABLE RECEIVER INTERRUPTS
1662	007004	104005		43900		CHAIN	, CHAIN TO NEXT TEST
1663	007006	000753		44000		BR 15	, REPEAT TEST

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1665          44200 ,*****
1666          44300 ,AT23-- TEST#63--CHECKS THAT THE RECEIVER DONE DOES NOT
1667          44400 ,      REINTERRUPT AFTER RTI INSTRUCTION WHEN DONE
1668          44500 ,      BIT IS LEFT SET
1669          44600 ,*****
1670          44700
1671 007010 000063 44800 AT23 63 , TEST NUMBER
1672 007012 007122 44900      AT24 , NEXT TEST
1673 007014 000012 45000      10 , ITERATION COUNT
1674 007016 007030 45100      15 , SCOPE ENTRY
1675 007020 032777 001000 171666 45200      BIT #LS11,@SR , CHECK FOR LSI-11
1676 007026 001015 45300      BNE 25 , SKIP TEST IF SET
1677 007030 012700 000226 45400 15 , MOV #226,R0
1678 007034 104010 45500      DELAY , DELAY 150 MSEC
1679 007036 104021 45600      AREAD , ENABLE RECEIVER
1680 007040 104003 45700      STRDRV , SET RECEIVER INTERRUPT
1681 007042 007074 45800      35 , VECTOR TO 35
1682 007044 005077 171542 45900      CLR @TKS , DISABLE RECEIVER INTERRUPTS
1683 007050 052777 000100 171534 46000      BIS #BIT6,@TKS , ENABLE RECEIVER INTERRUPT
1684 007056 000240 46100      NOP
1685 007060 104001 46200      ERROR , NO INTERRUPT, ERROR
1686 007062 005077 171524 46300 25 , CLR @TKS , DISABLE RECEIVER INTERRUPTS
1687 007066 000005 46400      RESET , RESET AFTER LAST INTF TEST
1688 007070 104005 46500      CHAIN , CHAIN TO NEXT TEST
1689 007072 000756 46600      BR 15 , REPEAT TEST
1690 007074 012777 007114 171520 46700 35 , MOV #55,@TKVTR , INTERRUPT, OK, CHANGE VECTOR TO 55
1691 007102 012716 007110 46800      MOV #45 @SP , CHANGE RET ADDR TO 45
1692 007106 000002 46900      RTI , RETURN
1693 007110 000240 47000 45 , NOP
1694 007112 000763 47100      BR 25 , OK, NO ADDITIONAL INTERRUPTS
1695 007114 022626 47200 55 , POPSP2 , ERROR, ADDITIONAL INTERRUPT
1696 007116 104001 47300      ERRCR
1697 007120 000760 47400      BR 25 , CHAIN TO NEXT TEST

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1699          47600 ;*****
1700          47700 ;AT24--TEST#64--HAVE OPERATOR TYPE A CHARACTER ON THE
1701          47800 ;      KEYBOARD, THEN CHECK FOR RECIEVER DONE
1702          47900 ;
1703          48000 ;
1704          48100 ;*****
1705          48200 ;
1706 007122 000064 48300 AT24 64 ; TEST NUMBER
1707 007124 007222 48400      AT25 ; NEXT TEST
1708 007126 000001 48500      1 ; ITERATION COUNT
1709 007130 007152 48600      25 ; SCOPE ENTRY
1710 007132 032777 001000 171554 48700 15 BIT #LSI11,@SR ; SKIP TEST IF NOT AN LSI-11
1711 007140 001426      48800      BEQ 55
1712 007142 005777 171444 48900      TST @TKS ; SHOULD BE CLEAR
1713 007146 001401      49000      BEQ 25
1714 007150 104001      49100      ERROR ; RECIEVER STATUS NOT =0
1715 007152 012700 000600 49200 25 MOV #600,R0 ; 1/2 SEC DELAY
1716 007156 012737 000030 000716 49300      MOV #30,CNTR ; SET UP FOR 12 SEC WAIT
1717 007164 104000      49400      TYPE
1718 007166 014364      49500      OPMSG ; MESSAGE TO TYPE A CHAR
1719 007170 104010      49600 35 DELAY ; 1/2 SECOND
1720 007172 105777 171414 49700      TSTB @TKS ; CHECK DONE BIT
1721 007176 100407      49800      BMI 55 ; SET - EXIT LOOP
1722 007200 005337 000716 49900      DEC CNTR
1723 007204 001403      50000      BEQ 45 ; TIME HAS RUN OUT
1724 007206 012700 171414 50100      MOV #-1,PD ; ANOTHER 1/2 SEC
1725 007212 000766      50200      BR 35 ; CONTINUE WAIT
1726 007214 104001      50300 45 ERROR ; NO RECIEVER DONE, OR
1727          50400 ; OPERATOR IS OUT TO LUNCH
1728 007216 104005      50500 55 CHAIN ; CHAIN TO NEXT TEST
1729 007220 000754      50600      BP 25
    
```

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1731          50800 ,*****
1732          50900 ,AT25--TEST#65--CHECK THAT RECIEVER DONE CAUSES AN INTERRUPT
1733          51000 ,                               WHEN BIT 6 (INTERRUPT ENABLE) IS SET
1734          51100 ;*****
1735          51200
1736 007222 000065 51300 AT25 65 , TEST NUMBER
1737 007224 007300 51400 AT26 , NEXT TEST
1738 007226 000001 51500 1 , ITERATION COUNT
1739 007230 007242 51600 25 , SCOPE ENTRY
1740 007232 032777 001000 171454 51700 15 BIT #LSI11,@SR , SKIP TEST IF NOT AN LSI-11
1741 007240 001414 51800 BEQ 55 ,
1742 007242 105777 171344 51900 25 TSTB @TKS , DONE SHOULD BE SET
1743 007246 001001 52000 BNE 35 ,
1744 007250 104001 52100 ERROR , RECIEVER DONE NOT SET
1745 007252 104003 52200 35 STRDRV , SET RECIEVER INTERRUPT
1746 007254 007272 52300 55 , VECTOR TO 55
1747 007256 052777 000100 171326 52400 BIS #BIT6,@TKS , ENABLE INTERRUPT
1748 007264 000240 52500 NOP ,
1749 007266 000240 52600 NOP ,
1750 007270 104001 52700 45 ERROR , RECIEVER DIDN'T INTERRUPT
1751 007272 022626 52800 55 PCPSP2 , CLEAN UP THE STACK
1752 007274 104005 52900 CHAIN , CHAIN TO NEXT TEST
1753 007276 000761 53000 BR 25
  
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1755          53200 , *****
1756          53300 , AT26--TEST#66--CHECK THAT READING TKB CLEARS DONE BIT
1757          53400 , AND THAT DONE CLEARED CON'T CAUSE AN INTERRUPT
1758          53500 , *****
1759          53600
1760 007300 000066 53700 AT26 66 , TEST NUMBER
1761 007302 177777 53800 -1 , LAST TEST
1762 007304 000001 53900 1 , ITERATION COUNT
1763 007306 007320 54000 2$ , SCOPE ENTRY
1764 007310 032777 001000 171376 54100 1$ BIT #LSI11,@SR , SKIP TEST IF NOT AN LSI-11
1765 007316 001422 54200 BEQ 5$
1766 007320 105777 171266 54300 2$ TSTB @TKS , MAKE SHURE DONE IS STILL SET
1767 007324 001001 54400 BNE 3$
1768 007326 104001 54500 ERROR , RECIEVER DONE NOT SET
1769 007330 017737 171260 000716 54600 3$ MOV @TKB,CNTR , READ DATA BUFFER
1770 007336 105777 171250 54700 TSTB @TKS , CHECK THE DONE BIT
1771 007342 100001 54800 BPL 4$ , OK
1772 007344 104001 54900 ERROR , DEADING DATA REG DIDN'T CLEAR DONE
1773 007346 104003 55000 4$ STRDRV , SET RECIEVER INTERRUPT
1774 007350 007374 55100 6$ , VECTOR TO 6$
1775 007352 052777 000100 171232 55200 B'5 #BIT6 @TKS , ENABLE INTERRUPT
1776 007360 000240 55300 NOP
1777 007362 000240 55400 NOP
1778 007364 005077 171222 55500 5$ CLR @TKS , OK- CLEAN UP
1779 007370 104005 55600 CHAIN , EXIT TESTS
1780 007372 000752 55700 BR 2$
1781 007374 104001 55800 6$ ERROR , DLV INTERRUPTED WITH DONE CLEAR
1782 007376 022626 55900 POPSP2 , CLEAN UP THE STACK
1783 007400 000771 56000 BP 5$

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1735

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1786 00100 SBTTL LA36 PRINTER TESTS
1787 00200
1788 00300 THE LA36 PRINTER TESTS WILL BE EXECUTED IN A
1789 00400 CONTINUOUS LOOP OUTPUTTING TO ALL MULTIPLE DL11'S
1790 00500 IF SR BIT 8 IS SET TO ZERO AT START UP TIME IF
1791 00600 BIT 8 IS SET TO 1 AT START UP THEY MAY BE EXECUTED
1792 00700 INDIVIDUALLY ONCE OR CONTINUALLY LOOPED, OR
1793 00800 BECOME THE FIRST OF THE ENTIRE SEQUENCE OF PRINTER
1794 00900 TESTS REFERENCE INSTRUCTIONS IN THE INTRODUCTION
1795 01000 FOR PROPER MODE OF OPERATION
1796 01100
1797 01200
1798 01300 *****
1799 01400
1800 01500 PTO -- DATA PATH TEST---FOUR LINES OF ALTERNATING
1801 01600 "*" AND "U" ARE PRINTED. OUT TO THE GIVEN PAPER
1802 01700 WIDTH THE PATTERN WILL APPEAR AS FOLLOWS
1803 01800
1804 01900 *U*U*U*U*U*U*
1805 02000 U*U*U*U*U*U*
1806 02100 *U*U*U*U*U*U*
1807 02200 U*U*U*U*U*U*
1808 02300
1809 02400 *****
1810 02500
1811 007402 000000 PTO 0 TEST NUMBER
1812 007404 007456 02700 PT1 NEXT TEST
1813 007406 104016 02800 PRTHDR
1814 007410 104007 02900 TYPEN PRINT COLUMN # MESSG
1815 007412 014112 03000 MDRO
1816 007414 012703 025125 03100 15 MOV #U,R3 SET FIRST CHAR PAIR
1817 007420 012702 000004 03200 MOV #4,R2 SET LINE COUNT
1818 007424 010300 03300 25 MOV R3,R0 SET CHAR PAIR
1819 007426 013701 000652 03400 MOV WIDTH,P1 SET COLUMN COUNT
1820 007432 104015 03500 35 PRINTC PRINT CHAR
1821 007434 000300 03600 SWAB R0 SET NEXT CHAR
1822 007436 005301 03700 DEC R1 DEC COLUMN COUNT
1823 007440 001374 03800 BNE 35 FINISH LINE
1824 007442 000303 03900 SWAB R2 SET NEXT LINE START CHAR
1825 007444 104012 04000 CRLF SEND CR-LF
1826 007446 005302 04100 DEC R2 DEC LINE COUNT
1827 007450 001365 04200 BNE 25 FINISH TEST
1828 007452 104005 04300 CHA N ALL DONE EXIT
1829 007454 000757 04400 BF 15 REPEAT TEST

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1831			04600	,XXXXXXXXXX	
1832			04700	,	
1833			04800	,PT1 -- PRINTER CHARACTER TEST --- PRINTS ALL PRINTABLE CHARACTERS	
1834			04900	,	
1835			05000	,XXXXXXXXXX	
1836			05100		
1837	007456	000001	05200	PT1 1	, TEST NUMBER
1838	007460	007600	05300	PT2	, NEXT TEST
1839	007462	104016	05400	PRTHDR	
1840	007464	012701	05500	15 MOV #40,R1	, SPACE TO R1
1841	007470	012702	05600	MOV #100,R2	, @ TO R2
1842	007474	012703	05700	MOV #140,R3	, TO R3
1843	007500	110100	05800	25 MOV R1,R0	, CHAR TO R0
1844	007502	004737	05900	JSR PC,SPSP	, SEND TWO SPACES
1845	007506	110200	06000	MOV R2,R0	, NEXT CHAR TO R0
1846	007510	004737	06100	JSP PC,SPSP	, SEND TWO SPACES
1847	007514	012704	06200	MOV #3,R4	, PRINT COUNT TO R4
1848	007520	110300	06300	MOV R3,R0	, THIRD CHAR TO R0
1849	007522	104015	06400	35 PRINTC	, PRINT THE CHAR
1850	007524	005304	06500	DEC R4	, THREE TIMES ?
1851	007526	001375	06600	BNE 35	, BRANCH IF NOT
1852	007530	104012	06700	CRLF	, CARRIAGE RETURN LINE FEED
1853	007532	122122	06800	CPB (P1)+,(P2)+	, NEXT CHARACTERS
1854	007534	105723	06900	TSTB (R3)+	
1855	007536	020327	07000	CPB R3,#200	, CHECK IF ALL DONE
1856	007542	103756	07100	BLO 25	, BRANCH IF NOT
1857	007544	104005	07200	CHAIN	, EXIT TO NEXT TEST
1858	007546	000746	07300	BR 15	, REPEAT TEST
1859	007550	012704	07400	SPSP MOV #3,R4	, PRINT COUNT TO R4
1860	007554	104015	07500	15 PRINTC	, PRINT CHAR
1861	007556	005304	07600	DEC R4	, THREE TIMES?
1862	007560	001375	07700	BNE 15	, BRANCH IF NOT
1863	007562	012700	07800	SP2 MOV #40,R0	, SPACE TO R0
1864	007566	104015	07900	PRINTC	, SEND A SPACE
1865	007570	012700	08000	SPC MOV #40,R0	, SPACE TO R0
1866	007574	104015	08100	PRINTC	, SEND ANOTHER
1867	007576	000207	08200	PTS FI	, RETURN

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1869 08400 ,XXXXXXXXXX
1870 08500 ,
1871 08600 ,PT2 -- NON-PRINTING CHARACTER TEST THIS TEST
1872 08700 , PRINTS THE OCTAL CODE FOLLOWED BY THE MNEMONIC
1873 08800 , OF ALL NON-PRINTING CHARACTERS FOLLOWING EACH
1874 08900 , MNEMONIC, THE PRINTER IS DRIVEN BY THE NON-PRINTING
1875 09000 , CODE (000 THROUGH 037 PLUS 177)
1876 09100 , ALL CONTROL CHARACTERS (INCLUDING THOSE FOR OPTIONS
1877 09200 , WILL BE SKIPPED, REFER TO THE DOCUMENT FOR A LIST OF THOSE
1878 09300 , TESTED
1879 09400 ,
1880 09500 ;XXXXXXXXXX
1881 09600 ;
1882 007600 000002 09700 PT2 2 ,TEST NUMBER
1883 007602 010164 09800 PT3 ,NEXT TEST
1884 007604 104016 09900 PRTHDR ,PRINT TEST HEADER
1885 007606 012701 007706 10000 15 MOV #IDEZ,R1 ,ADDR OF IDENT TO R1
1886 007612 012703 010137 10100 MOV #NPCODE R3 ,ADDR OF NON-PRINT-CODES TO R3
1887 007616 012702 000003 10200 25 MOV #3,R2 ,NO OF ID'S PER LINE TO R2
1888 007622 012704 000010 10300 35 MOV #10,R4 ,NO OF CHARS PER ID TO R4
1889 007626 121327 000055 10400 45 CMPB (R3),#55 ,ZERO TERMINATOR IN NP TABLE??
1890 007632 001422 10500 BEQ 75 ,BRANCH IF YES
1891 007634 112100 10600 MOVB (R1)+,R0 ,GET ID CHARACTERS
1892 007636 104015 10700 PRINTC ,AND PRINT A
1893 007640 005304 10800 DEC R4 ,GROUP OF
1894 007642 001371 10900 BNE 45 ,8 CHARACTERS
1895 007644 112300 11000 MOVB (R3)+,R0 ,GET NP CODE FROM TABLE
1896 007646 012704 000312 11100 MOV #3,R4 ,AND
1897 007652 104015 11200 55 PRINTC ,TRY TO PRINT IT
1898 007654 005304 11300 DEC R4 ,THREE
1899 007656 001375 11400 BNE 55 ,TIMES
1900 007660 005302 11500 DEC R2 ,MORE TO GO ON THIS LINE ?
1901 007662 001404 11600 BEQ 65 ,BRANCH IF NO
1902 007664 004737 007562 11700 JSR PC,SP2 ,SEND 3 SPACES
1903 007670 104015 11800 PRINTC
1904 007672 000753 11900 BR 35 ,BRANCH TO CONTINUE LINE
1905 007674 104012 12000 65 CRLF
1906 007676 000747 12100 BP 25 ,GO TO NEXT LINE
1907 007700 104012 12200 75 CRLF
1908 007702 104005 12300 CHAIN ,CHAIN TO NEXT TEST
1909 007704 000740 12400 BR 15
1910 12500
1911 12600
1912 12700
1913 007706 030060 020060 047040 12800 IDEZ ASCII '000 NUL002 STX
007714 046125 030060 020062
007722 051440 054124
1914 007726 030060 020066 040440 12900 ASCII '006 ACK020 DLE021 CC1
007734 045503 031060 020060
007742 042040 042514 031060
007750 020061 042040 030503
1915 007756 031060 020062 042040 13000 ASCII '022 DC023 DC3024 DC4
007764 031103 031060 020063
007772 042040 031503 031060
010000 020064 042040 032103
1916 010006 031060 020065 047040 13100 ASCII '025 NAM026 SYN027 ETB
    
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	010014	045501	031060	020066					
	010022	051440	047131	031060					
	010030	020067	042440	041124					
1917	010036	031460	020060	041440	13200		ASCII	/030	CAN031 EM 032 SUB/
	010044	047101	031460	020061					
	010052	042440	020115	031460					
1918	010060	020062	051440	041125					
	010066	031460	020064	043040	13300		ASCII	/034	FS 035 GS 036 RS /
	010074	020123	031460	020065					
	010102	043440	020123	031460					
	010110	020066	051040	020123					
1919	010116	031460	020067	052440	13400		ASCII	/037	US 177 DEL /
	010124	020123	033461	020067					
	010132	042040	046105	040					
1920	010137	000	002	006	13500	NPCCDE	BYTE		0, 2, 6, 20, 21, 22, 23, 24
	010142	020	021	022					
	010145	023	024						
1921	010147	025	025	027	13600		BYTE		25, 25, 27, 30, 31, 32, 34, 35
	010152	030	031	032					
	010155	034	035						
1922	010157	036	037	177	13700		BYTE		36, 37, 177, 55
	010162	055							
1923		010164			13800		EVEN		

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1925 14000 ,XXXXXXXXXX
1926 14100 ,
1927 14200 ,PT3 -- CARRIAGE RETURN TEST
1928 14300 ,
1929 14400 , THE LINE CONSISTS OF A STRING OF O S AND
1930 14500 , X'S FIRST, THE O'S ARE PRINTED OUT TO THE LAST
1931 14600 , COLUMN WITH A SPACE SEPARATING EACH THEN THE
1932 14700 , CARRIAGE IS SPACED TO THE FIRST BLANK SPACE, AN X
1933 14800 , IS PRINTED AND THEN RETURNED TO THE MARGIN THIS
1934 14900 , PROCESS IS CONTINUE UNTIL ALL SPACES BETWEEN
1935 15000 , THE ZEROES HAVE BEEN FILLED
1936 15100 ,
1937 15200 ,XXXXXXXXXX
1938 15300 ,
1939 010164 000003 15400 PT3 3 ,TEST NUMBER
1940 010166 010304 15500 PT4 ,NEXT TEST
1941 010170 104016 15600 PPTHDR ,TYPE HEADER
1942 010172 005037 000674 15700 1$ CLR SPCNT ,CLEAR SPACE COUNTER
1943 010176 013701 000652 15800 MOV WIDTH R1 ,POSITION COUNTER TO R1
1944 010202 012700 000117 15900 2$ MOV #117,RO , "0" TO RO
1945 010206 104015 16000 PFINTC ,PRINT THE "0"
1946 010210 005301 16100 DEC R1 ,DECREMENT POSITION COUNTER
1947 010212 001404 16200 BEQ 3$ ,BRANCH IF 0
1948 010214 004737 007570 16300 JSR PC,SPC ,SEND SPACE
1949 010220 005301 16400 DEC R1 ,DECREMENT POSITION COUNTER
1950 010222 001367 16500 BNE 2$ ,BRANCH IF NOT ZERO
1951 010224 104022 16600 3$ CR ,SEND A CR
1952 010226 012737 000001 000674 16700 MOV #1,SPCNT ,SPACE, COUNTER SET TO 1
1953 010234 013701 000674 16800 4$ MOV SPCNT,R1 ,NO OF SPACES TO R1
1954 010240 004737 007570 16900 5$ JSR PC,SPC ,SEND SPACE
1955 010244 005301 17000 DEC R1 ,DECREMENT SPACE COUNTER
1956 010246 001374 17100 BNE 5$ ,BRANCH IF NOT ZEPO
1957 010250 012700 000130 17200 MOV #130,RO , "X" INTO RO
1958 010254 104015 17300 PRINTC ,PRINT "X"
1959 010256 104022 17400 CR ,PRINT CR
1960 010260 062737 000002 000674 17500 ADD #2,SPCNT ,INCREMENT SPACE COUNT BY 2
1961 010266 023737 000674 000652 17600 CMP SPCNT,WIDTH ,COMPARE POSITION COUNTER WITH COLM COUNT
1962 010274 103757 17700 BLO 4$ ,BRANCH IF LOWER
1963 010276 104014 17800 LF ,SEND LF
1964 010300 104005 17900 CHAIN ,CHAIN TO NEXT TEST
1965 010302 000733 18000 BF 1$ REPEAT TEST

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1967					18200	,XXXXXXXXXX			
1968					18300	,			
1969					18400	,PT4 -- MULTIPLE LINE FEED TEST -- 63 LINE FEEDS ARE			
1970					18500	, SENT WITH A REFERENCE LINE AT THE START AND END ,			
1971					18600	, A NUMBER IS PRINTED WHICH INDICATES THE NUMBER OF LINE			
1972					18700	, FEEDS THAT WILL BE ISSUED BEFORE THE NEXT			
1973					18800	, NUMBER OR REFERENCE LINE IS PRINTED			
1974					18900	,			
1975					19000	,XXXXXXXXXX			
1976					19100				
1977	010304	000004			19200	PT4 4		, TEST NUMBER	
1978	010306	010462			19300	PT5		, NEXT TEST	
1979	010310	104016			19400	PRTHDR		, TYPE HEADER	
1980	010312	012737	000001	000706	19500	15 MOV #1, LFCNT		, LINE FEED COUNT TO 1	
1981	010320	013701	000652		19600	MOV WIDTH, R1		, COLUMN COUNT TO R1	
1982	010324	012702	010444		19700	MOV #LINE3, R2		, ADDR OF NUMBER FIELD TO R2	
1983	010330	004737	010414		19800	JSR PC, REF		, PRINT REFERENCE LINE	
1984	010334	013701	000706		19900	25 MOV LFCNT, R1		, LINE FEED COUNT TO R1	
1985	010340	104014			20000	35 LF		, SEND LF	
1986	010342	005301			20100	DEC R1		, DECREMENT COUNTER	
1987	010344	001375			20200	BNE 35		, BRANCH IF NOT YET 0	
1988	010346	006337	000706		20300	ASL LFCNT		, DOUBLE LINE FEED COUNT	
1989	010352	022737	000100	000706	20400	CMP #BIT6, LFCNT		, TEST IF COUNT IS 32	
1990	010360	001406			20500	BEQ 45		, BRANCH IF =32. END	
1991	010362	112200			20600	MOVB (R2)+, R0		, NUMBER TO R0	
1992	010364	104015			20700	PRINTC		, PRINT IT	
1993	010366	112200			20800	MOVB (R2)+, R0		, NUMBER TO R0	
1994	010370	104015			20900	PRINTC		, PRINT IT	
1995	010372	104022			21000	CR		, PRINT CR	
1996	010374	000757			21100	BR 25		, DRIVE THE LINEFEEDS	
1997	010376	013701	000652		21200	45 MOV WIDTH, R1		, COLUMN COUNT TO R1	
1998	010402	004737	010414		21300	JSR PC, REF		, SEND END REFERENCE LINE	
1999	010406	104014			21400	LF		, ADVANCE PAPER	
2000	010410	104005			21500	CHAIN			
2001	010412	000737			21600	BR 15		, REPEAT TEST	
2002	010414	112200			21700	PEF MOVB (R2)+, R0		, NUMBER TO R0	
2003	010416	104015			21800	PRINTC		, PRINT IT	
2004	010420	112200			21900	MOVB (R2)+, R0		, NUMBER TO R0	
2005	010422	104015			22000	PRINTC		, PRINT IT	
2006	010424	005741			22100	TST -(R1)		, DECREASE COUNTER BY 2	
2007	010426	012700	000137		22200	MOV #137, R0		, DASH (-) TO R0	
2008	010432	104015			22300	15 PRINTC		, PRINT IT	
2009	010434	005301			22400	DEC R1		, DECREMENT COLUMN COUNTER	
2010	010436	001375			22500	BNE 15		, BRANCH IF NO ZERO	
2011	010440	104022			22600	CF		, PRINT CR	
2012	010442	000207			22700	RTS PC		, RETURN	
2013					22800				
2014	010444	030460	031060	032060	22900	LINE3 ASCII /0102040S163200			
	010452	034060	033061	031063					
	010460	030060							

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2016      23100 ;XXXXXXXXXX
2017      23200 ,PT5-- SINGLE LINE FEED TEST -- TESTS THE LINE FEED
2018      23300 ,          CAPABILITY FROM ALL COLUMNS.
2019      23400 ;XXXXXXXXXX
2020      23500
2021 010462 000005 23600 PT5      5          ,TEST NUMBER
2022 010464 010666 23700          PT6          ,NEXT TEST
2023 010466 104016 23800          PRTHDR        ,TYPE HEADER
2024 010470 013701 000652 23900 1$      MOV      WIDTH,R1    ,COLUMN COUNT TO R1
2025 010474 005741 24000          TST      -(P1)       ,DECREASE BY 2
2026 010476 012700 000060 24100          MOV      #60,R0     , '0' TO R0
2027 010502 104015 24200 2$      PRINTC          ,SEND 0
2028 010504 005301 24300          DEC      R1         ,DECREMENT COLUMN COUNTER
2029 010506 001375 24400          BNE     2$         ,BRANCH IF NOT ZERO
2030 010510 012700 000062 24500          MOV      #62,R0     ,SEND A 2
2031 010514 104015 24600          PRINTC
2032 010516 104015 24700          PRINTC          ,SEND A SECOND TWO
2033 010520 023727 000652 000204 24800      CMP      WIDTH,#132 ,COMPARE COLUMN COUNT
2034 010526 001404 24900          BEQ     3$         ,BRANCH IF EQ 132
2035 010530 012700 001410 25000          MOV      #3410,R0  ,DELAY 1 8 SEC
2036 010534 104010 25100          DELAY
2037 010536 000407 25200          BR      5$
2038 010540 012700 000063 25300 3$      MOV      #63,R0     ,3'S TO RC
2039 010544 012701 000100 25400          MOV      #100,R1   ,64 TO COUNTER
2040 010550 104015 25500 4$      PRINTC          ,SEND CHARACTER
2041 010552 005301 25600          DEC      R1         ,DECREMENT COUNT
2042 010554 001375 25700          BNE     4$         ,BRANCH IF NOT ZERO
2043 010556 104012 25800 5$      CRLF          ,SEND A CR,LF
2044 010560 013701 000652 25900          MOV      WIDTH,R1  ,NO COLUMNS TO R1
2045 010564 012700 000134 26000 6$      MOV      #134,R0   ,BACKSLASH TO R0
2046 010570 104015 26100          PRINTC          ,SEND IT
2047 010572 104014 26200          LF          ,PRINT LF
2048 010574 005301 26300          DEC      R1         ,DECREMENT COUNTER
2049 010576 001372 26400          BNE     6$         ,BRANCH IF NOT ZERO
2050 010600 104022 26500          CR          ,SEND CR
2051 010602 004737 010630 26600          JSR     PC,PT5AL   ,SEND REF LINE #1
2052 010606 104012 26700          CRLF          ,SEND A CR,LF
2053 010610 012700 001750 26800          MOV      #1750,R0 ,DELAY 1 SEC
2054 010614 104010 26900          DELAY
2055 010616 004737 010630 27000          JSR     PC,PT5AL   ,SEND A SECOND REF LINE
2056 010622 104012 27100          CRLF          ,SEND A CR,LF
2057 010624 104005 27200          CHAIN          ,CHAIN TO NEXT TEST
2058 010626 000720 27300          BR      1$
2059 010630 013701 000652 27400 PT5AL  MOV      WIDTH,R1  ,COLUMN COUNT TO R1
2060 010634 012700 000061 27500          MOV      #61,R0   , "1" TO R0
2061 010640 104015 27600 1$      PRINTC          ,PRINT R0
2062 010642 005301 27700          DEC      R1         ,DECREMENT COUNTER
2063 010644 001407 27800          BEQ     2$         ,BRANCH IF=0
2064 010646 005200 27900          INC      R0         ,INCREMENT CHARACTER
2065 010650 020027 000071 28000          CMP      R0,#71   ,COMP CHAR TO "9"
2066 010654 101771 28100          BLOS   1$         ,BRANCH IF LOWER OR SAME
2067 010656 012700 000060 28200          MOV      #60,R0   ,RESET CHAR TO "0"
2068 010662 000766 28300          BR      1$
2069 010664 000207 28400 2$      RTS      PC        ,FINISHED, RETURN TO CALLER

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2071				28600	,XXXXXXXXXX		
2072				28700	,PT6--	BACKSPACE TEST -- A REFERENCE LINE SUCH AS IN	
2073				28800	,	TEST PT5 IS PRINTED THE SECOND LINE CONSISTS	
2074				28900	,	OF PRINTING A BACKSLASH, BACKSPACE PND FORWARD	
2075				29000	,	SLASH COMBINATION OUT TO THE GIVEN COLUMN WIDTH	
2076				29100	,	THIS LINE IS THEN FOLLOWED BY THE SAME TWO REFERENCE	
2077				29200	,	LINES AS PRINTED IN TEST PT5	
2078				29300	,XXXXXXXXXX		
2079				29400			
2080	010666	000006		29500	PT6	6	, TEST NUMBER
2081	010670	011054		29600		PT7	, NEXT TEST
2082	010672	104016		29700		PRTHDR	, PRINT HEADER
2083	010674	104007		29800		TYPEN	, PRINT COLUMN # MMSG
2084	010676	014112		29900		HDRO	
2085	010700	013701	000652	30000	1\$	MOV	WIDTH, R1
2086	010704	005741		30100		TST	-(R1)
2087	010706	012700	000060	30200		MOV	#60, RO
2088	010712	104015		30300	2\$	PRINTC	, SEND 0
2089	010714	005301		30400		DEC	R1
2090	010716	001375		30500		BNE	2\$
2091	010720	012700	000062	30600		MOV	#62, RO
2092	010724	104015		30700		PRINTC	, SEND A "2"
2093	010726	104015		30800		PRINTC	, SEND A SECOND "2"
2094	010730	023727	000652 000204	30900		CMF	WIDTH, #132
2095	010736	001404		31000		BEQ	3\$
2096	010740	012700	003410	31100		MOV	#3410, RO
2097	010744	104010		31200		DELAY	
2098	010746	000407		31300		BR	5\$
2099	010750	012700	000063	31400	3\$	MOV	#63, RO
2100	010754	012701	000100	31500		MOV	#100, R1
2101	010760	104015		31600	4\$	PRINTC	, SEND CHAR
2102	010762	005301		31700		DEC	R1
2103	010764	001375		31800		BNE	4\$
2104	010766	104012		31900	5\$	CRLF	, SEND A CR, LF
2105	010770	013701	000652	32000		MOV	WIDTH, R1
2106	010774	012700	000134	32100	6\$	MOV	#134, RO
2107	011000	104015		32200		PRINTC	, SEND IT
2108	011002	012700	000010	32300		MOV	#10, RO
2109	011006	104015		32400		PRINTC	, SEND IT
2110	011010	012700	000057	32500		MOV	#57, RO
2111	011014	104015		32600		PRINTC	, SEND IT
2112	011016	005301		32700		DEC	R1
2113	011020	001365		32800		BNE	6\$
2114	011022	104014		32900		LF	, SEND LF
2115	011024	104022		33000		CR	, SEND CR
2116	011026	004737	010630	33100		JSR	PC, PT5AL
2117	011032	104012		33200		CRLF	, SEND A CR, LF
2118	011034	012700	001750	33300		MOV	#1750, RO
2119	011040	104010		33400		DELAY	1 SEC
2120	011042	004737	010630	33500		JSR	PC, PT5AL
2121	011046	104012		33600		CRLF	, SEND A CR, LF
2122	011050	104005		33700		CHAIN	, CHAIN TO NEXT TEST
2123	011052	000712		33800		BR	1\$

2125				34000		,XXXXXXXXXX			
2126				34100		,			
2127				34200		,PT7--	OVERPRINT TEST--	A ROW OF ALTERNATING M'S AND	
2128				34300		,	SPACES ARE PRINTED,	OUT TO THE LAST COLUMN AND OVERPRINTED TWICE	
2129				34400		,	A SECOND LINE OF ALTERNATING SPACES AND "a'S" IS THEN		
2130				34500		,	SENT 3 TIMES AS THE FIRST LINE THIS IS FOLLOWED		
2131				34600		,	BY A THIRD AND FINAL LINE OF ALTERNATING '&'		
2132				34700		,	AND SPACES		
2133				34800		,			
2134				34900		,XXXXXXXXXX			
2135				35000					
2136	011054	000007		35100	PT7	7		, TEST NUMBER	
2137	011056	011266		35200		PT10		, NEXT TEST	
2138	011060	104016		35300		PRTHDR		, PRINT MESSAGE	
2139	011062	012703	000002	35400	1\$	MOV	#2, R3	, 2 COUNT TO R3	
2140	011066	013701	000652	35500	2\$	MOV	WIDTH, R1	, NO OF COLUMNS TO R1	
2141	011072	012700	000115	35600	3\$	MOV	#115, R0	, "M" TO R0	
2142	011076	104015		35700		PRINTC		, SEND IT	
2143	011100	005301		35800		DEC	R1	, END OF LINE	
2144	011102	001404		35900		BEQ	4\$	, BRANCH IF YES	
2145	011104	004737	007570	36000		JSR	PC, SPC	, SEND SPACE	
2146	011110	005301		36100		DEC	R1	, END OF LINE?	
2147	011112	001367		36200		BNE	3\$	, BRANCH IF NO	
2148	011114	022703	000002	36300	4\$	CMP	#2, R3	, TEST R3	
2149	011120	001003		36400		BNE	6\$	, BRANCH IF NOT FIRST TIME	
2150	011122	104022		36500	5\$	CR		, SEND CR	
2151	011124	005303		36600		DEC	R3	, DECREASE LINE COUNTER	
2152	011126	000757		36700		BR	2\$	, REPEAT LINE	
2153	011130	005703		36800	6\$	TST	R3	, THIRD TIME?	
2154	011132	001373		36900		BNE	5\$	, BRANCH IF NOT	
2155	011134	104012		37000		CRLF		, NEXT LINE	
2156	011136	005723		37100		TST	(R3)+	, REPEAT COUNTER TO R3	
2157	011140	013701	000652	37200	7\$	MOV	WIDTH, R1	, COLUMN COUNT TO R1	
2158	011144	004737	007570	37300	8\$	JSR	PC, SPC	, SEND SPACE	
2159	011150	005301		37400		DEC	R1	, DECREASE COLUMN COUNT	
2160	011152	001405		37500		BEQ	9\$	, BRANCH IF 0, END OF LINE	
2161	011154	012700	000100	37600		MOV	#100, R0	, "a" TO R0	
2162	011160	104015		37700		PPINTC		, SEND IT	
2163	011162	005301		37800		DEC	R1	, DECREASE COLUMN COUNT	
2164	011164	001367		37900		BNE	8\$	, BRANCH IF NOT 0 (NOT END)	
2165	011166	022703	000002	38000	9\$	CMP	#2, R3	, END OF LINE, FIRST TIME?	
2166	011172	001003		38100		BNE	11\$	, BRANCH IF NOT	
2167	011174	104022		38200	10\$	CR		, SEND CR	
2168	011176	005303		38300		DEC	R3	, DECREASE LINE COUNTER	
2169	011200	000757		38400		BP	7\$	, REPEAT LINE	
2170	011202	005703		38500	11\$	TST	P3	, TEST IF THIRD REPEAT	
2171	011204	001373		38600		BNE	10\$	, BRANCH IF NOT	
2172	011206	104012		38700		CRLF		, DO NEXT LINE	
2173	011210	005723		38800		TST	(R3)+	, LINE REPEAT COUNTER TO R3	
2174	011212	013701	000652	38900	12\$	MOV	WIDTH, R1	, COLUMN COUNT TO R1	
2175	011216	012700	000046	39000	13\$	MOV	#46, R0	, "8" TO R0	
2176	011222	104015		39100		PRINTC		, SEND IT	
2177	011224	005301		39200		DEC	R1	, DECREASE COLUMN COUNT	
2178				39300					
2179	011226	001404		39400		BEQ	14\$	, BRANCH IF END	
2180	011230	004737	007570	39500		JSR	PC, SPC	, SEND SPACE	

2181	011234	005301		39600		DEC	R1	, DECREASE COLUMN COUNT
2182	011236	001367		39700		BNE	13\$	, BRANCH IF NOT END
2183	011240	022703	000002	39800	14\$	CMP	#2, R3	, TEST IF FIRST TIME
2184	011244	001003		39900		BNE	16\$	, BRANCH IF =2, FIRST TIME
2185	011246	104022		40000	15\$	CR		, SENT CR
2186	011250	005303		40100		DEC	R3	, DECREASE REPEAT COUNTER
2187	011252	000757		40200		BR	12\$	, PRINT LINE AGAIN
2188	011254	005703		40300	16\$	TST	R3	, TEST IF END, R3=0
2189	011256	001373		40400		BNE	15\$	, BRANCH IF NOT END
2190	011260	104012		40500		CRLF		, SEND CR, LF
2191	011262	104005		40600		CHAIN		, CHAIN TO NEXT TEST
2192	011264	000676		40700		BP	1\$, REPEAT TEST

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2194 40900 ,XXXXXXXXXX
2195 41000 ,
2196 41100 ,PT10-- PRINTING FREQUENCY TEST-- 120 H'S ARE PRINTED ON 4 LINES
2197 41200 , 30 PER LINE. THE TEST IS SUCH THAT BETWEEN THE FIRST AND SECOND
2198 41300 , "H" A 30 MSEC DELAY IS INTRODUCED THIS DELAY IS THEN INCREASED
2199 41400 , BETWEEN CHARACTERS OUT TO 60 CHARACTERS IN AN EXPONENTIAL
2200 41500 , MANNER THE DELAY IS THEN DECREASED IN THE SAME MANNER OUT TO THE
2201 41600 , 120TH CHARACTER. THIS DELAY IS CALCULATED AS FOLLOWS,
2202 41700 ,
2203 41800 , NEW DELAY = OLD DELAY + OR - ( OLD DELAY/16 + OLD DELAY/128 )
2204 41900 ,
2205 42000 ,XXXXXXXXXX
2206 42100 ,
2207 011266 000010 42200 PT10 10 , TEST NUMBER
2208 011270 011424 42300 PT11 , NEXT TEST
2209 011272 104016 42400 PRTHDR , TYPE MESSAGE
2210 011274 012701 000036 42500 15 MOV #36,R1 , SET R1=30
2211 011300 012702 000170 42600 MOV #120,R2 , SET CHAR COUNT = 120
2212 011304 012737 000036 011322 42700 MOV #30,R3+2 , SET UP DELAY VALUE
2213 011312 012700 000110 42800 25 MOV #110,R0 , "H" TO R0
2214 011316 104015 42900 PRINTC , SEND IT
2215 011320 012700 000036 43000 35 MOV #30,R0
2216 011324 104010 43100 DELAY , DELAY
2217 011326 005301 43200 DEC R1 , DEC. COUNT OF CHARS PER LINE
2218 011330 001426 43300 BEQ 65 , BRANCH IF 0, END OF LINE
2219 011332 005302 43400 45 DEC R2 , DECREMENT CHAR COUNTER
2220 011334 001430 43500 BEQ 75 , BRANCH IF END
2221 011336 013704 011322 43600 MOV 35+2,R4 , GET OLD DELAY
2222 011342 006204 43700 ASR R4 , CAL 1/16 OF OLD DELAY
2223 011344 006204 43800 ASR R4
2224 011346 006204 43900 ASR R4
2225 011350 006204 44000 ASP R4
2226 011352 010405 44100 MOV R4,R5 , SAVE 1/16 IN P5
2227 011354 006204 44200 ASR R4 , CAL 1/128 OF OLD DELAY
2228 011356 006204 44300 ASR R4
2229 011360 006204 44400 ASR R4
2230 011362 060405 44500 ADD R4,R5 , 1/16 +1/128 TO R5
2231 011364 022702 000074 44600 CMF #60,R2 , TEST WHICH HALF OF THE 120 CHARS
2232 011370 003403 44700 BLE 55 , BRANCH IF LT OR EQ 60
2233 011372 160537 011322 44800 SUB R5,35+2 , GT 51, DECREASE DELAY BY 34 MEC
2234 011376 000745 44900 BR 25 , GO PRINT AGAIN
2235 011400 060537 011322 45000 55 ADD R5,35+2 , LT HALF WAY, ADD DELAY OF 34 MEC
2236 011404 000742 45100 BR 25 , GO PRINT AGAIN
2237 011406 104012 45200 65 CRLF , SEND CRLF
2238 011410 012701 000036 45300 MOV #36,R1 , SET R1=30
2239 011414 000746 45400 BR 45
2240 011416 104012 45500 75 CRLF , SEND CR,LF
2241 011420 104005 45600 CHAIN , CHAIN TO NEXT TEST
2242 011422 000724 45700 BR 15 , REPEAT TEST

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2244 45900 ,XXXXXXXXXX
2245 46000 ,
2246 46100 ,PT11-- RIBBON FEED TEST-- THIS TEST PRINTS A SINGLE COLUMN OF X'S
2247 46200 , (24 LINES) DOWN THE LEFT MARGIN OF THE PAGE
2248 46300 , VISUALLY CHECK THE RIBBON FEED MECHANISM FOR PROPER OPERATION
2249 46400 ,
2250 46500 ,XXXXXXXXXX
2251 46600 ,
2252 46700 ,
2253 011424 000011 46800 PT11 11 , TEST NUMBER
2254 011426 011456 46900 PT12 , NEXT TEST
2255 011430 104016 47000 PRTHDR , TYPE MESSAGE
2256 011432 012701 000030 47100 15 MOV #30,R1 , SET R1=24(10), LINE COUNT
2257 011436 012700 000130 47200 25 MOV #130,R0 , SET CHAR = X
2258 011442 104015 47300 PRINTC , PRINT X
2259 011444 104012 47400 CRLF , SEND CR-LF
2260 011446 005301 47500 DEC R1 , DECREMENT LINE COUNT
2261 011450 001372 47600 BNE 25 , CONTINUE IF NOT DONE TEST
2262 011452 104005 47700 CHAIN , CHAIN TO NEXT TEST
2263 011454 000766 47800 BP 15 , REPEAT TEST
2264 47900 ,
2265 48000 ,
2266 48100 ,
2267 48200 ,XXXXXXXXXX
2268 48300 ,
2269 48400 ,PT12-- PRINTER BELL TEST-- THE LAST TEST IN THE
2270 48500 , PRINTER TEST SEQUENCE THIS TEST OUTPUTS
2271 48600 , EIGHT BELL SIGNALS TO THE PRINTER
2272 48700 ,
2273 48800 ,
2274 48900 ,XXXXXXXXXX
2275 49000 ,
2276 011456 000012 49100 PT12 12 THIS TEST
2277 011460 007402 49200 PTO , NEXT TEST
2278 011462 104016 49300 PRTHDR , TYPE HEADER
2279 011464 012701 000010 49400 PT12A MOV #10,R1 , COUNTER TO R1
2280 011470 012700 000007 49500 MOV #7,R0 , BELL TO R0
2281 011474 104015 49600 15 PRINTC , SEND IT
2282 011476 005301 49700 DEC R1 , DECREMENT COUNT
2283 011500 001375 49800 BNE 15 , BRANCH IF NOT ZERO
2284 011502 104014 49900 LF ,
2285 011504 012700 003720 50000 MOV #3720,R0 , DELAY 2 SEC BEFORE RESTARTING
2286 011510 104010 50100 DELAY ,
2287 011512 013700 000042 50200 MOV @#42,R0 , CHECK IF UNDER ACT11 OR XXDP
2288 011516 001405 50300 BEQ HERE , CONTINUE TEST SEQUENCE
2289 011520 000240 50400 NOP , A RESET WAS FORMERLY HERE
2290 011522 004710 50500 LOGICAL JSR PC,(R0) ,
2291 011524 000240 50600 NOP ,
2292 011526 000240 50700 NOP ,
2293 011530 000240 50800 NOP ,
2294 011532 104005 50900 HERE CHAIN , CHAIN TO NEXT TEST
2295 011534 000753 51000 BR PT12A , REPEAT TEST

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2297				51200	,XXXXXXXXXX		
2298				51300	,		
2299				51400	,PT17-- LIFE TEST		
2300				51500	,		
2301				51600	,		
2302				51700	,		
2303				51800	,		
2304				51900	,		
2305				52000	,		
2306				52100	,XXXXXXXXXX		
2307				52200			
2308	011536	000017		52300	PT17B 17		, TEST NUMBER
2309	011540	011536		52400	PT17B		, NEXT TEST
2310	011542	000137	011576	52500	JMP PT17D		, CONTINUE
2311	011546	000017		52600	PT17 17		, TEST NUMBER
2312	011550	011536		52700	PT17B		, NEXT TEST
2313	011552	005037	012114	52800	CLR PASCNT		, CLEAR PASS COUNT
2314	011556	013704	000652	52900	MOV WIDTH,R4		, INITIALIZE R4
2315	011562	012737	000001 012112	53000	MOV #1,DIRTN		, AND DIRECTION OF PRECESS
2316	011570	104016		53100	PRTHDR		
2317	011572	104007		53200	T,PEM		, PRINT COLUMN # MMSG
2318	011574	014112		53300	HDRO		
2319	011576	012703	000041	53400	PT17D MOV #41,R3		, SET START CHAR
2320	011602	005237	012114	53500	INC PASCNT		
2321	011606	023727	012114 000031	53600	CMF PASCNT,#31		, DO 31 TIMES
2322	011614	001003		53700	BNE 20\$		, BRANCH IF NOT DONE
2323	011616	012737	000001 012114	53800	MOV #1,PASCNT		, START OVER
2324	011624	012700	014025	53900	20\$ MOV #PASMES,R0		, SET MMSG ADDR
2325	011630	013701	012114	54000	MOV PASCNT,R1		, # TO CONVERT
2326	011634	012702	000002	54100	MOV #2,R2		, # DIGITS
2327	011640	104023		54200	BTOASC		, CONVERT PASCNT TO ASCII
2328	011642	013701	000652	54300	1\$ MOV WIDTH,R1		, SET COLUMN COUNT
2329	011646	010300		54400	2\$ MOV R3,R0		, GET CHARACTER
2330	011650	004737	011764	54500	JSR PC,CKPOS		, TIME TO INSERT PASS # ?
2331	011654	104015		54600	PRINTC		, SEND CHAR
2332	011656	005301		54700	DEC P1		, DECREMENT COUNT
2333	011660	003372		54800	BGT 2\$		, BRANCH IF NOT DONE
2334	011662	004737	012032	54900	JSR PC,ADJP4		, ADJUST R4 POINTER
2335	011666	104012		55000	CRLF		
2336	011670	012702	000005	55100	MOV #5,R2		, SET OVERPRINT COUNT
2337	011674	013701	000652	55200	3\$ MOV WIDTH,R1		, SET COLUMN COUNT
2338	011700	010300		55300	4\$ MOV R3,R0		, GET CHARACTER
2339	011702	004737	011764	55400	JSR PC,CKPOS		, TIME TO INSERT PASS # ?
2340	011706	104015		55500	PRINTC		, SEND CHAR
2341	011710	005301		55600	DEC R1		, DECREMENT COUNT
2342	011712	003372		55700	BGT 4\$		, BRANCH IF NOT DONE
2343	011714	104022		55800	CR		, SEND CR
2344	011716	005302		55900	DEC R2		, DONE OVERPRINTS ?
2345	011720	001365		56000	BNE 3\$		, NO CONTINUE
2346	011722	004737	012032	56100	JSR PC,ADJP4		, ADJUST R4 POINTER
2347	011726	104014		56200	LF		, SEND LF
2348	011730	005203		56300	INC R3		, SET NEXT CHAR
2349	011732	022703	000177	56400	CMF #177,R3		, DONE CHAR SET ?
2350	011736	001341		56500	BNE 1\$		, NO CONTINUE
2351	011740	004737	012032	56600	JSR PC,ADJP4		, OFFSET POINTER 2 PLACES
2352	011744	004737	012032	56700	JSR PC,ADJP4		, TO RETAIN M-CIAL ALIGNMENT

2353	011750	004737	012032	56800	JSR	PC,ADJR4	, THROUGH END OF PASS
2354	011754	104007		56900	TYPEM		, TYPE END OF PASS MMSG
2355	011756	014006		57000	ENDPAS		
2356	011760	104005		57100	CHAIN		, REPEAT TEST
2357	011762	000705		57200	BR	PT17D	
2358				57300			

2360				57500					
2361	011764	020401		57600	CKPOS	CMP	R4,R1		, IS IT TIME TO INSERT PASS # ?
2362	011766	001020		57700		BNE	15		, BRANCH IF NO
2363	011770	012700	000040	57800		MOV	#40, R0		, PRINT A SPPCE
2364	011774	104015		57900		PRINTC			
2365	011776	113700	014025	58000		MOVB	PASMES, R0		, PRINT MSG OF PASS COUNT
2366	012002	104015		58100		PRINTC			
2367	012004	113700	014026	58200		MOVB	PASMES+1, R0		
2368	012010	104015		58300		PRINTC			
2369	012012	012700	000040	58400		MOV	#40, R0		, PRINT A SPACE
2370	012016	104015		58500		PRINTC			
2371	012020	162701	000003	58600		SUB	#3, R1		, ADJUST R1 3 POSITIONS
2372	012024	062716	000002	58700		ADD	#2, (SP)		, ADJUST RETURN PC OVER PRINTC
2373	012030	000207		58800	15	PTS	PC		
2374				58900					
2375	012032	005737	012112	59000	ADJP4	TST	DIRTN		, TEST DIRECTION OF PRECESS
2376	012036	001013		59100		BNE	15		, BR IF LEFT
2377	012040	005204		59200		INC	R4		, INCREASE POSITION CNTP
2378	012042	020437	000652	59300		CMP	R4, WIDTH		, IS R4 > WIDTH ?
2379	012046	101420		59400		BLOS	35		, BR IF NOT GREATER
2380	012050	013704	000652	59500		MOV	WIDTH, R4		, CHANGE DIRECTION
2381	012054	005304		59600		DEC	R4		TO
2382	012056	012737	000001 012112	59700		MOV	#1, DIRTN		LEFT
2383	012064	000411		59800		BR	35		
2384	012066	005304		59900	15	DEC	R4		, DECREASE POSITION CNTP
2385	012070	020427	000004	60000		CMP	R4, #4	LESS THAN 4 ?	
2386	012074	002401		60100		BLT	25		, BR IF YES
2387	012076	000404		60200		BR	35		, ELSE EXIT
2388	012100	012704	000005	60300	25	MOV	#5, R4		, SET R4 TO POS 5
2389	012104	005037	012112	60400		CLP	DIRTN		, CHANGE DIRECTION TO RIGHT
2390	012110	000207		60500	35	PTS	PC		, EXIT
2391				60600					
2392	012112	000000		60700	DIRTN	WOPD	0		DIPECT, ON OF PRECESS (0=LEFT)
2393				60800					
2394	012114	000000		60900	PASENT	WOPD	0		

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2397          00100          SBTTL LA36 ECHO TESTS
2398          00200          /
2399          00300          /XXXXXXXXXX
2400          00400          /
2401          00500          /E020-- CHARACTER ECHO TEST-- ALL PRINTABLE AND
2402          00600          /      NON-PRINTING CHARACTERS TYPED ON THE KEYBOARD
2403          00700          /      ARE USED TO DRIVE THE PRINTER, ONE CHARACTER AT
2404          00800          /      A TIME. A "RUBOUT" WILL CAUSE THE TEST TO BE
2405          00900          /      TERMINATED
2406          01000          /
2407          01100          /XXXXXXXXXX
2408          01200          /
2409          012116 000020 01300          E020      20          / TEST NUMBER
2410          012120 012166 01400          E021          / NEXT TEST
2411          012122 104016 01500          PRTHDR        / TYPE HEADER
2412          012124 104020 01600          15          READ          / GO WAIT FOR KEYBOARD INPUT
2413          012126 012700 000036 01700          MOV          #30 ,R0    / DELAY FOR HALF DUPLEX
2414          012132 104010 01800          DELAY
2415          012134 022737 000177 000700 01900          CMP          #177,TEMPCH / CHECK IF RUBOUT
2416          012142 001405 02000          BEQ          25          / BRANCH IF YES
2417          012144 104017 02100          PFNT
2418          012146 117777 166442 166444 02200          MOV#B,2TPB    / NO, CHECK PRINTER READY
2419          012154 000763 02300          BP          15          / READY, ECHO CHARACTER
2420          012156 104007 02400          25          TYPEM        / PRINT TERMINATION MESSAGE
2421          012160 014255 02500          ECGEND
2422          012162 104005 02600          CHAIN
2423          012164 000757 02700          BR          15          / CHAIN TO NEXT TEST
2424          02800          / REPEAT TEST
2425          02900          /XXXXXXXXXX
2426          03000          /
2427          03100          /E021-- LINE ECHO TEST, FAST RATE-- THIS TEST WILL
2428          03200          /      CAUSE THE CONTINUAL PRINTING OF "O" AT THE MAXIMUM
2429          03300          /      RATE UNTIL EITHER ANOTHER CHARACTER IS SELECTED
2430          03400          /      BY PRESSING A KEY ON THE KEYBOARD OR TERMINATION BY THE
2431          03500          /      RUBOUT.
2432          03600          /
2433          03700          /XXXXXXXXXX
2434          03800          /
2435          012166 000021 03900          E021      21          / TEST NUMBER
2436          012170 012224 04000          E022          / NEXT TEST
2437          012172 104016 04100          PRTHDR        / TYPE HEADER
2438          012174 012737 000060 000662 04200          E021A  MOV          #60,REPT / CHARACTER TO BE REPEATED 101
2439          012202 013702 000652 04300          15          MOV          WIDTH,R2  / SET COLUMN COUNT
2440          012206 013700 000662 04400          25          MOV          REPT,R0   / GET CHAR
2441          012212 104015 04500          PRINTC        / PRINT CHAR
2442          012214 005302 04600          DEC          P2          / DEC COLUMN COUNT
2443          012216 003373 04700          BGT          25          / FINISH LINE
2444          012220 104012 04800          CPLF
2445          012222 000767 04900          BR          15          / SEND A CF AND LF
    
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2447					05100	,XXXXXXXXXX			
2448					05200	,			
2449					05300	,E022-- LINE ECHO TEST. SLOW RATE-- SAME AS E021 EXCEPT			
2450					05400	, THAT A DELAY IS INTRODUCED BETWEEN CHARACTERS			
2451					05500	, TO PRODUCE A LCV ACTION			
2452					05600	,			
2453					05700	,XXXXXXXXXX			
2454					05800	,			
2455	012224	000022			05900	E022	22		
2456	012226	012476			06000		E023		
2457	012230	104016			06100		PRTHDR		,TYPE HEADER
2458	012232	012737	000060	000662	06200	E022A	MOV	#60,REPT	,LOAD 0 AS INITIAL CHARACTER
2459	012240	013702	000652		06300	15	MOV	WIDTH,R2	,SET COLUMN COUNT
2460	012244	013700	000662		06400	25	MOV	REPT,RO	,GET CHAR
2461	012250	104015			06500		PRINTC		,PRINT CHAR
2462	012252	005302			06600		DEC	R2	,DEC COLUMN COUNT
2463	012254	001404			06700		BEQ	35	,BRANCH IF DONE LINE
2464	012256	012700	003410		06800		MOV	#3410,RO	
2465	012262	104010			06900		DELAY		,DELAY 1 8 SEC
2466	012264	000767			07000		BP	25	,OUTPUT NEW CHAR
2467	012266	104012			07100	25	CFLF		,SEND A CR AND LF
2468	012270	000763			07200		BP	15	

2470				07400	,*****
2471				07500	:
2472				07600	: THIS FOLLOWING TABLE IS USED BY TEST E023
2473				07700	:
2474				07800	,*****
2475				07900	:
2476	012272	052516	020114	08000	MONIC ASCII /NUL /
2477	012276	047523	020110	08100	ASCII /SOH /
2478	012302	052123	020130	08200	ASCII /STX /
2479	012306	052105	020130	08300	ASCII /ETX /
2480	012312	047505	020124	08400	ASCII /EOT /
2481	012316	047105	020121	08500	ASCII /ENQ /
2482	012322	041501	020113	08600	ASCII /ACK /
2483	012326	042502	020114	08700	ASCII /BEL /
2484	012332	051502	020040	08800	ASCII /BS /
2485	012336	052110	020040	08900	ASCII /HT /
2486	012342	043114	020040	09000	ASCII /LF /
2487	012346	052126	020040	09100	ASCII /VT /
2488	012352	043106	020040	09200	ASCII /FF /
2489	012356	051103	020040	09300	ASCII /CR /
2490	012362	047523	020040	09400	ASCII /SO /
2491	012366	044523	020040	09500	ASCII /SI /
2492	012372	046104	020105	09600	ASCII /DLE /
2493	012376	041504	020061	09700	ASCII /DC1 /
2494	012402	041504	020062	09800	ASCII /DC2 /
2495	012406	041504	020063	09900	ASCII /DC3 /
2496	012412	041504	020064	10000	ASCII /DC4 /
2497	012416	040516	020113	10100	ASCII /NAK /
2498	012422	054523	020116	10200	ASCII /SYN /
2499	012426	052105	020102	10300	ASCII /ETB /
2500	012432	040503	020116	10400	ASCII /CAN /
2501	012436	046505	020040	10500	ASCII /EM /
2502	012442	052523	020102	10600	ASCII /SUB /
2503	012446	051505	020103	10700	ASCII /ESC /
2504	012452	051506	020040	10800	ASCII /FS :
2505	012456	051507	020040	10900	ASCII /GS :
2506	012462	051522	020040	11000	ASCII /RS :
2507	012466	051525	020040	11100	ASCII /US :
2508	012472	050123	020040	11200	ASCII /SP
2509				11300	
2510				11400	EVEN

2512				11600	,XXXXXXXXXX	
2513				11700	,	
2514				11800	,E023-- CHARACTER CODE TEST-- ANY CHARACTER SELECTED	
2515				11900	, WILL BE ECHOED ALONG WITH ITS OCTAL CODE	
2516				12000	, A MNEMONIC WILL BE PRINTED INSTEAD OF THE CHARACTER	
2517				12100	, IF IT IS A NON-PRINTING CHARACTER	
2518				12200	, THE PARITY OF THE RECEIVED CODE WILL ALSO BE	
2519				12300	, INDICATED AS EITHER EVEN OR ODD	
2520				12400	,	
2521				12500	,XXXXXXXXXX	
2522				12600	,	
2523	012476	000023		12700	E023 23	, TEST NUMBER
2524	012500	013020		12800	E024	, NEXT TEST
2525	012502	104016		12900	PRTHDR	, TYPE HEADER
2526	012504	104020		13000	15 READ	, GO WAIT FOR CHARACTER
2527	012506	012700	000036	13100	MOV #30, R0	, DELAY FOR HALF DUPLEX
2528	012512	104010		13200	DELAY	
2529	012514	023727	000700 000041	13300	CMP TEMPCH, #41	, TEST IF CHAR IS PRINTABLE
2530	012522	103015		13400	BHIS 35	, BRANCH IF IT IS
2531	012524	004737	012660	13500	JSR PC, STRLN	, STORE CODE INTO MESSAGE
2532	012530	113700	000700	13600	MOVB TEMPCH, R0	, GET CODE AGAIN
2533	012534	006300		13700	ASL R0	, MULT BY 2
2534	012536	006300		13800	ASL R0	, MULT BY 4
2535	012540	062700	012272	13900	ADD #MONIC, R0	, ADD ADDR OF MNEMONIC TABLE
2536	012544	004737	012736	14000	JSR PC, MOVNUM	, MOV MNEMONIC TO MESSAGE
2537	012550	104000		14100	25 TYPE	, TYPE CODE AND MNEMONIC
2538	012552	014304		14200	E023M	, ADDRESS OF MESSAGE
2539	012554	000753		14300	BR 15	, GO WAIT FOR NEXT CHARACTER
2540	012556	023727	000700 000177	14400	35 CMP TEMPCH, #177	, TEST IF CHAR IS A RUBOUT
2541	012564	001421		14500	BEQ 45	, BRANCH IF RUBOUT
2542	012566	012701	013010	14600	MOV #MG24, R1	
2543	012572	113721	000700	14700	MOVB TEMPCH, (R1)+	
2544	012576	112721	000040	14800	MOVB #40, (R1)+	
2545	012602	112721	000040	14900	MOVB #40, (R1)+	
2546	012606	112721	000040	15000	MOVB #40, (R1)+	
2547	012612	004737	012660	15100	JSR PC, STRLN	, STORE CODE INTO MESSAGE
2548	012616	012700	013010	15200	MOV #MG24, R0	, ADDR OF CHAR INTO R0
2549	012622	004737	012736	15300	JSR PC, MOVNUM	, MOVE CHAR INTO MESSAGE
2550	012626	000750		15400	BR 25	, TYPE MESSAGE
2551	012630	004737	012660	15500	45 JSR PC, STRLN	, RUBOUT, CONVERT AND STOR CODE
2552	012634	012700	013014	15600	MOV #MG25, R0	, ADDR OF DEL INTO R0
2553	012640	004737	012736	15700	JSR PC, MOVNUM	, MOVE DEL INTO MESSAGE
2554	012644	104000		15800	TYPE	, TYPE MESSAGE
2555	012646	014304		15900	E023M	, ADDR OF MESSAGE
2556	012650	104007		16000	TYPEN	
2557	012652	014255		16100	ECOEND	
2558	012654	104005		16200	CHAIN	, CHAIN TO NEXT TEST
2559	012656	000712		16300	BR 15	, REPEAT TEST
2560	012660	012702	000003	16400	STRLN MOV #3, R2	, COUNT OF 3 TO R2
2561	012664	012701	014306	16500	MOV #LINES, R1	, ADDR OF MSG TO R1
2562	012670	062701	000003	16600	ADD #3, R1	, POINT TO LAST SPACE IN MSG
2563	012674	013700	000704	16700	15 MOV PCHAR, R0	, MOVE OCTAL CODE TO R0
2564	012700	042700	177770	16800	BIC #177770, R0	, SAVE LS OCTAL CHAR
2565	012704	062700	000060	16900	ADD #60, R0	, MAKE ASCII
2566	012710	110041		17000	MOVB R0, -(R1)	, MOVE INTO MSG
2567	012712	005302		17100	DEC R2	, DECREMENT CHAR COUNTER

2568	012714	001407		17200		BEQ	25	, BRANCH IF 3 MOVED
2569	012716	006237	000704	17300		ASR	PCHAR	, NOT THREE, SHIFT NEXT OCTAL
2570	012722	006237	000704	17400		ASR	PCHAR	, CHARACTER TO THE RIGHT
2571	012726	006237	000704	17500		ASR	PCHAR	,
2572	012732	000760		17600		BR	15	, CONVERT AND STORE NEXT CHAR
2573	012734	000207		17700	25	RTS	PC	, RETURN TO CALLER
2574	012736	012701	014312	17800	MOVNUM	MOV	#LINE5, R1	, ADDR OF LINES IN R1
2575	012742	012702	000004	17900		MOV	#4, R2	, COUNT OF 4 TO R2
2576	012746	112021		18000	15	MOVB	(R0)+, (R1)+	, MOV 4 CHARS TO MMSG AREA
2577	012750	005302		18100		DEC	R2	, DECREMENT COUNTER
2578	012752	001375		18200		BNE	15	, BRANCH IF NOT ALL DONE
2579	012754	105737	000702	18300		TSTB	PARITY	, TEST PARITY FLAG
2580	012760	001003		18400		BNE	25	, BRANCH IF ODD PARITY
2581	012762	012700	014354	18500		MOV	#EVEN, R0	, SET ADDRESS FOR EVEN PARITY MMSG
2582	012766	000402		18600		BR	35	, CONTINUE
2583	012770	012700	014360	18700	25	MOV	#ODD, R0	, SET ADDRESS FOR ODD PARITY MMSG
2584	012774	012702	000004	18800	35	MOV	#4, R2	, COUNT OF 4 TO R2
2585	013000	112021		18900	45	MOVB	(R0)+, (R1)+	, MOVE 4 CHARS TO MMSG AREA
2586	013002	005302		19000		DEC	R2	, DECREMENT COUNTER
2587	013004	001375		19100		BNE	45	, BRANCH IF NOT DONE
2588	013006	000207		19200		RTS	PC	, RETURN
2589				19300				
2590	013010	020040	020040	19400	MG24	ASCII	/ /	, SAVE CHARACTER CODE
2591				19500				
2592				19600		EVEN		
2593				19700				
2594	013014	042504	020114	19800	MG25	ASCII	'DEL	, MNEMONIC F1P PUBOUT
2595				19900				
2596				20000		EVEN		

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2598 20200 ,XXXXXXXXXX
2599 20300 ,E024-- SELECTED PATTERN ECHO TEST-- SELECT 1 TO 256
2600 20400 , CHARACTERS. EACH WILL BE ECHOED
2601 20500 , AND STORED UNTIL THE CNTL/C IS SELECTED
2602 20600 , AT THAT TIME ALL CHARACTERS WILL BE PRINTED AS
2603 20700 , A CONTINUOUS STRING UNTIL EITHER THE RUBOUT IS
2604 20800 , SELECTED TO TERMINATE OR THE CNTL/C IS SELECTED
2605 20900 , AGAIN. A TERMINATING CNTL/C FOLLOWED BY ANOTHER
2606 21000 , CNTL/C WILL ALWAYS CAUSE THE LAST INPUTTED STRING TO
2607 21100 , BE PRINTED A TERMINATING CNTL/C FOLLOWED BY A CHARACTER OTHER THAN A
2608 21200 , RUBOUT WILL CAUSE A NEW STRING TO BE INPUTTED
2609 21300 ,XXXXXXXXXX
2610 21400
2611 013020 000024 21500 E024 24 , TEST NUMBER
2612 013022 013566 21600 E025 , NEXT TEST
2613 013024 104016 21700 PRTHDR , TYPE TEST HEADER
2614 013026 005001 21800 E024B. CLR R1 , CLEAR CHARACTER COUNT
2615 013030 012702 013164 21900 MOV #BUFR,R2 , ADDRESS OF BUFFER TO R2
2616 013034 104020 22000 15 READ , WAIT FOR INPUT
2617 013036 012700 000036 22100 MOV #30 ,R0 , DELAY FOR HALF DUPLEX
2618 013042 104010 22200 DELAY
2619 013044 022737 000177 000700 22300 CMP #177,TEMPCH , TEST IF RUBOUT
2620 013052 001440 22400 BEQ TERM , BRANCH IF RUBOUT
2621 013054 022737 000003 000700 22500 CMP #3,TEMPCH , TEST IF CNTL-C
2622 013062 001413 22600 BEQ OUTPUT , BRANCH IF CNTL-C
2623 013064 020127 000400 22700 CMP R1,#256 , YES, CHECK IF CHAR CNT IS EQ, GT 256
2624 013070 103361 22800 BHIS 15 , BRANCH IF YES, IGNORE CHAR
2625 013072 113722 000700 22900 MOVB TEMPCH,(R2)+ , STORE CHAR INTO BUFFER
2626 013076 005201 23000 INC R1 , INCREMENT CHARACTER COUNT
2627 013100 104017 23100 PRNT , CHECK IF PRINTER READY
2628 013102 113777 000700 165510 23200 MOVB TEMPCH,@TPB , ECHO CHAR
2629 013110 000751 23300 BR 15 , GO WAIT FOR NEXT CHAR
2630 23400
2631 23500 , SECTION TO OUTPUT CONTINUOUS STRING
2632 23600
2633 013112 020227 013164 23700 OUTPUT. CMP R2,#BUFR , CHECK IF POINTER IS AT START OF TABLE
2634 013116 001403 23800 BEQ 15 , YES, BRANCH
2635 013120 113722 000700 23900 MOVB TEMPCH,(R2)+ , NO, STORE C IN TABLE
2636 013124 104013 24000 SCPLF , SEND A CR LF
2637 013126 012702 013164 24100 15 MOV #BUFR,R2 , BUFFER ADDRESS TO R2
2638 013132 021227 000003 24200 CMP (R2),#3 , CHECK IF FIRST CHAR IS C
2639 013136 001733 24300 BEQ E024B , YES, LOOK FOR INPUT AGAIN
2640 013140 112200 24400 25 MOVB (R2)+,R0 , GET CHARACTER
2641 013142 020027 000003 24500 CMP R0,#3 , DONE STRING?
2642 013146 001767 24600 BEQ 15 , YES, RESTART STRING
2643 013150 104015 24700 PRINTC , PRINT CHAR
2644 013152 000772 24800 BR 25 , CONTINUE
2645 013154 104007 24900 TERM TYPEM , OUTPUT TERMINATION MESSAGE
2646 013156 014255 25000 EOCEND
2647 013160 104005 25100 CHAIN , CHAIN TO NEXT TEST
2648 013162 000721 25200 BR E024B , REPEAT TEST
2649 013164 000003 25300 BUFR 3 , INITIALIZE FIRST CHAR AS CNTL-C IN TABLE
2650 013166 000400 25400 BLKB 256 , 256 CHARACTER BUFFER

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2652					25600				,XXXXXXXXXXXX
2653					25700				,
2654					25800				,E025-- BELL ECHO TEST-- A MESSAGE IS PRINTED AND
2655					25900				, THE TEST WAITS FOR SOME PRINTABLE CHARACTER
2656					26000				, TO BE SELECTED ON THE KEYBCARD (GTO40) THIS
2657					26100				, TEST IS VALID ONLY IF THE PAPER WIDTH IS GT 64
2658					26200				, COLUMNS IF LT64 COLUMNS AN ILLEGAL BELL TEST
2659					26300				, MESSAGE IS PRINTED
2660					26400				,
2661					26500				,XXXXXXXXXXXX
2662					26600				,
2663	013566	000025			26700	E025	25		, TEST NUMBER
2664	013570	012116			26800		E020		, NEXT TEST HEADER
2665	013572	104016			26900		PRTHDR		, PRINT HEADER
2666	013574	023727	000652	000101	27000	15	CMF	WIDTH, #101	, TEST IF COLUMN COUNT IS EQ, GT 64
2667	013602	103427			27100		BLO	45	, BRANCH IF NOT
2668	013604	104007			27200		TYPEN		, TYPE TEST MMSG
2669	013606	014130			27300		E025MA		
2670	013610	000402			27400		BR	35	, WAIT FOR CHAR
2671	013612	104000			27500	25	TYPE		, TYPE TEST MMSG ON TERM CHAR PCVD ON
2672	013614	014130			27600		E025MA		
2673	013616	104020			27700	35	READ		, WAIT FOR OPERATOR RESPONSE
2674	013620	012700	000036		27800		MOV	#30 , RD	, DELAY FOR HALF DUPLEX
2675	013624	104010			27900		DELAY		
2676	013626	023727	000700	000040	28000		CMF	TEMPCH, #40	, TEST IF PRINTABLE
2677	013634	103770			28100		BLO	35	, BRANCH IF NON-PRINTABLE
2678	013636	022737	000177	000700	28200		CMF	#177, TEMPCH	, CHECK IF CHAR IS RUBCUT
2679	013644	001410			28300		BEQ	55	, BRANCH IF YES
2680	013646	104017			28400		PRNT		, CHECK IF PRINTER IS READY
2681	013650	113777	000700	164742	28500		MOVB	TEMPCH, @TPB	, PRINT CHAR (BELL SHOULD SOUND)
2682	013656	104013			28600		SCRLF		, SEND A CRLF
2683	013660	000754			28700		BR	25	, REPEAT
2684	013662	104007			28800	45	TYPEN		, TYPE ERROR MESSAGE
2685	013664	014230			28900		E025MB		
2686	013666	104007			29000	55	TYPEN		, PRINT TERMINATION
2687	013670	014255			29100		E0END		
2688	013672	104005			29200		CHAIN		, EXIT TO NEXT TEST
2689	013674	000737			29300		BP	15	, REPEAT TEST

2691

2692					00100		SBTTL	MISC	DIAGNOSTIC	MESSAGES
2693					00200					
2694	013676	001007	007600	040515	00300	STARTM	ASCII	<7><2><ACRLF><17>	/MAINDEC-11-DZLAC-C/<ACRLF>	
	013704	047111	042504	026503						
	013712	030461	042055	046132						
	013720	041501	041455	200						
2695	013725	114	031501	020066	00400		ASCII	/LA36 TERMINAL DIAGNOSTIC/<ACRLF>		
	013732	042524	046522	047111						
	013740	046101	042040	040511						
	013746	047107	051517	044524						
	013754	100103								
2696	013756	046104	030461	023040	00500		ASCIZ	/DL11 & KL11 INTERFACE/<ACRLF><12>		
	013764	045440	030514	020061						
	013772	047111	042524	043122						
	014000	041501	100105	000012						
2697	014006	005200	047105	020104	00600	ENDPAS	ASCII	<ACRLF><12>/END OF PASS /		
	014014	043117	050040	051501						
	014022	020123	040							
2698	014025	060	030060	100060	00700	PASMES	ASCIZ	/0000/<ACRLF><12>		
	014032	000012								
2699	014034	041600	047117	047523	00800	DL11S	ASCII	<ACRLF>/CONSOLE & /		
	014042	042514	023040	040						
2700	014047	060	020060	046104	00900	DL11S1	ASCIZ	/00 DL11'S UNDER TEST/<ACRLF><12>		
	014054	030461	051447	052440						
	014062	042116	051105	052040						
	014070	051505	100124	000012						
2701	014076	001007	007600	052012	01000	HDMSG	ASCIZ	<7><2><ACRLF><17><12>/TEST #/		
	014104	051505	020124	000043						
2702	014112	030060	020060	047503	01100	HDRO	ASCIZ	/000 COLUMNS/<ACRLF><12>		
	014120	052514	047115	100123						
	014126	000012								
2703	014130	054524	042520	040440	01200	EO25MA	ASCII	/TYPE ANY PRINTABLE CHARACTER		
	014136	054516	050040	044522						
	014144	052116	041101	042514						
	014152	041440	040510	040522						
	014160	052103	051105	040						
2704	014165	101	042116	046040	01300		ASCIZ	/AND LISTEN FOR BELL		
	014172	051511	042524	020116						
	014200	047506	020122	042502						
	014206	046114	027056	027056						
	014214	027056	027056	027056						
	014222	027056	027056	000056						
2705	014230	047200	052117	042440	01400	EO25MB	ASCIZ	<ACRLF>/NOT ENOUGH COLUMNS <ACRLF>		
	014236	047516	043525	020110						
	014244	047503	052514	047115						
	014252	100123	000							
2706	014255	200	041505	047510	01500	EO2END	ASCIZ	<ACRLF>/ECHO TEST TERMINATED <ACRLF>		
	014262	052040	051505	020124						
	014270	042524	046522	047111						
	014276	052101	042105	000200						
2707	014304	020040			01600	EO23M	ASCII	/		
2708	014306	020040	020040		01700	LINE5	ASCII	/ ,MSG FOR TEST EO24		
2709	014312	020040	020040	020040	01800	LINE5A	ASCIZ	/<ACRLF>		
	014320	020040	000200							
2710	014324	007600	051412	046105	01900	MESG3	ASCIZ	<ACRLF>/17 12/ SELECT TEST NUMBER		
	014332	041505	020124	042524						

ACRLF = 000200	CHAINN 001412	E025MA 014130	PRGTAB 002522	START3 000772
ADJR4 012032	CHAINY 001534	E025MB 014230	PRINTC= 104015	STLSPV 003376
ADTENP 004070	CHALT = 104006	ERR 003310	PRNT = 104017	STLSRV 003346
APEAD = 104021	CHLT 000720	ERRHLT 003344	PRTHDR= 104016	STPCHV= 104004
ATO 005276	CKPOS 011764	ERROR = 104001	PRTY4 = 000200	STPPA 003414
ATOX 005300	CNTLSW 000634	EVEN 014354	PRTY7 = 000340	STPRA 003364
AT1 005330	CNTR 000716	FORWD = 104024	PSW = 177776	STRDRV= 104003
AT10 005754	CNVCTR 004062	FORWDA 003604	PT0 007402	STRLN 012660
AT11 006012	CONADD 000602	FORWDB 003612	PT1 007456	SWREG 000176
AT12 006052	CONIT 003700	FSTDL 000632	PT10 011266	TEMP 000712
AT13 006126	CONSET 003704	HDRMSG 014076	PT11 011424	TEMPCH 000700
AT14 006206	CONVEC 000604	HDR0 014112	PT12 011456	TENPWR 004066
AT15 006272	COUNT3 000666	HERE 011532	PT12A 011464	TERM 013154
AT16 006372	CR = 104022	ICTR 000660	PT17 011546	TESTC 002460
AT17 006440	CRBUF 000646	IDEZ 007706	PT17B 011536	TIMER 000672
AT2 005362	CRLF = 104012	INCHK 000710	PT17D 011576	TKB 000614
AT20 006510	CTRA 000650	LEVEL 000654	PT2 007600	TKLVL 000624
AT21 006602	CURTST 000676	LF = 104014	PT3 010164	TKS 000612
AT22 006702	DELAY = 104010	LFCNT 000706	PT4 010304	TKVTR 000622
AT23 007010	DIGIT 004064	LINE3 010444	PT5 010462	TPB 000620
AT24 007122	DIRTN 012112	LINES 014306	PTSAL 010630	TPBS 003774
AT25 007222	DISPRE 000174	LINE5A 014312	PT6 010666	TPLVL 000630
AT26 007300	DLADR 000606	LOGICA 011522	PT7 011054	TPS 000616
AT3 005414	DLCNT 000656	LS111 = 001000	READ = 104020	TPSS 003772
AT4 005446	DLNR 000610	MACHER 000004	READC = 104025	TPVTR 000626
AT5 005536	DLY 003426	MESG3 014324	READ1 004202	TTYCTL= 104011
AT6 005614	DL11S 014034	MG24 013010	REF 010414	TTY1 001776
AT7 005704	DL11S1 014047	MG25 013014	REPT 000662	TTY1B 002062
BIT0 = 000001	ECOEND 014255	MONIC 012272	RESTRT 003506	TYP 003076
BIT1 = 000002	EHALT = 104002	MOVNUM 012736	RTNNO 000636	TYPE = 104000
BIT10 = 002000	EHLT 003336	NEXT 001654	SAVR6 003504	TYPEN = 104007
BIT11 = 004000	EMTINT 002722	NEXT1 001674	SCOPSW= 040000	TYPM 003154
BIT12 = 010000	EMTTAB 002776	NITRSW= 004000	SCOPTR 000642	WAITF 001700
BIT13 = 020000	ENDPAS 014006	NOSWR 014407	SCRLF = 104013	WIDTH 000652
BIT14 = 040000	END2 001332	NPCODE 010137	SELHLT 000734	XCSR 000670
BIT15 = 100000	END2A 001320	NXTST 000640	SK P 001630	SAREAD 003630
BIT2 = 000004	END3 001262	ODD 014360	SPARET 003072	SBTASC 003776
BIT3 = 000010	END4 001334	OPEN = 000000	SPBOT 000600	SCR 003216
BIT4 = 000020	E020 012116	OPMSG 014364	SFC 007570	SCRLF 003204
BIT5 = 000040	E021 012166	OUTPUT 013112	SPCNT 000674	SFORWD 003552
BIT6 = 000100	E021A 012174	PARITY 000702	CPSP 007550	SLF 003206
BIT7 = 000200	E022 012224	PASCNT 012114	SP2 007562	SPRHDR 003226
BIT8 = 000400	E022A 012232	PASMES 014025	SR 000714	SPRNT 004304
BIT9 = 001000	E023 012476	PCHAR 000704	START 001010	SPRTC 004314
BRCTR 000664	E023M 014304	PFAIL 003450	STAPTM 013676	SREAD 004102
BTOASC= 104023	E024 013020	POPSP = 005726	STARTX 001024	SREADC 004174
BUFR 013164	E024B 013026	POPSP2= 022626	STAPT1 000736	SSCLPF 003132
CHAIN = 104005	E025 013566	PRGID 000644	STAPT2 000754	= 014463

ABS 014463 000

ERRORS DETECTED 0

DZLACD, DZLACC DOC=DZLACD DIAG

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DZLACD P11 16-NOV-77 15 57 SYMBOL TABLE

SEQ 0075
SEQ 0098

PUN-TIME 2 6 2 SECONDS
PUN-TIME RATIO 249/9=27 2
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