

IDENTIFICATION

Product Code: MAINDEC-08-DILAC-B-D
Product Name: LA180 Printer Diagnostic
Date: July 1976
Maintainer: Diagnostic Group
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1.0 ABSTRACT

The diagnostics for the LA180 Printer are designed to exercise all areas of the printer, simulating worse case conditions to detect both mechanical and electrical faults. Additional facilities within the diagnostic program will aid in isolation of any fault conditions detected.

Operation of the diagnostic program will be controlled from the processor switch register or from an available console device. The operator will be given as much control over the operation of the program as possible while trying to keep the control scheme simple.

This diagnostic program was designed to run in 4K or less of memory.

2.0 REQUIREMENTS

2.1 Equipment

This diagnostic was written to run on all models of the PDP-8 processor with a LA180 printer using the standard LA180 parallel interface. The program will use a standard console device, if available, for operator instructions and error reporting. It is suggested that a console device be used when running this diagnostic but it is not required if the CPU has a hardware switch register. If any non-standard IOT codes are used for either the LA180 or the console device, change the IOT codes at PTRIOT and IOTSEL before starting the program.

The diagnostic was made capable of running with either of two interfaces in June of 1976. The first being the standard LA180 parallel interface, and the second being the PDP-8A Option Board 1's 12 Bit Parallel I/O Interface.

2.2 Storage

This program uses most of 4K of memory without affecting the area used by the Binary Loader.

2.3 Preliminary Programs

All applicable PDP-08 diagnostics should be run successfully on the processor.

3.0 LOADING PROCEDURE & INITIALIZATION

Load the LA180 diagnostic program following normal procedures.

If a hardware switch register does not exist or to use the software switch register control when a hardware switch register is available, set bit 0 of location 21 to 0 before starting the diagnostic. Location 20 will then be used as the software switch register (SSR). Make sure the SSR is set as desired before starting the program. Refer to Section 5.3 for a description of the dynamic SSR routine operation.

If the PDP-8A Option Board 1's 12 Bit Parallel I/O interface is to be used instead of the standard LA180 Parallel interface, set bit 1 of location 21 to 1 before starting the diagnostic. If the PDP-8A Option Board 1's 12 Bit Parallel I/O interface is to be used, set switch S1-9 on the PDP-8A Option Board 1 to the "ON" position.

Refer to the Test Address Table in the program listing for details on changing the printing test sequence or deleting tests from the diagnostic.

4.0 STARTING PROCEDURES

Starting Addresses:

- 200 = General Start;
Run operator intervention tests then enter printing test sequence.
- 201 = Restart;
Enter printing test sequence directly skipping operator intervention tests.
- 202 = Go directly to console terminal keyboard control - select test.

Starting at 200 will run the entire diagnostic package. The program will first execute the operator intervention tests and then enter the printing test sequence where it will loop continuously. Starting at 201 (the restart) will skip the operator intervention tests and enter the printing test sequence directly. Starting at 202 will cause the program to go directly to console keyboard control if a console device exists, otherwise, the program will halt waiting for a test selection from the processor switch register. Also, by placing the Halt and Select Test switch up (1) before starting the diagnostic, the diagnostic will halt waiting for a test selection from the processor switch register after initialization of the program.

To start the diagnostic program; set the desired starting address in the switch register and depress load address, set the processor switch register options as desired (see section 5.1), and depress start. The diagnostic program will now run in the manner selected.

5.0 OPERATING PROCEDURES

5.1 Switch Register Controls

The following, basic control functions are available through the use of the switch register.

Switch -----	Position -----	Function -----
00	1 (UP) 0 (DWN)	Stop on Error Continue on Error
01	1 (UP) 0 (DWN)	Inhibit Error Timeout Normal Operation
02	1 (UP) 0 (DWN)	Loop on Test Normal Operation
03	1 (UP) 0 (DWN)	Halt & Select Test Normal Operation
04		Manual Timing - Overall print speed timing
04	1 (UP) 0 (DWN)	Single Char - Scope Routine Full Lines
04-11	# Columns at Start Up.	
06-11	Test Selection During Diag.	
05-11	Char selection for Scope Routine	

5.1.1 Switch 0 - Stop on Error

With this switch up (1), the program will halt or wait for a keyboard on any detected error. When down (0), the program will continue on error if possible.

5.1.2 Switch 1 - Inhibit Error Typeout

Whenever this switch is in the up (1) position, error typeouts will not occur.

5.1.3 Switch 2 - Loop on Test

With this switch up (1), the program will continue to loop on the current test until this switch is placed down (0). After returning this switch to the down (0) position, the test will continue normal operation at the completion of the current test. Thus, whenever this switch is down (0), the program will continue normal operation.

5.1.4 Switch 3 - Halt & Select Test

The program will halt whenever this switch is placed in the up (1) position. At that time, set the desired test number in the proper position in the processor switch register.

To start the normal test sequence with the selected test, place the halt and select test switch down (0) then depress the continue switch.

To run a selected test once and halt, leave the halt and select test switch up (1) and depress continue. The program will execute one complete pass of the selected test, then halt waiting for another test selection. To halt the program during execution of the selected test, place the halt & select test switch down (0) at any time. The program will halt at the completion of the current operation and wait for another test selection.

5.1.5 Switch 4 - Manual Timing

This switch will be used to manually time the overall print speed of the LA180 Printer if a clock option does not exist.

5.1.6 Switch 4 - Single Char/Full Lines Char

This switch will be used to select whether to send only a single character or full lines of characters to the LA180 Printer during Test 61 only.

5.1.7 Selection of Number of Columns

These switches will be used when the program is first started to input the desired, maximum number of columns the diagnostic is to test. The number set must be in octal and be equal to or greater than 2 and less than or equal to 132(10). If the switches are not set within these set limits, the program will default to testing 132(10) columns. Thus, leaving these switches down (000) the program will automatically test the full 132(10) columns.

5.1.8 Test Selection

These switches will be used to select a desired test whenever the halt and select test switch is used to halt the diagnostic program.

5.2 Console Terminal - Keyboard Control

Whenever a console terminal is determined to be available by the program, the diagnostic will be capable of being controlled from the keyboard of the console device. Typing a Rubout (DEL) on the console keyboard at any time will cause the program to stop and print the following message on the console device:

SELECT TEST #:

Type any legal test number followed by one of the following control characters and a carriage return:

Character -----	Function -----
. (Period)	Run test once & return to test selection
L	Loop on selected test
S	Start sequence with selected test

The L and S may be either upper or lower case but test numbers must always be entered as 2 digit numbers.

To reset the desired maximum number of columns, type a CONTROL-C (™C) on the console terminal keyboard at any time, the following message will be typed on the console device:

COLUMNS =

Type in the desired number of columns (in decimal) on the console keyboard followed by a carriage-return. If the selected number is less than 2 or greater than 132(10) the message will be repeated and you must reenter the number of columns. When a correct number is entered, the program will then ask for a test selection as described previously in this section.

To change the number of columns when waiting for a test selection, type a control-C followed by a carriage return. While inputting a test selection or column number the rubout (DEL) key may be used to delete incorrect entries. At all times switch register control will still be effective, even if using console terminal keyboard control.

5.3 Dynamic Software Switch Register Control

Whenever a console terminal is available and a hardware switch register is not available (or it is desired to use the software switch register instead) set bit zero of location 20 to 0 and the program will recognize the following dynamic software switch register control:

Typing a control-G (BEL) at any time during program execution, except when waiting for a test or column number selection, will cause the diagnostic to stop the current test and type the following message on the console device:

SWR = XXXX NEW =

where XXXX is the current contents of the software switch register (SSR) in octal. The software control routine will then await operator action. The operator is then required to type one or more of the legal characters 1) 0-7, 2) line feed <LF>, 3) carriage return <CR>, 4) control-U <"U>. No check is made for character legality. If the input character is not a LF, CR, or "U it is assumed to be an octal digit and will be echoed as the digit that is going to be stored in the switches.

To change the contents of the SSR, the operator simply types the new desired value in octal, leading zeros need not be typed. And terminates the input string with a <CR> or <LF> depending on the program action desired as described below. The input value will be truncated to the last 6 digits typed. At least one digit must be typed on any given input string prior to the terminator before a change to the SSR will occur.

When the input string is terminated with a <CR>, the diagnostic will continue execution from the point at which it was interrupted. If a <CR> is the only thing typed, the program will continue without changing the SSR. If a line feed <LF> is used to terminate the input string, the program will then ask for a test selection as described in Section 5.2.

If a "U is typed at any point in the input string prior to the terminator, the input value will be disregarded and the prompt message will be retyped.

5.4 Error Reporting

If a console terminal exists and the inhibit error typeout switch is down (0), whenever an error is detected the following error message will be printed on the console device:

```
TEST #XX, PC=XXXX, ERROR #XXX, MESSAGE >>>>>>>>>
```

The error message indicates the test number, the location where the error occurred, the error number, and the type of error that occurred. For additional information on any error condition, refer to the program listing.

Whenever a console terminal is not available the Halt on Error switch should be used. After an error occurs and the program halts, examine the contents of ERRPC to find the address where the error occurred and ERRNM to find the error number. The test number will be located in either the hardware or software display depending on CPU type. Then refer to the program listing to determine the type of error that occurred and to find any additional information regarding that error. If needed, the error messages are located near the end of the program listing.

6.0 TEST DESCRIPTIONS

6.1 Operator Intervention Tests

This series of tests consists of all tests normally executed which could possibly require operator intervention. These tests are executed only once each when the diagnostic is first started up. A detailed description of each test follows:

6.1.1 Test 00 - Interface & Control Tests

This test is designed as a command decode and control interface test and includes checkout of the printer interrupt facility. Manual intervention is required to test the various testable non-ready conditions of the printer. Operator instructions will be printed on the console device if available then the program will wait for the operator to complete the action. Depress the space bar on the console keyboard or the continue switch on the CPU if no console device is available to test the next condition when ready. If any unexpected results are encountered, an error message will be printed on the console device if available. (Refer to section 5.3 on Error Reporting.)

Power should be off on the LA180 before starting this test. The program will first test that the printer is not ready with power off. An instruction will then ask for the printer power to be turned on. Turn power on and make sure there is paper in the printer and the printer is off line. The diagnostic will again check that the printer is not ready. An instruction on the console device will next inform the operator to turn the LA180 on line. The program will now check that the printer is ready. The next printed instruction will have the operator force a paper out condition by opening the paper feed tractors and removing the paper from the printer. The diagnostic will check that the printer is not ready. The last instruction will ask to restore the printer to on-line by re-inserting paper and clearing the error condition. Make sure the printer is set to on-line before continuing. The program will test to see that the printer is again ready.

The last half of this test will be performed automatically without further manual intervention required. First, a check will be made to see that the PCLP instruction clears the ready flag. A Rubout (DEL) will then be loaded twice to the printer, once using a PSTB instruction and again using a PCLP instruction, to see if loading the character buffer will clear the ready bit. The test will check that the printer ready bit sets within a reasonable amount of time. The final tests will check the printer interrupt system. A check will be made for unexpected interrupts, and if an interrupt occurs with the printer ready bit set. Then a check will be made to see that no interrupt occurs with the printer interrupt enabled and the ready bit set, but the CPU interrupt system off.

6.1.2 Test 01 - Top of Form Switch Test

This test checks all positions of the top of form switch. The program will print instructions for the next setting of the top of form switch on the console terminal (if available) and then wait for the operator to complete the action. After setting the switch, depress the space bar of the console device (or continue on the processor if no console device exists) to test that switch position. After checking all positions, the printer output can be visually verified. A line of all dashes is printed as a starting point and then lines are printed to indicate the proper spacing (in inches) from the previous line to that line.

Example:

```
-----  
----- 4.0 INCH FORM FEED -----
```

6.1.3 Test 02 - Print Speed Timing Test

This test is designed to time the LA180 for one full minute while a swirl pattern is printed to the selected maximum number of columns. If a line clock or a programmable clock option is determined to be available by the program, it will be used to automatically time the printer. When neither clock option is available, manual timing will be used and operating instructions will be typed on the console device if it is available. Whichever method of timing is used, at the end of one full minute the approximate print speed will be printed on the LA180 and also on the console device (if available). Remember, the print speed is directly related to the number of columns being printed. Also, the contents of one location in memory will have to be changed if the line frequency is 50 HZ. and a clock option is being used for timing.

6.2 Printing Tests

These tests are designed as a test of the printing mechanism and the associated control logic. At the beginning of each test, a test header will indicate the test number being executed. The test program continually monitors for proper operation of the line printer after each printer operation has been completed, through the printer "ready" line and the setting of the "demand" flag. It should be noted, however, that the "demand" return from the printer is conditional upon the printer "ready". Since the processor can only detect the current condition of the "ready" and "demand" return lines it is necessary to examine the print patterns produced by the various test routines. Each pattern has been chosen for ease of visual verification. Detailed descriptions of each test pattern appears in the description of the following test routines.

6.2.4 Test 23 - Character Generator Test

This test checks the space and all 94 printable characters (ASCII codes 040 to 176) by printing a single line, 30 characters long, of each character.

Example:

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
.
.
AAAAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBBBBBBBB
```

6.2.5 Test 24 - Non-Printable Character Test

This test is designed to test the LA180 handling of non-printable characters and to exercise the full range of the character storage buffer. The test pattern produced will be a 30 line swirl pattern, consisting of full lines of the entire printable character set. If this test is looped on, the pattern will continue a full swirl, rather than only 30 lines and then repeating. As the swirl pattern is produced, a group of printable characters will be shifted (in increments depending on the number of columns being tested) through the full range of the character buffer, starting at the end of the buffer. Non-printable characters will be used to fill the character buffer before and after the group of printable characters for each printed line. All non-printable characters having no control function within the LA180 will be used.

Example:

```
!"#$%&'()*+,-./0123456789:;<=>?@ABC....
!"#$%&'()*+,-./0123456789:;<=>?@ABCD....
!"#$%&'()*+,-./0123456789:;<=>?@ABCDE....
```

6.2.6 Test 25 - Buffer Test

This test is designed to test the character storage buffer in the LA180 for proper operation. This test will produce four lines of print with 2 blank lines between the first and second lines. The lines printed will also serve as a check of printing the correct column width. The patterns are described for 132 columns but will be shortened accordingly for narrower test widths. Before the first line is stored, 16 E's will be loaded into the buffer. Then a rubout (177) will be sent to check that a rubout will clear the buffer. Before each of the last three lines is printed and before the blank lines between the first and second printed lines, the character buffer will be filled with all E's. Thus, an E printed anywhere in the test pattern indicates an error.

Thus, the column number may be read directly by reading the numbers in any given column on the last three lines, from top to bottom.

Column 132 would be

1
3
2

[illegible]

```
00000000000000000000000000000000.....111
0000000001111111111222222222233.....333
1234567890123456789012345678901.....012
```

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

Row 1	E - SP
Row 2	SP - 0
Row 3	M - SP
Row 4	SP - #

Examples:

E E E E E E E E E E
 @ @ @ @ @ @ @ @ @ @
 M M M M M M M M M M
 # # # # # # # # # #

6.2.8 Test 27 - Multiple Line Feed Test

This test checks the line feed capability of the printer by sending various groups of line feeds interspaced with reference lines. The number printed at the left margin of the reference line indicates the number of line feeds that follow. Each line will contain a string of dashes as reference points for measuring, the first and last being 132 characters long (maximum) and the middle lines being 30 characters long.

Example:

```
01-----
02-----

04-----

08-----
  \
  > 7 blank lines
  /
16-----
  \
  > 15 blank lines
  /
32-----
  \
  > 31 blank lines
  /
00-----
```

6.2.9 Test 30 - Ribbon Feed Test

This test checks the ribbon feed mechanism by printing a single column of 24 lines of X's down the left hand margin of the page. Visually check for proper operation of the ribbon feed mechanism during this test.

Example:

```
X
X
X
.
.
.
X
X
X
```

6.2.10 Test 31 - Bell Test

This test is designed to check the bell code logic and the timing sequence of the micro logic. The test will print "Bell Test" interspaced with bell codes between characters and the following carriage return and line feed functions. A total of five bells will be sounded. This test will also audibly indicate an end of a complete pass through the printing test sequence.

Example:

```
<BEL> BELL <BEL> <SP> TEST <BEL> <CR>
<BEL> <LF> <BEL> <CR>
```

6.3 Maintenance Aids

These tests are provided as additional debugging and exercising aids for the LA180 printer. A detailed description of each test follows.

6.3.1 Test 60 - Life Test

This test runs continuously and is run as an individual, special test, and 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 completion of each pass through the entire printable character set, the pass count will be printed on the LA180.

Time for a complete pass, with 132 columns is approximately 10 minutes.

Example:

```

AAAAAAAAAAAAAAAAAAAA
AAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBB
BBBBBBBBBBBBBBBBBBBB

```

6.3.2 Test 61 - Scope Drive Routine

The purpose of this test is to provide the operator with a short but comprehensive scope driver routine for use in trouble shooting the vinter and interface control logic with an oscilloscope.

Depending on the setting of the single char/full line switch of the switch register (switch 04) this test will either continually send whatever character is set in the switch register to the line printer, or only send it once and halt. When continuously sending characters, a line feed will be inserted after the maximum column count is reached to print the line. When sending single characters, depress continue to send the character set in the processor switch register. To resume sending continuous characters, place the single char/full line control switch down, set the desired character, and depress continue. To stop sending continuously place the single char/full line switch up and the program will halt waiting for a character selection. When sending individual characters or if sending non-printable characters, no line feeds or carriage returns will be inserted by the program.

6.3.3 Test 62 - Line Print Test

This test continuously prints full lines of whatever character is typed on the console keyboard. To change characters, reselect this test and type another character. An error message will be printed on the LA180 if this test is selected and a console terminal does not exist.

6.3.4 Test 63 - Character Print Test

This test loads whatever character is typed on the console keyboard to the LA180, character by character. All typed characters are echoed to the console device as they are loaded to the LA180. Extra carriage returns or line feeds are echoed to the console device to avoid overprinting lines. If this test is selected and a console terminal does not exist an error message will be printed on the LA180.

1 /MAINDEC-08-DILAC-B-L
2
3 /LA180 PRINTER DIAGNOSTIC
4
5 /COPYRIGHT (C) 1975, 1976, DIGITAL EQUIPMENT CO., MAYNARD, MA. 01754
6
7 /AUTHOR: ROBERT BAKER/BRUCE HANSEN
8
9
10
11
12
13
14

/SWITCH REGISTER OPTIONS:

/SWITCH NUMBER	DESCRIPTION
/ 00	STOP ON ERROR
/ 01	INHIBIT ERROR TYPING
/ 02	LOOP ON TEST
/ 03	HALT AND SELECT TEST
/ 04	SINGLE CHAR/FULL LINES - SCOPE ROUTINE
/	MANUAL TIMING - PRINT SPEED TEST
/ 04 - 11	# COLUMNS AT START UP
/ 06 - 11	TEST SELECTION
/ 05 - 11	CHARACTER SELECTION - SCOPE ROUTINE

35	0000	*0	
37			
38	0000	0000	0
39	0001	5402	JMP I ISRV
40	0002	0347	ISRV, IERROR
41			
42	0010		*10
43			
44	0010	0000	AUTPTR, 0
45			
46	0020		*20
47			
48	0020	0000	SWITCH, 0000
49	0021	4003	PARAM, 4003
50	0022	0000	0000
51			
52			/FLAGS, POINTERS, & STORAGE
53			
54	0023	0000	TSTNM, 0
55	0024	0000	ERRNM, 0

56	0025	0000	ERRPC, 0	/ERROR LOCATION
57	0026	0000	WIDTH, 0	/NEGATIVE NUMBER OF COLUMNS
58				
59	0027	0660	PTRTOT, 0660	/LA180 IOT CODE - 0XX0
60	0030	0304	IOTSEL, 0304	/TTY IOT CODES, XMT - RCV
61				
62	0031	0000	CHAR, 0	/CHARACTER STORAGE
63	0032	0000	CHAR2, 0	
64	0033	0000	SAVE, 0	/TEMP STORAGE
65	0034	0000	COUNT, 0	/WORKING COUNTERS
66	0035	0000	COUNT2, 0	
67	0036	0000	LPCNT, 0	
68	0037	0000	CKCNT, 0	
69	0040	0000	PASCNT, 0	
70	0041	0000	TABPTR, 0	/TABLE POINTER
71	0042	0000	TSTPTR, 0	/TEST ADDRESS FROM TABLE
72	0043	0000	MSGADR, 0	/MESSAGE ADDRESS STORAGE
73				
74	0044	0000	ONES, 0	/CONVERSION COUNTERS
75	0045	0000	TENS, 0	
76	0046	0000	HUNDS, 0	
77	0047	0000	THOUS, 0	
78				
79				
80	0050	0000	STRONE, 0	/ONE RUN FLAG - SW REG CNTRL
81	0051	0000	TRONE, 0	/ONE RUN FLAG - KYBD CNTRL
82	0052	0000	TLOOP, 0	/LOOP ON TEST FLAG - KYBD CNTRL
83				
84	0053	0000	TPFLG, 0	/TERMINAL AVAILABLE FLAG
85				/0 = NO, 7777 = YES --- (SET BY THE PROGRAM)
86				
87	0054	0000	CKFLAG, 0	/CLOCK OPTION FLAG
88				/0 = NONE AVAILABLE, OR DO NOT USE AVAILABLE OPTION
89				
90				/IF DK8EA OR DK8EC IS AVAILABLE -
91				/SET CKFLAG DEPENDING ON CLOCK FREQ.
92				
93				/7773 = 50 HZ - DK8EC
94				/7766 = 50 HZ LINE FREQ. - DK8EA
95				/7764 = 60 HZ LINE FREQ. - DK8EA
96				/7716 = 500 HZ - DK8EC
97				/7014 = 5 KHZ - DK8EC
98				
99				/TAGS
100				
101	0055	4000	TTYPE, RTYPE	
102	0056	4060	TLOAD, RLOAD	
103	0057	3123	THOLD, RHOLD	
104	0060	4105	TWLOAD, RMLoad	
105	0061	4200	TPRINT, RPRINT	
106	0062	4262	TPRHDR, RPRHDR	
107	0063	3600	TERROR, RERROR	
108	0064	3107	TCHECK, RCHECK	
109	0065	3017	TEXIT, REXIT	
110	0066	3405	TKBDST, KYBDST	

```

111 0067 3054 TSELECT, SELECT
112 0070 4000 TAT, TAT
113 0071 2716 TMOT, MOT
114 0072 2600 TKSF, KSF
115 0073 2600 TKCC, KCC
116 0074 2610 TKRS, KRS
117 0075 2613 TKRB, KRB
118 0076 2616 TTSF, TSF
119 0077 2623 TTCF, TCF
120 0100 2626 TTPC, RTPC
121 0101 2631 TPLS, RLS
122 0102 2634 TPKSF, RPSKF
123 0103 2646 TPCLF, RPCLF
124 0104 2656 TPSTB, RPSTB
125 0105 2670 TPSIE, RPSIE
126 0106 2702 TPCLP, RPCLP
127 0107 3200 TKBFG, KYBDF
128 0110 3465 TTSEL, TSEL
129 0111 4400 READ, TREAD
130 0112 4451 TREADQ, READQ
131 0113 4510 CHKOC, TCKOUT
132 0114 4520 CHKNR, TCHKNR
133 0115 4022 GOUT, OUT
134 0116 0333 TDELAY, DELAY
135 0117 3713 TCNVRT, CNVRT
136 0120 3000 TCKSRV, CKSRV
137 0121 0322 TGTSW, RGTSW
138 0122 3660 PDIGIT, RPDIGT
139 0123 3665 TPOCT, POCT
140 0124 4504 LREADT, READT
141 0125 0347 LIERR, IERROR

```

/CONSTANTS

```

145 0126 0002 P2, 0002
146 0127 0007 P7, 0007
147 0130 0010 P10, 0010
148 0131 0012 P12, 0012
149 0132 0015 P15, 0015
150 0133 0036 P36, 0036
151 0134 0040 P40, 0040
152 0135 0041 P41, 0041
153 0136 0055 P55, 0055
154 0137 0057 P57, 0057
155 0140 0060 P60, 0060
156 0141 0072 P72, 0072
157 0142 0077 P77, 0077
158 0143 0100 P100, 0100
159 0144 0134 P134, 0134
160 0145 0177 P177, 0177
161 0146 0200 P200, 0200
162 0147 0204 P204, 0204
163 0150 0377 P377, 0377
164 0151 0400 P400, 0400
165 0152 1000 P1000, 1000

```

```

166 0153 7777 M1, 7777
167 0154 7776 M2, 7776
168 0155 7775 M3, 7775
169 0156 7774 M4, 7774
170 0157 7771 M7, 7771
171 0160 7766 M12, 7766
172 0161 7763 M15, 7763
173 0162 7760 M20, 7760
174 0163 7755 M23, 7755
175 0164 7753 M25, 7753
176 0165 7750 M30, 7750
177 0166 7743 M35, 7743
178 0167 7742 M36, 7742
179 0170 7740 M40, 7740
180 0171 7722 M56, 7722
181 0172 7700 M100, 7700
182 0173 7634 M144, 7634
183 0174 7601 M177, 7601

```

/SUBROUTINE CALL EQUATES

```

187 4455 TYPE=JMS I TTYPE /TYPE ASCII STRING ON CONSOLE
188 5465 EXIT=JMP I TEXT /EXIT TEST
189 4456 LOAD=JMS I TLOAD /LOAD SINGLE CHAR TO LA100
190 4457 HOLD=JMS I THOLD /WAIT FOR OPERATOR
191 4464 CHECK=JMS I TCHECK /CHECK FOR CONTROL
192 4463 ERROR=JMS I TERROR /ERROR REPORT
193 4461 PRINT=JMS I TPRINT /PRINT ASCII STRING ON LA100
194 4460 MLOAD=JMS I TMLOAD /LOAD MULTIPLE CHARS TO LA100
195 4521 GETSW=JMS I TGETSW /GET SWITCH REGISTER SETTING
196 4462 PPTHDR=JMS I TPRHDR /PRINT TEST HEADER ON LA100

```

/LINE PRINTER INSTRUCTIONS

```

201 6661 PskF=6661 /SKIP ON CHAR FLAG
202 6662 PCLF=6662 /CLEAR CHAR FLAG
203 6664 PSTB=6664 /LOAD BUFFER
204 6665 PSIE=6665 /ENABLE INTERRUPT
205 6666 PCLP=6666 /CLEAR FLAG & LOAD CHAR

```

/DK8-EA & DK8-EC CLOCK INSTRUCTIONS

```

210 6131 CLEI=6131 /ENABLE CLOCK INTERRUPT
211 6132 CLDI=6132 /DISABLE CLOCK INTERRUPT
212 6133 CUSK=6133 /SKIP ON CLOCK FLAG, AND CLEAR FLAG

```

/PDP-8A OPTION BOARD #1 PARALLEL I/O INSTRUCTIONS

```

216 6570 DBST=6570 /SKIP ON DATA ACCEPTED AND CLEAR DATA
217 /DATA ACCEPTED AND DATA AVAILABLE
218 6571 DBSK=6571 /SKIP ON DATA READY
219 6572 DBRD=6572 /READ DATA INTO AC 0-11
220 6573 DBCF=6573 /CLEAR DATA READY ISSUE DATA ACCEPTED OUT

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221      6574      DRD=6574      /LOAD AC 0-11 INTO BUFFER AND TRANSMIT
222      6575      DBSE=6575      /SET PARALLEL I/O INTERRUPT ENABLE
223      6576      DCE=6576      /CLF= PARALLEL I/O INTERRUPT ENABLE
224      6577      DRSS=6577      /ISSUE DATA STROBE PULSE
225
226
227
228      /STARTING ADDRESSES
229
230      0200      *200
231
232      0200 5210      JMP      START      /GENERAL DIAGNOSTIC STARTING ADR
233
234      0201 5213      JMP      RESTRT     /RESTART, SKIP OPR INTERVENTION TESTS
235
236      0202 5217      JMP      CONTRL    /GO DIRECTLY TO OPERATOR CONTROL
237
238      0210      *210
239
240      0210 7300      START, CLA CLL      /CLEAR
241      0211 3023      DCA      TSTNM     /SET TEST NUMBER TO ZERO
242      0212 5221      JMP      STARTX    /INITIALIZE
243      0213 7300      RESTRT, CLA CLL    /CLEAR
244      0214 1377      TAD      (20)      /GET CONSTANT
245      0215 3023      DCA      TSTNM     /SET TEST #20
246      0216 5221      JMP      STARTX    /INITIALIZE
247      0217 7240      CONTRL, CLA CMA    /SET AC = -1
248      0220 3023      DCA      TSTNM     /SET CONTROL FLAG
249      0221 6002      STARTX, IOF        /INTERRUPTS OFF
250      0222 6132      CLDI
251      0223 7300      CLA CLL
252      0224 4505      JMS I      TPSIE
253      0225 4521      GETSW
254      0226 0150      AND      P377      /GET SW REG
255      0227 7041      CIA              /SAVE BITS 04-11
256      0230 3026      DCA      WIDTH    /NEGATE VALUE
257      0231 1126      TAD      P2       /STORE # COLUMNS
258      0232 1026      TAD      WIDTH    /CHECK COLUMN SELECTION
259      0233 7740      SMA SZA CLA      /# COLUMNS < 2 ?
260      0234 5241      JMP      START2    /YES, SET TO 132(10)
261      0235 1147      TAD      P204     /NO, CHECK AGAIN
262      0236 1026      TAD      WIDTH
263      0237 7700      SMA CLA          /# COLUMNS > 132(10) ?
264      0240 5243      JMP      .+3      /NO, CONTINUE
265      0241 1376      TAD      (-204)   /SET COLUMN COUNT TO 132(10)
266      0242 3026      DCA      WIDTH    /STORE VALUE
267      0243 3052      DCA      TLOOP   /CLEAR PROGRAM FLAGS
268      0244 3050      DCA      STRONE
269      0245 3051      DCA      TRONE
270      0246 1125      TAD      LIERR    /RESET INTERRUPT ERROR
271      0247 3002      DCA      ISRV
272      0250 1145      TAD      P177     /SET LA180 READY FLAG
273      0251 4506      JMS I      TPCLP
274      0252 4471      JMS I      TMIOT   /SET IOTS FOR TTY & PRINTER
275      0253 4501      JMS I      TTLS   /CLEAR FLAG

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276      0254 4333      JMS      DELAY    /WAIT 150 MILLISECONDS
277      0255 4476      JMS I      TTSP    /SKIP IF FLAG IS SET
278      0256 7610      SKP CLA          /AC = 0, NO TERMINAL
279      0257 7240      CLA CMA          /AC = -1, TERMINAL EXISTS
280      0260 3053      DCA      TPFLG    /STORE TERMINAL FLAG
281      0261 1053      TAD      TPFLG    /CHECK FOR CONSOLE
282      0262 7640      SZA CLA          /SKIP IF NONE
283      0263 5266      JMP      STARTB   /CONTINUE
284      0264 4461      PPRINT
285      0265 5231      NCMSG
286      0266 7410      STARTB, SKP
287      0267 5274      JMP      STARTS   /PRINT NO CONSOLE MSG ON LA180
288      0270 4455      TYPE
289      0271 4716      HEADER
290      0272 1375      TAD      (NOP)    /TYPE TITLE MESSAGE ON TERMINAL
291      0273 3266      DCA      STARTB   /SKIP TITLE MSG THERE AFTER
292      0274 1023      STARTS, TAD      TSTNM
293      0275 7700      SMA CLA          /GET TEST #
294      0276 5306      JMP      START7   /WANT CONTROL?
295      0277 1053      START9, TAD      TPFLG /NO, CONTINUE
296      0300 7640      SZA CLA          /YES, TERMINAL THERE
297      0301 5466      JMP I      TKBDST  /YES, GO TO KYBD CONTROL
298      0302 5467      JMP I      TSELCT  /NO, DEFAULT TO SW REG CONTROL
299      0303 7640      START8, SZA CLA
300      0304 5277      JMP      START9   /GO TO CONTROL IF NO TEST IN TABLE
301      0305 2023      ISZ      TSTNM
302      0306 4521      START7, GETSW
303      0307 0151      AND      P400     /INC TEST #
304      0310 7640      SZA CLA          /GET SW REG
305      0311 5467      JMP I      TSELCT  /WANT TEST SELECTION?
306      0312 1070      TAD      TTAT     /YES, GO TO TEST SELECTION HALT
307      0313 1023      TAD      TSTNM    /GET TABLE ADR
308      0314 3041      DCA      TABPTR   /ADD TEST #
309      0315 1441      TAD I      TABPTR  /STORE POINTER
310      0316 7550      SNA SPA          /GET TEST ADDRESS
311      0317 5303      JMP      START8   /TEST IN TABLE?
312      0320 3042      DCA      TSTPTR   /NO, INC TEST ADR
313      0321 5442      JMP I      TSTPTR  /YES, STORE TEST ADR
314
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318
319      /ROUTINE TO GET SWITCH SETTINGS
320
321      0322 0000      RGETSW, 0
322      0323 7300      CLA CLL          /CLEAR AC AND LINK
323      0324 1021      TAD      PARAM    /CHECK IF HAVE HARDWARE SWR
324      0325 7710      SPA CLA          /SKIP IF NO
325      0326 5331      JMP      .+3
326      0327 1020      TAD      SWITCH  /GET SOFTWARE SWITCHES
327      0330 5722      JMP I      RGETSW  /RETURN
328      0331 7604      LAS
329      0332 5722      JMP I      RGETSW  /GET HARDWARE SWITCHES
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331 /ROUTINE TO DELAY ABOUT 150 MILLISECONDS
332 /USING INSTRUCTION TIMING.
333
334 0333 0000 DELAY, 0
335 0334 7300 CLA CLL /CLEAR
336 0335 3345 DCA DELAY0 /SET DELAY COUNT
337 0336 1374 TAD (-10
338 0337 3346 DCA DELAY1
339 0340 2345 ISZ DELAY0 /DELAY
340 0341 5340 JMP ,=1
341 0342 2346 ISZ DELAY1
342 0343 5340 JMP ,=3
343 0344 5733 JMP I DELAY /RETURN
344
345 0345 0000 DELAY0, 0000 /DELAY COUNTS
346 0346 7770 DELAY1, 7770
347
348
349
350
351 /ROUTINE TO REPORT UNEXPECTED INTERRUPTS DURING EXECUTION
352
353 0347 4463 IERROR, ERROR /REPORT ERROR
354 0350 0012 12
355 0351 5400 JMP I 0 /RETURN & CONTINUE IF POSSIBLE
356 0374 7770
357 0375 7000
358 0376 7574
359 0377 0020 0400
360
361 /OPERATOR INTERVENTION TESTS
362
363 /TEST 0 - INTERFACE & CONTROL TESTS
364
365 /TEST READY BIT, PRINTER OFF LINE - POWER OFF
366
367 0400 4455 TEST0, TYPE /TYPE INSTRUCTIONS
368 0401 5250 TMSG0
369 0402 4457 HOLD /WAIT FOR OPERATOR
370 0403 4464 T0AC, CHECK /CHECK FOR CONTROL
371 0404 7300 CLA CLL /CLEAR AC AND LINK
372 0405 1145 TAD P177 /SEND RUBOUT
373 0406 4506 JMS I TPCLP
374 0407 4516 JMS I TDELAY /DELAY 150 MSEC FOR FLAG
375 0410 4502 JMS I TPSKF /SKIP ON READY
376 0411 5215 JMP T0AA /OK, READY CLEAR
377 0412 4463 ERROR /READY SET, POWER OFF
378 0413 0001 1
379 0414 5203 JMP T0AC /RETEST
380
381 /TEST READY BIT, PRINTER OFF LINE - POWER ON
382
383 0415 4455 T0AA, TYPE /TYPE INSTRUCTIONS, TURN POWER ON
384 0416 5270 TMSG1

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385 0417 4457 T0AB, HOLD /WAIT FOR OPERATOR
386 0420 4464 CHECK /CHECK FOR CONTROL
387 0421 7300 CLA CLL /CLEAR AC AND LINK
388 0422 1145 TAD P177 /SEND RUBOUT
389 0423 4506 JMS I TPCLP
390 0424 4516 JMS I TDELAY /DELAY 150 MSEC FOR FLAG
391 0425 4502 JMS I TPSKF /SKIP ON READY
392 0426 5232 JMP T0B /OK, READY CLEAR
393 0427 4463 ERROR /READY SET, PRINTER OFF LINE
394 0430 0002 2
395 0431 5220 JMP T0AB /RETEST
396
397 /TEST READY BIT, PRINTER ON LINE
398
399 0432 4455 T0B, TYPE /TYPE INSTR, TURN ON LINE
400 0433 5302 TMSG2
401 0434 4457 HOLD /WAIT FOR OPERATOR
402 0435 4464 T0C, CHECK /CHECK FOR CONTROL
403 0436 7300 CLA CLL /CLEAR AC AND LINK
404 0437 1145 TAD P177 /SEND RUBOUT
405 0440 4506 JMS I TPCLP
406 0441 4516 JMS I TDELAY /DELAY 150 MSEC FOR FLAG
407 0442 4502 JMS I TPSKF /SKIP ON READY
408 0443 5253 JMP ,+10 /READY NOT SET
409 0444 4777 JMS OP1CHK /CHECK TO SEE IF PARALLEL I/O
410 0445 0447 ,+2 /WAS PARALLEL I/O
411 0446 5256 JMP T0E /OK-READY SET
412 0447 1145 TAD P177 /RESET DATA ACCEPTED FLAG
413 0450 4506 JMS I TPCLP /GO LOAD THE BUFFER
414 0451 4516 JMS I TDELAY
415 0452 5256 JMP T0E
416 0453 4463 ERROR /CONTINUE THE TEST
417 0454 0003 3 /READY CLEAR, PRINTER ON LINE
418 0455 5235 JMP T0C /RETEST
419
420 /TEST PAPER OUT SWITCH
421
422 0456 4455 T0E, TYPE /TYPE INSTR, PAPER OUT
423 0457 5320 TMSG3
424 0460 4457 HOLD /WAIT FOR OPERATOR
425 0461 4464 T0F, CHECK /CHECK FOR CONTROL
426 0462 4461 PRINT
427 0463 5440 LF /SEND LF
428 0464 4516 JMS I TDELAY /DELAY FOR 150 MSEC
429 0465 4502 JMS I TPSKF /SKIP ON READY
430 0466 5272 JMP T0H /OK, READY CLEAR
431 0467 4463 ERROR /READY SET, PAPER OUT, ON LINE
432 0470 0004 4
433 0471 5261 JMP T0F /RETEST
434
435 /TEST ABILITY TO CLEAR ERROR CONDITION
436
437 0472 4455 T0H, TYPE /TYPE INSTR, RESET & ON LINE
438 0473 5335 TMSG4
439 0474 4457 HOLD /WAIT FOR OPERATOR

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440 0475 4464 T01, CHECK /CHECK FOR CONTROL
441 0476 7300 CLA CLL /CLEAR AC AND LINK
442 0477 1145 TAD P177 /SEND RUBOUT
443 0480 0506 JMS I T01LP /DELAY 150 MSEC FOR FLAG
444 0481 4516 JMS I T01LAY /SKIP ON READY
445 0482 4502 JMS I T0SKF /OK, READY SET
446 0483 7410 SKP /READY NOT SET
447 0484 5310 JMP T0K /RETEST
448 0485 4463 ERROR
449 0486 0405 5
450 0487 5275 JMP T01 /RETEST

/TEST ABILITY TO CLEAR READY FLAG
451
452
453
454 0510 4464 T0K, CHECK /CHECK FOR CONTROL
455 0511 4503 JMS I TPCLF /CLEAR FLAG
456 0512 4502 JMS I T0SKF /SKIP ON CHAR FLAG
457 0513 5317 JMP T0L /OK, FLAG CLEAR
458 0514 4463 ERROR /FLAG DID NOT CLEAR
459 0515 0406 6
460 0516 5310 JMP T0K /RETEST

/TEST THAT SENDING CHAR WILL RESET READY FLAG
461
462
463
464 0517 4464 T0L, CHECK /CHECK FOR CONTROL
465 0520 7300 CLA CLL /GET RUBOUT
466 0521 1145 TAD P177 /LOAD CHAR
467 0522 4504 JMS I TPSTB /WAIT 150 MSEC
468 0523 4516 JMS I T0LAY /SKIP ON CHAR FLAG
469 0524 4502 JMS I T0SKF /SKIP ON CHAR FLAG
470 0525 7410 SKP
471 0526 5332 JMP T0M /READY DID NOT SET
472 0527 4463 ERROR /RETEST CLEAR & SET FLAG
473 0530 0407 7
474 0531 5310 JMP T0K /RETEST

/TEST AGAIN USING SINGLE INSTR
475
476
477
478 0532 4464 T0M, CHECK /CHECK FOR CONTROL
479 0533 4776 JMS SETSKP /GO SETUP FOR SKIP IOT TO BE USED
480 0534 1145 TAD P177 /SET RUBOUT
481 0535 4506 JMS I TPCLP /LOAD CHAR
482 0536 6661 T0MIOT, PSKF/DBST /SKIP ON CHAR FLAG
483 0537 5343 JMP T0N /OK, FLAG CLEAR
484 0540 4463 ERROR /FLAG DID NOT CLEAR
485 0541 0410 10
486 0542 5332 JMP T0M /RETEST
487 0543 4516 JMS I T0LAY /DELAY 150 MSEC
488 0544 4502 JMS I T0SKF /SKIP ON CHAR FLAG
489 0545 7410 SKP
490 0546 5352 JMP T00 /OK, FLAG SET
491 0547 4463 ERROR /FLAG DID NOT SET
492 0550 0411 11
493 0551 5332 JMP T0M /RETEST
494

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495 /CHECK FOR UNEXPECTED INTERRUPTS
496
497 0552 4464 T00, CHECK /CHECK FOR CONTROL
498 0553 7300 CLA CLL
499 0554 1375 TAD (T0P /SET INT RETURN
500 0555 3002 DCA ISRV
501 0556 4473 JMS I TKCC
502 0557 4477 JMS I TTCF /CLEAR CONSOLE PTR FLAG
503 0560 4503 JMS I TPCLF /CLEAR LA180 READY BIT
504 0561 7300 CLA CLL
505 0562 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
506 0563 6001 ION /ENABLE INTERRUPT SYSTEM
507 0564 7000 NOP
508 0565 7000 NOP
509 0566 6002 IOF /DISABLE INTERRUPT SYSTEM
510 0567 5773 JMP I LT00 /OK, CONTINUE
511 0570 4463 T0P, ERROR /UNEXPECTED INTERRUPT
512 0571 0412 12
513 0572 5352 JMP T00 /RETEST
514 0573 0600 LT00, T00
515 0575 0570
516 0576 1540
517 0577 3142
518 PAGE
519
520 /CHECK THAT NO INTERRUPT OCCURS WITH READY BIT CLEAR
521
522 0600 4464 T0Q, CHECK /CHECK FOR CONTROL
523 0601 7300 CLA CLL
524 0602 1377 TAD (T0R /SET INTERRUPT RETURN
525 0603 3002 DCA ISRV
526 0604 4473 JMS I TKCC
527 0605 4477 JMS I TTCF /CLEAR CONSOLE PTR FLAG
528 0607 7201 JMS I TPCLF /CLEAR LA180 READY BIT
529 0610 4505 JMS I TPSIE /ENABLE LA180 INTERRUPT
530 0611 6001 ION /ENABLE INTERRUPT SYSTEM
531 0612 7000 NOP /DELAY 2 INSTRUCTION TIMES
532 0613 7000 NOP
533 0614 6002 IOF /DISABLE INTERRUPT SYSTEM
534 0615 7300 CLA CLL
535 0616 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
536 0617 5225 JMP T0S
537
538 0620 7300 T0R, CLA CLL /DISABLE LA180 INTERRUPT
539 0621 4505 JMS I TPSIE /INTERRUPT WITH READY BIT CLEAR
540 0622 4463 ERROR
541 0623 0413 13
542 0624 5200 JMP T0Q /RETEST
543
544 /CHECK THAT INTERRUPT OCCURS WITH READY BIT SET
545
546 0625 4464 T0S, CHECK /CHECK FOR CONTROL
547 0626 7300 CLA CLL
548 0627 1376 TAD (T0N /SET INTER RETURN

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549 0630 3002 DCA ISRV
550 0631 1145 TAD P177 /SEND CHAR TO SET FLAG
551 0632 4506 JMS I TPCLP /GO CHECK FOR PARALLEL I/O
552 0633 4775 JMS OP1CHK /ON PARALLEL I/O - GO DELAY
553 0634 0640 .+4 /SKIP ON READY
554 0635 4502 JMS I TPSKF /WAIT FOR READY
555 0636 5235 JMP .-1
556 0637 7410 SKP
557 0640 4516 JMS I TDELAY /CLEAR CONSOLE PTR FLAG
558 0641 4473 JMS I TKCC
559 0642 4477 JMS I TTCF
560 0643 7201 CLA IAC
561 0644 4505 JMS I TPSIE /ENABLE LA180 INTERRUPT
562 0645 6001 ION /ENABLE INTERRUPT SYSTEM
563 0646 7000 NOP /WAIT 2 INSTR TIMES
564 0647 7000 NOP
565 0650 6002 IOF /DISABLE INTERRUPT SYSTEM
566 0651 7300 CLA CLL
567 0652 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
568 0653 4463 ERROR /DID NOT INTER, READY SET
569 0654 0014 14
570 0655 5225 JMP T0S /RETEST
571 0656 7300 CLA CLL
572 0657 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
573
574 /TEST NO INTERRUPT OCCURS WITH LA180 INTERRUPT ENABLED, READY SET,
575 /BUT CPU INTERRUPT SYSTEM OFF.
576
577 0660 4464 T0U, CHECK /CHECK FOR CONTROL
578 0661 7300 CLA CLL
579 0662 1374 TAD (T0V /SET INTER RETURN ADR
580 0663 3002 DCA ISRV
581 0664 1145 TAD P177 /SEND CHAR TO SET FLAG
582 0665 4506 JMS I TPCLP /GO CHECK FOR PARALLEL I/O
583 0666 4775 JMS OP1CHK /ADDRESS FOR PARALLEL I/O - DELAY
584 0667 0673 .+4 /WAIT FOR READY
585 0670 4502 JMS I TPSKF
586 0671 5270 JMP .-1
587 0672 7410 SKP
588 0673 4516 JMS I TDELAY /DELAY TO ALLOW FLAG TO SET
589 0674 4473 JMS I TKCC
590 0675 4477 JMS I TTCF /CLEAR CONSOLE PTR FLAG
591 0676 7201 CLA IAC
592 0677 4505 JMS I TPSIE /ENABLE LA180 INTERRUPT
593 0700 7000 NOP /WAIT 2 INSTR TIMES
594 0701 7000 NOP
595 0702 7300 CLA CLL
596 0703 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
597 0704 1125 TAD LIERR /SET INTERRUPT ERROR ADR
598 0705 3002 DCA ISRV
599 0706 5465 EXIT /EXIT TEST
600
601 0707 7300 T0V, CLA CLL
602 0710 4505 JMS I TPSIE /DISABLE LA180 INTERRUPT
603 0711 4463 ERROR /INTERRUPT WITH SYSTEM DISABLED

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604 0712 0015 15
605 0713 5260 JMP T0U /RETEST
606
607 /TEST 1 - TOP OF FORM SWITCH TEST
608
609 0714 4462 TEST1, PRTHDR /PRINT TEST HEADER
610 0715 1373 TAD (T1TAB
611 0716 3041 DCA TABPTR /STORE TABLE POINTER
612 0717 1165 TAD M30
613 0720 3034 DCA COUNT /SET DASH COUNT
614 0721 1136 TAD P55 /SET DASH CHAR
615 0722 4460 MLOAD /LOAD DASHED LINE
616 0723 4461 PRINT
617 0724 5437 CR /PRINT LINE
618 0725 4455 TYPE /TYPE INSTRUCTIONS
619 0726 5375 TIMSG3 /SET SWITCH SETTING FOR MSG
620 0727 1041 TAD TABPTR
621 0730 3332 DCA .+2
622 0731 4455 TYPE
623 0732 0000 0
624 0733 4455 TYPE /FINISH INSTR
625 0734 5412 TIMSG4
626 0735 4457 HOLD /WAIT FOR OPERATOR
627 0736 4464 CHECK /CHECK FOR CONTROL
628 0737 4461 PRINT /ISSUE FF
629 0740 5442 FF
630 0741 4461 PRINT /PRINT REFERENCE LINE
631 0742 5355 TIMSG1
632 0743 1041 TAD TABPTR /SET FF LENGTH FOR MSG
633 0744 3346 DCA .+2
634 0745 4461 PRINT
635 0746 0000 0
636 0747 4461 PRINT /FINISH MSG
637 0750 5361 TIMSG2
638 0751 2041 ISZ TABPTR /INC TABLE POINTER
639 0752 2041 ISZ TABPTR
640 0753 1441 TAD I TABPTR /CHECK TABLE TO SEE IF DONE
641 0754 7640 SZL CLA
642 0755 5325 JMP T1A /CONTINUE
643 0756 4461 PRINT
644 0757 5440 LF /ADVANCE PAPER
645 0760 5465 EXIT /EXIT
646
647 0773 5447
648 0774 0707
649 0775 3142
650 0776 0656
651 0777 0620
652 1000

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652 /TEST 2 - PRINT SPEED TIMING TEST
653 /
654 /A SWIRL PATTERN IS PRINTED FOR ONE FULL MINUTE
655 /WHILE THE NUMBER OF LINES PRINTED IS COUNTED.
656 /TIMING WILL BE DONE BY DMS-EA OR DMS-EC CLOCK
657

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650 /OPTION IF EITHER IS AVAILABLE AND LOCATION
651 /"CKFLAG" IS PRESET WITH THE TIME COUNT.
652 /IF CKFLAG IS ZERO, MANUAL TIMING WILL BE USED TO
653 /OBTAIN AN APPROXIMATE PRINT TIMING.
654 /IF A HARDWARE SWITCH REGISTER IS NOT AVAILABLE, THIS TEST
655 /CANNOT BE RUN WITHOUT A CLOCK OPTION BEING AVAILABLE.
656 /THE PROGRAM WILL AUTOMATICALLY SKIP THIS TEST IF IT CANNOT BE RUN.
657
658 TEST2, PRTTHR /PRINT TEST HEADER
659 DCA PASCNT /CLEAR PASS COUNT (LINE COUNT)
660 TAD CKFLAG /CLOCK OPTION AVAILABLE?
661 SZA CLA
662 JMP T2C /YES, GO TO CLOCK SET-UP
663 TAD PARAM /HAVE HARDWARE SWITCH REGISTER?
664 SPA CLA
665 JMP T2A /YES, CONTINUE
666 PRINT /NO, PRINT ERROR MSG
667 T2EM
668 TYPE
669 T2EM
670 EXIT /EXIT TEST
671
672 /MANUAL TIMING START-UP
673
674 T2A, TYPE /PRINT INSTRUCTIONS
675 T2M1
676 TYPE
677 T2M2
678 TYPE
679 T2M3
680 GETSW /GET SWITCHES
681 AND P200 /MASK SWITCH 4
682 SNA CLA /START? - SWITCH UP?
683 JMP T2B /NO, WAIT FOR SWITCH TO GO UP
684 JMP T2SP /YES, START PRINTING
685
686 /CLOCK OPTION START-UP
687
688 T2C, TAD (6656 /SET TIME COUNT FOR ONE MINUTE
689 DCA LPCNT
690 TAD TCKSRV
691 DCA ISRV
692 TAD CKFLAG
693 DCA CKCNT
694 JMS I TKCC
695 JMS I TTCF
696 CLA CLL
697 JMS I TPSIE /DISABLE PRINTER INTERRUPT
698 CLEI /SET CLOCK INTERRUPT ENABLE
699 ION /INTERRUPT SYSTEM ON
700
701 /PRINTING ROUTINE FOR TEST 2
702
703 T2SP, CLA IAC /SET START CHAR
704 TAD P40

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713 1046 3032 DCA CHAR2 /SAVE IT
714 1047 1032 T2PA, TAD CHAR2 /GET START CHAR
715 1050 3031 DCA CHAR /SET CHARACTER TO BE LOADED
716 1051 1026 TAD WIDTH /SET COLUMN COUNT
717 1052 3034 DCA COUNT
718 1053 1031 T2PC, TAD CHAR /GET CHAR
719 1054 4456 LOAD /LOAD CHAR
720 1055 2034 ISZ COUNT /INC CHAR COUNT
721 1056 7410 SKP /CONTINUE LINE
722 1057 5270 JMP T2PD /SEND LF IF END OF LINE
723 1060 2031 ISZ CHAR /SET NEXT CHAR
724 1061 1174 TAD M177 /CHECK CHAR
725 1062 1031 TAD CHAR
726 1063 7640 SZA CLA
727 1064 5253 JMP T2PC /OK, CONTINUE
728 1065 1134 TAD P40 /RESET CHAR TO SPACE
729 1066 3031 DCA CHAR /STORE NEW CHAR
730 1067 5253 JMP T2PC /CONTINUE
731 1070 4461 T2PD, PRINT /SEND LF TO PRINT LINE
732 1071 5440 LF
733 1072 2040 ISZ PASCNT /INC LINE COUNT
734 1073 1054 TAD CKFLAG /USING CLOCK?
735 1074 7640 SZA CLA
736 1075 5302 JMP T2PE /YES, BYPASS MANUAL TIMING
737 1076 4521 GETSW /GET SWITCH REGISTER
738 1077 0146 AND P200 /MASK SWITCH 4
739 1100 7650 SNA CLA /STILL UP?
740 1101 5314 JMP T2SPD /NO, EXIT PRINTING ROUTINE - PRINT COUNT
741 1102 2032 ISZ CHAR2 /SET NEW START CHAR (SWIRL)
742 1103 1174 TAD M177 /CHECK CHAR
743 1104 1032 TAD CHAR2
744 1105 7640 SZA CLA
745 1106 5247 JMP T2PA /OK, CONTINUE
746 1107 5244 JMP T2SP /RESET START CHAR
747
748 /ROUTINE TO PRINT NUMBER OF LINES PRINTED
749
750 1110 6002 T2SPDC, IOF /INTERRUPT SYSTEM OFF
751 1111 6132 CLDI /DISABLE CLOCK INTERRUPT
752 1112 1125 TAD LIERR /RESET UNEXPECTED INTERRUPT ERROR
753 1113 3002 DCA ISRV
754 1114 7300 T2SPD, CLA CLL /CLEAR AC AND LINK
755 1115 1145 TAD P177 /GET RUBOUT
756 1116 4456 LOAD /CLEAR LA180 BUFFER
757 1117 4455 TYPE /START MSG
758 1120 5171 PRSP1
759 1121 4461 PRINT
760 1122 5171 PRSP1
761 1123 1054 TAD CKFLAG /CHECK IF USED CLOCK
762 1124 7640 SZA CLA
763 1125 5332 JMP T2S1 /YES, SKIP WORD "APPROX"
764 1126 4455 TYPE /NO, ADD WORD "APPROXIMATE" TO MSG
765 1127 5202 PRSP2
766 1130 4461 PRINT
767 1131 5202 PRSP2

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768 1132 1040 T281, TAD PASCNT /GET LINE COUNT
769 1133 4517 JMS I TCNVRT /CONVRT NUMBER TO ASCII MESS
770 1134 4461 PRINT /PRINT IT
771 1135 5435 CNVMSG
772 1136 4455 TYPE
773 1137 5435 CNVMSG
774 1140 4461 PRINT /PRINT MORE OF MESS
775 1141 5206 PRSP3
776 1142 4455 TYPE
777 1143 5206 PRSP3
778 1144 1026 TAD WIDTH /GET # OF COLUMNS
779 1145 7041 CIA
780 1146 4517 JMS I TCNVRT /CONVERT IT TO ASCII MESS
781 1147 4461 PRINT
782 1150 5435 CNVMSG
783 1151 4455 TYPE
784 1152 5435 CNVMSG
785 1153 4461 PRINT
786 1154 5222 PRSP4 /FINISH MESS & PRINT
787 1155 4455 TYPE
788 1156 5222 PRSP4
789 1157 5465 EXIT /EXIT TEST
790
791 1177 6650 PAGE
792 1200
793 /PRINTING TESTS
794
795
796 /TEST 20 - DATA TRANSFER PATHS TEST
797 /
798 /THIS TEST PRINTS 16 LINES OF ALTERNATING X'S AND U'S IN A
799 /CHECKERBOARD PATTERN
800
801 1200 4462 TEST20, PRTHOR /PRINT TEST HEADER
802 1201 1162 TAD M20 /SET LINE COUNT FOR 16 LINES
803 1202 3036 DCA LPCNT /STORE COUNT
804 1203 1226 T20A, TAD WIDTH /GET # COLUMNS
805 1204 3034 DCA COUNT /STORE
806 1205 7001 IAC /CHECK LINE COUNT
807 1206 0036 AND LPCNT
808 1207 7640 SZA CLA /START CHAR #?
809 1210 5216 JMP T20C /START WITH "U"
810 1211 1377 T20B, TAD (52 /GET "*" CHAR CODE
811 1212 4456 LOAD /LOAD *
812 1213 2034 ISZ COUNT /INC CHAR COUNT
813 1214 7410 SKP /CONTINUE
814 1215 5222 JMP T20D /PRINT LINE IF DONE LOAD
815 1216 1376 T20C, TAD (125 /GET "U" CHAR CODE
816 1217 4456 LOAD /LOAD CHAR
817 1220 2034 ISZ COUNT /INC CHAR COUNT
818 1221 5211 JMP T20B /CONTINUE LOAD
819 1222 4461 T20D, PRINT /PRINT LINE WHEN DONE LOAD
820 1223 5440 LF /ADVANCE PAPER
821 1224 2036 ISZ LPCNT /INC LINE COUNT

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822 1225 5203 JMP T20A /FINISH TEST
823 1226 5465 EXIT /EXIT
824
825 /TEST 21 - HEAD POSITIONING TEST
826 /
827 /THIS TEST PRINTS A SINGLE LINE OF ALTERNATING 0'S AND SPACES
828 /THEN FILLS IN THE SPACES WITH X'S ONE AT A TIME
829
830 1227 4462 TEST21, PRTHDR /PRINT TEST HEADER
831 1230 1026 TAD WIDTH /GET # COLUMNS
832 1231 3034 DCA COUNT /STORE
833 1232 1140 T21B, TAD P00 /LOAD 0
834 1233 4456 LOAD
835 1234 2034 ISZ COUNT /INC CHAR COUNT, DONE?
836 1235 7410 SKP /NO, SEND SPACE
837 1236 5243 JMP T21C /YES, SEND CR - PRINT LINE
838 1237 1134 TAD P40 /LOAD SPACE
839 1240 4456 LOAD
840 1241 2034 ISZ COUNT /INC COUNT, DONE?
841 1242 5232 JMP T21B /NO, CONTINUE LOAD
842 1243 4461 T21C, PRINT /YES, PRINT LINE
843 1244 5437 CR
844 1245 7240 CLA CMA /SET AC=-1
845 1246 3273 DCA T21W /STORE SPACE COUNT
846 1247 1273 TAD T21W /SAVE SPACE COUNT
847 1250 3034 DCA COUNT
848 1251 1134 TAD P40 /GET SPACE
849 1252 4460 MLOAD /LOAD SPACES
850 1253 1375 TAD (130 /GET X CHAR CODE
851 1254 4456 LOAD /LOAD IT
852 1255 4461 PRINT /PRINT LINE
853 1256 5437 CR
854 1257 1154 TAD M2 /ADD 2 TO SPACE COUNT
855 1260 1273 TAD T21W
856 1261 3273 DCA T21W /STORE NEW COUNT
857 1262 7240 CLA CMA /SET AC=-1
858 1263 1273 TAD T21W /SUBTRACT SPACE COUNT
859 1264 7041 CIA /MAKE IT POSITIVE
860 1265 1026 TAD WIDTH /ADD # COLUMNS
861 1266 7750 SPA SNA CLA /DONE LINE?
862 1267 5247 JMP T21D /NO CONTINUE
863 1270 4461 PRINT /ADVANCE PAPER
864 1271 5440 LF
865 1272 5465 EXIT /EXIT
866
867 1273 0000 T21W, 0
868
869 /TEST 22 - BACKSPACE TEST
870 /
871 /TWO LINES OF X'S INTERSPACED WITH DASHES
872 /WILL BE PRINTED BY PRINTING A SLASH, EXECUTING A BACKSPACE,
873 /AND THEN PRINTING A BACKSLASH TO COMPLETE EACH X CHAR.
874 /A MAX. OF 127 COLUMNS WILL BE PRINTED.
875
876 1274 4462 TEST22, PRTHDR /PRINT TEST HEADER

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877 1275 1154 TAD M2 /SET LINE COUNT
878 1276 3036 DCA LPCNT /STORE COUNT
879 1277 1026 TAD WIDTH /GET : COLUMNS
880 1300 1145 TAD P177 /OVER 127?
881 1301 7710 SPA CLA
882 1302 5305 JMF ,+3
883 1303 1026 TAD WIDTH
884 1304 7410 SKP
885 1305 1174 TAD M177 /YES, SET TO 127
886 1306 3034 DCA COUNT /STORE COUNT
887 1307 1137 TAD P57 /GET "/" CODE
888 1310 4456 LOAD /LOAD
889 1311 1130 TAD P10 /GET BACKSPACE CODE
890 1312 4456 LOAD /LOAD
891 1313 1144 TAD P134 /GET "\" CODE
892 1314 4456 LOAD /LOAD
893 1315 2034 ISZ COUNT /INC COLUMN COUNT
894 1316 7410 SKP /CONTINUE IF NOT DONE
895 1317 5324 JMF T22C /PRINT LINE IF DONE
896 1320 1136 TAD P55 /GET DASH
897 1321 4456 LOAD /LOAD
898 1322 2034 ISZ COUNT /INC COUNT, DONE?
899 1323 5307 JMF T22B /NO, CONTINUE
900 1324 4461 T22C, PRINT /YES, PRINT LINE
901 1325 5440 LF
902 1326 2036 ISZ LPCNT /INC LINE COUNT, DONE?
903 1327 5277 JMF T22A /NO, CONTINUE
904 1330 5465 EXIT /YES, EXIT
905
906 /TEST 23 - CHARACTER GENERATOR TEST
907 /
908 /THIS TEST PRINTS A SINGLE LINE (30 CHARACTERS LONG) OF EACH
909 /PRINTABLE CHARACTER PRECEDED BY A LINE OF ALL SPACES
910
911 1331 4462 TEST23, PRTHDR /PRINT TEST HEADER
912 1332 1134 TAD P40 /SET START CHAR (SPACE)
913 1333 3031 DCA CHAR /STORE IT
914 1334 1167 TAD M36 /SET COLUMN COUNT = 30
915 1335 3034 DCA COUNT /STORE IT
916 1336 1031 TAD CHAR /GET CHAR
917 1337 4460 MLOAD /LOAD LINE
918 1340 4461 PRINT /PRINT IT
919 1341 5440 LF
920 1342 2031 ISZ CHAR /SET NEXT CHAR
921 1343 1174 TAD M177 /CHECK CHAR
922 1344 1031 TAD CHAR
923 1345 7640 SZA CLA /DONE TEST?
924 1346 5334 JMF T23A /NO, CONTINUE
925 1347 5465 EXIT /YES, EXIT
926
927 1375 0130
928 1376 0125
929 1377 0052
930 1400
PAGE
930

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931 /TEST 24 - NON-PRINTABLE CHARACTER TEST
932 /
933 /THIS TEST PRINTS A 30 LINE SWIRL PATTERN WITH NON-PRINTABLE CHARACTERS
934 /LOADED BEFORE AND AFTER THE PRINTING CHARACTERS TO TEST ALL AREAS OF THE
935 /CHARACTER BUFFER IN THE LA180. IF THIS TEST IS LOOPED ON,
936 /THE SWIRL PATTERN WILL CONTINUE, 30 LINES PRINTED
937 /EACH TIME THE TEST IS LOOPED.
938
939 1400 4462 TEST24, PRTHDR /PRINT TEST HEADER
940 1401 1135 TAD P41 /SET START CHAR
941 1402 3031 DCA CHAR
942 1403 1167 TAD M36
943 1404 3036 DCA LPCNT /SET LINE COUNT
944 1405 3040 DCA PASCNT /CLEAR CHAR INC COUNT
945 1406 1026 TAD WIDTH
946 1407 1150 TAD P377 /BUFFER SIZE-COLUMN COUNT
947 1410 1166 T24A, TAD M35 /DIVIDE NON-PRINT CHAR COUNT BY 29
948 1411 7510 SPA
949 1412 5215 JMF T24B
950 1413 2040 ISZ PASCNT /PASCNT=NON-PRINT CHAR INC COUNT
951 1414 5210 JMF T24A
952 1415 7300 T24B, CLA CLL /CLEAR NON-PRINT CHAR COUNT 2ND BLOCK
953 1416 3035 DCA COUNT2
954 1417 1035 T24C, TAD COUNT2 /CALCULATE : NON-PRINT CHARS, 1ST BLOCK
955 1420 7041 CIA
956 1421 1377 TAD (-377
957 1422 1026 TAD WIDTH
958 1423 4277 JMS T24S /LOAD 1ST BLOCK OF NON-PRINT CHAR
959 1424 7300 CLA CLL /CLEAR AC AND LINK
960 1425 1026 TAD WIDTH /SET : PRINTABLE CHARS (COLUMN COUNT)
961 1426 3034 DCA COUNT
962 1427 1031 TAD CHAR /SET FIRST PRINT CHAR
963 1430 3032 DCA CHAR2
964 1431 1032 TAD CHAR2
965 1432 4456 LOAD /GET CHAR
966 1433 2034 ISZ COUNT /LOAD PRINTABLE CHAR
967 1434 7410 SKP /INS CHAR COUNT
968 1435 5246 JMF T24E /NEXT CHAR
969 1436 2032 ISZ CHAR2
970 1437 1032 TAD CHAR2 /CHECK CHAR
971 1440 1174 TAD M177 /CHAR=RUROUT?
972 1441 7640 SZA CLA
973 1442 5231 JMF T24D /NO, CONTINUE
974 1443 1134 TAD P40 /YES, RESET CHAR=SPACE
975 1444 3032 DCA CHAR2
976 1445 5231 JMF T24D /CONTINUE
977 1446 1035 TAD COUNT2 /SET : NON-PRINT CHARS, 2ND BLOCK
978 1447 4277 JMS T24S /LOAD 2ND BLOCK NON-PRINT CHARS
979 1450 4461 PRINT /PRINT LINE
980 1451 5440 LF
981 1452 1035 TAD COUNT2 /IN NON-PRINT CHAR COUNT, 2ND BLOCK
982 1453 1040 TAD PASCNT
983 1454 3035 DCA COUNT2
984 1455 2031 ISZ CHAR /INC START CHAR
985 1456 1031 TAD CHAR /CHECK START CHAR

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986 1457 1174 TAD M177
987 1460 7640 SZA CLA
988 1461 5264 JMP ,+3 /OK, CONTINUE
989 1462 1134 TAD P40 /RESET START CHAR
990 1463 3031 DCA CHAR
991 1464 2036 ISZ LPCNT /INC LINE COUNT
992 1465 5217 JMP T24C /CONTINUE
993 1466 7300 T24F, CLA CLL
994 1467 1052 TAD TLOOP /LOOP ON TEST?
995 1470 7640 SZA CLA
996 1471 5276 JMP T24G /YES, CONTINUE SWIRL
997 1472 4521 GETSW
998 1473 0152 AND P1000 /LOOP ON TEST?
999 1474 7650 SNA CLA
1000 1475 5465 EXIT /NO, EXIT TEST
1001 1476 5203 T24G, JMP T24H /LOOP ON TEST
1002
1003 /ROUTINE TO LOAD NON-PRINTABLE CHARACTERS FOR TEST 24
1004
1005 1477 0000 T24S, 0
1006 1500 7550 SPA SNA /GOOD CHAR COUNT?
1007 1501 5677 JMP I T24S /NO, RETURN
1008 1502 7041 CIA /YES, NEGATE IT
1009 1503 3034 DCA COUNT /SAVE IT
1010 1504 3032 T24SC, DCA CHAR2 /SET FIRST NON-PRINT CHAR
1011 1505 1032 T24SA, TAD CHAR2 /GET CHAR
1012 1506 4456 LOAD /LOAD CHAR
1013 1507 2034 ISZ COUNT /INC COUNT
1014 1510 7410 SKP
1015 1511 5677 JMP I T24S /RETURN IF ZERO
1016 1512 2032 T24SB, ISZ CHAR2 /NEXT CHAR
1017 1513 7300 CLA CLL
1018 1514 1032 TAD CHAR2 /CHECK CHAR
1019 1515 1157 TAD M7
1020 1516 7450 SNA
1021 1517 5312 JMP T24SB /BELL, SKIP
1022 1520 1153 TAD M1
1023 1521 7450 SNA
1024 1522 5312 JMP T24SB /SKIP BS
1025 1523 1154 TAD M2
1026 1524 7450 SNA
1027 1525 5312 JMP T24SB /SKIP LF
1028 1526 1154 TAD M2
1029 1527 7450 SNA
1030 1530 5312 JMP T24SB /SKIP FF
1031 1531 1153 TAD M1
1032 1532 7450 SNA
1033 1533 5312 JMP T24SB /SKIP CR
1034 1534 1163 TAD M23
1035 1535 7650 SNA CLA /CHAR=SPACE?
1036 1536 5304 JMP T24SC /YES, RESET CHAR
1037 1537 5305 JMP T24SA /NO, CONTINUE
1038
1039 1540 0000 SETSKP, 0
1040 1541 7300 CLA CLL

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1041 1542 1021 TAD PARAM /GET HARDWARE WORD 1
1042 1543 7004 RAL /PUT OPTION 1 BIT INTO BIT 0
1043 1544 7710 SPA CLA /WAS OPTION 1 SELECTED ?
1044 1545 5351 JMP ,+4 /YES-SETUP IOT TO SKIP ON AND CLEAR DATA ACCEPTED
1045 1546 1776 TAD RPSKF+3 /NO-SETUP FOR LA100 SKIP ON CHAR IOT
1046 1547 3775 DCA T0MIOT /SAVE THE SKIP IOT
1047 1550 5740 JMP I SETSKP /RETURN TO PROGRAM TO LOAD CHAR
1048 1551 1774 TAD OPDBST /GET OPTION 1 IOT TO SKIP
1049 1552 5347 JMP ,+3 /RETURN TO PROGRAM
1050
1051 1574 2643
1052 1575 0536
1053 1576 2637
1054 1577 7401
1055 1600

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1055
1056 /TEST 25 - BUFFER TEST
1057 /
1058 /THIS TEST CHECKS THE CHARACTER BUFFER OF THE LA100 WHILE PRINTING
1059 /FOUR LINES OF NUMBERS (WITH 2 BLANK LINES BETWEEN THE
1060 /FIRST AND SECOND LINE). THESE LINES CAN BE USED TO
1061 /CHECK THE PROPER PRINTING WIDTH.
1062 /ANY E PRINTED INDICATES AN INCORRECT LOAD OR BUFFER ACTION.
1063
1064 1600 4462 TEST25, PRTHDR /PRINT TEST HEADER
1065 1601 1162 TAD M20 /SET CHAR COUNT
1066 1602 3034 DCA COUNT
1067 1603 1377 TAD (105 /SET E CHAR
1068 1604 4460 MLOAD /LOAD BUFFER
1069 1605 1145 TAD P177 /
1070 1606 4456 LOAD /CLEAR BUFFER
1071 1607 1026 TAD WIDTH
1072 1610 3034 DCA COUNT /SET COLUMN COUNT
1073 1611 1173 TAD M144
1074 1612 3036 DCA LPCNT /SET ONES COUNT
1075 1613 7001 IAC /SET FIRST CHAR=1
1076 1614 4345 JMS T253 /LOAD ONES
1077 1615 5230 JMP T25A /DONE LINE-PRINT
1078 1616 1167 TAD M36
1079 1617 3036 DCA LPCNT /SET THREE'S COUNT
1080 1620 1376 TAD (3
1081 1621 4345 JMS T253 /PRINT THREE'S
1082 1622 5230 JMP T25A
1083 1623 1154 TAD M2
1084 1624 3036 DCA LPCNT /SET TWO'S COUNT
1085 1625 1126 TAD P2 /SET CHAR
1086 1626 4345 JMS T253 /PRINT TWO'S
1087 1627 7000 NOP
1088 1630 4461 T25A, PRINT /PRINT LINE
1089 1631 5440 LF
1090 1632 1375 TAD (-400 /SET CHAR COUNT
1091 1633 3034 DCA COUNT
1092 1634 1377 TAD (105 /SET E CHAR
1093 1635 4460 MLOAD /FILL BUFFER
1094 1636 4461 PRINT /PRINT BLANK LINE

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1095	1637	5440	LF		
1096	1640	1374	TAD	(-376	
1097	1641	3034	DCA	COUNT	
1098	1642	1377	TAD	(105	
1099	1643	4460	MLOAD		/LOAD BUFFER E'S
1100	1644	1145	TAD	P177	/CLEAR BUFFER
1101	1645	4456	LOAD		/CLEAR BUFFER
1102	1646	4461	PRINT		
1103	1647	5440	LF		/PRINT BLANK LINE
1104	1650	1375	TAD	(-400	
1105	1651	3034	DCA	COUNT	
1106	1652	1377	TAD	(105	
1107	1653	4460	MLOAD		/FILL BUFFER ALL E'S
1108	1654	1026	TAD	WIDTH	
1109	1655	3034	DCA	COUNT	/SET COLUMN COUNT
1110	1656	1373	TAD	(-143	
1111	1657	3036	DCA	LPCNT	/SET 0'S COUNT=99
1112	1660	4345	JMS	T25S	/LOAD 0'S
1113	1661	5265	JMP	T25B	/PRINT IF DONE LINE
1114	1662	7001	LAC		/SET 1'S
1115	1663	4345	JMS	T25S	/LOAD 1'S TILL END OF LINE
1116	1664	7000	NOP		
1117	1665	4461	T25B, PPINT		/PRINT LINE
1118	1666	5440	LF		
1119	1667	1372	TAD	(-377	
1120	1670	3034	DCA	COUNT	
1121	1671	1377	TAD	(105	
1122	1672	4460	MLOAD		/FILL BUFFER WITH E'S
1123	1673	1145	TAD	P177	
1124	1674	4456	LOAD		/CLEAR BUFFER
1125	1675	1026	TAD	WIDTH	
1126	1676	3034	DCA	COUNT	/SET COLUMN COUNT
1127	1677	1371	TAD	(-11	
1128	1700	3036	DCA	LPCNT	/SET GROUP COUNT
1129	1701	3031	T25C, DCA	CHAR	/SET CHAR
1130	1702	1031	T25D, TAD	CHAR	/CHECK CHAR
1131	1703	1160	TAD	M12	
1132	1704	7650	SNA CLA		
1133	1705	5301	JMP	T25C	/RESET CHAR IF NECESSARY
1134	1706	1031	TAD	CHAR	/GET CHAR
1135	1707	4345	JMS	T25S	/LOAD CHAR
1136	1710	5315	JMP	T25E	/PRINT LINE IF DONE
1137	1711	1160	TAD	M12	/RESET GROUP COUNT
1138	1712	3036	DCA	LPCNT	/SET NEXT CHAR
1139	1713	2031	ISZ	CHAR	
1140	1714	5302	JMP	T25D	/CONTINUE
1141	1715	4461	T25E, PRINT		/PRINT LINE
1142	1716	5440	LF		
1143	1717	1375	TAD	(-400	
1144	1720	3034	DCA	COUNT	
1145	1721	1377	TAD	(105	
1146	1722	4460	MLOAD		/FILL BUFFER WITH E'S
1147	1723	1370	TAD	(61	
1148	1724	3031	DCA	CHAR	/SET FIRST CHAR=1
1149	1725	1026	TAD	WIDTH	

1150	1726	3034	DCA	COUNT	/SET COLUMN COUNT
1151	1727	1031	T25F, TAD	CHAR	/GET CHAR
1152	1730	4456	LOAD		/LOAD IT
1153	1731	2031	ISZ	CHAR	/LINE CHAR
1154	1732	1031	TAD	CHAR	/CHECK CHAR
1155	1733	1367	TAD	(-72	
1156	1734	7640	SZA CLA		
1157	1735	5340	JMP	T25G	
1158	1736	1140	TAD	P60	
1159	1737	3031	DCA	CHAR	/RESET CHAR TO 0
1160	1740	2034	T25G, ISZ	COUNT	/INC COLUMN COUNT
1161	1741	5327	JMP	T25F	/FINISH LINE
1162	1742	4461	PRINT		/PRINT LINE
1163	1743	5440	LF		
1164	1744	5465	EXIT		/EXIT TEST
1165					
1166					/ROUTINE TO LOAD GROUPS OF CHARS FOR TEST 25
1167					
1168	1745	0000	T25S, 0		
1169	1746	1140	TAD	P60	/MAKE CHAR ASCII
1170	1747	3032	DCA	CHAR2	/SAVE CHAR
1171	1750	1032	TAD	CHAR2	/GET CHAR
1172	1751	4456	LOAD		/LOAD CHAR
1173	1752	2034	ISZ	COUNT	/INC COLUMN COUNT
1174	1753	7410	SKP		/CONTINUE
1175	1754	5745	JMP I	T25S	/RETURN, END OF LINE
1176	1755	2036	ISZ	LPCNT	
1177	1756	5350	JMP	T25S+3	/CONTINUE
1178	1757	2345	ISZ	T25S	/INC RETURN ADR
1179					
1180	1760	5745	JMP I	T25S	/RETURN
1181					
1182	1767	7706			
1183	1770	0061			
1184	1771	7767			
1185	1772	7401			
1186	1773	7635			
1187	1774	7402			
1188	1775	7400			
1189	1776	0003			
1190	1777	0105			
1191		2000			
1192					
1193					
1194					
1195					/TEST 26 - OVERPRINT TEST
1196					/
1197					/THIS TEST PRINTS FOUR LINES OF ALTERNATING CHARACTERS AND SPACES
1198					/IN A CHECKERBOARD PATTERN. EACH LINE IS OVERPRINTED TWICE
1199	2000	4462	TEST26, PRTHDR		/PRINT TEST HEADER
1200	2001	1377	TAD	(T26TAB	/SET TABLE POINTER
1201	2002	3041	DCA	TABPTR	
1202	2003	1155	T26A, TAD	M3	/STROE COUNT FOR 2 OPERPRINTS
1203	2004	3036	DCA	LPCNT	
1204	2005	1026	T26B, TAD	WIDTH	/SET # COLUMNS

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1204	2006	3034	DCA	COUNT	
1205	2007	1441	TAD I	TABPTR	/GET CHARS
1206	2010	7450	SNA		/DONE TEST?
1207	2011	5465	EXIT		/YES, EXIT TEST
1208	2012	0142	AND	P77	/NO, MASK CHAR
1209	2013	1170	TAD	M40	/MAKE ASCII
1210	2014	7510	SPA		
1211	2015	1143	TAD	P100	
1212	2016	1134	TAD	P40	
1213	2017	4456	LOAD		/LOAD CHAR
1214	2020	2034	ISZ	COUNT	/INC CHAR COUNT
1215	2021	7410	SKP		/CONTINUE
1216	2022	5237	JMP	T26D	/PRINT LINE
1217	2023	1441	TAD I	TABPTR	/GET CHAR PAIR AGAIN
1218	2024	7012	RTR		/GET SECOND CHAR
1219	2025	7012	RTR		
1220	2026	7012	RTR		
1221	2027	0142	AND	P77	/MASK CHAR
1222	2030	1170	TAD	M40	/MAKE ASCII
1223	2031	7510	SPA		
1224	2032	1143	TAD	P100	
1225	2033	1134	TAD	P40	
1226	2034	4456	LOAD		/LOAD IT
1227	2035	2034	ISZ	COUNT	/INC COUNT
1228	2036	5207	JMP	T26C	/CONTINUE
1229	2037	4461	T26D, PRINT		/PRINT LINE
1230	2040	5437	CR		
1231	2041	2036	ISZ	LPCNT	/INC OVERPRINT COUNT
1232	2042	5205	JMP	T26B	/CONTINUE
1233	2043	4461	PRINT		/ADVANCE PAPER
1234	2044	5440	LF		
1235	2045	2041	ISZ	TABPTR	/INC TABLE POINTER
1236	2046	5203	JMP	T26A	/GET NEXT PAIR
1237					
1238	2047	0540	T26TAB, 0540		/E-SP
1239	2050	4000	4000		/SP-0
1240	2051	1540	1540		/M-SP
1241	2052	4043	4043		/SP-1
1242	2053	0000	0		/END OF TABLE
1243					
1244					
1245					
1246					
1247					
1248					
1249					
1250	2054	4462	TEST27, PRTHDR		/PRINT TEST HEADER
1251	2055	1376		(T27TAB	/SET TABLE POINTER
1252	2056	3041	DCA	TABPTR	
1253	2057	3045	DCA	TENS	/CLEAR CONVERSION COUNTERS
1254	2060	3044	DCA	ONES	
1255	2061	1441	TAD I	TABPTR	/GET NUMBER
1256	2062	2045	ISZ	TENS	/CONVERT TO ASCII
1257	2063	1160	TAD	M12	
1258	2064	7500	SMA		

/TEST 27 - MULTIPLE LINE FEED TEST

/NUMBER PRINTED INDICATES NUMBER OF LINE FEEDS FOLLOWING THAT LINE.
/DASHED REFERENCE LINES ARE PRINTED TO AID IN CHECKING PROPER
/LINE FEEDS.

1259	2065	5262	JMP	.+3	
1260	2066	3044	DCA	ONES	
1261	2067	7240	CLA CMA		
1262	2070	1945	TAD	TENS	
1263	2071	7450	SNA		/SKIP LEADING ZERO'S
1264	2072	5275	JMP	T27B	
1265	2073	1140	TAD	P60	
1266	2074	4456	LOAD		/LOAD TENS DIGIT
1267	2075	7300	T27B, CLA CLL		
1268	2076	1044	TAD	ONES	
1269	2077	1141	TAD	P72	
1270	2100	4456	LOAD		/LOAD ONES DIGIT
1271	2101	1441	TAD I	TABPTR	/GET #
1272	2102	7450	SNA		/SKIP IF NOT ZERO
1273	2103	5307	JMP	T27C	/ZERO, PRINT 131 DASHES MAX
1274	2104	1153	TAD	M1	
1275	2105	7440	SZA		/SKIP IF ONE
1276	2106	5315	JMP	T27D	
1277	2107	1026	TAD	WIDTH	/PRINT 131 DASHES MAX,
1278	2110	1133	TAD	P36	/29 MINIMUM
1279	2111	7740	SMA SZA	CLA	
1280	2112	5322	JMP	T27DA	
1281	2113	1026	TAD	WIDTH	
1282	2114	5323	JMP	T27E	
1283	2115	1160	TAD	M12	/CHECK IF WANT 28 OR 29 DASHES
1284	2116	7700	SMA CLA		
1285	2117	5322	JMP	.+3	
1286	2120	1166	TAD	M35	/SET 29
1287	2121	7410	SKP		
1288	2122	1375	TAD	(-34	/SET 28
1289	2123	3034	DCA	COUNT	/STORE DASH COUNT
1290	2124	1136	TAD	P55	
1291	2125	4460	MLOAD		/LOAD DASH LINE
1292	2126	1441	TAD I	TABPTR	
1293	2127	7450	SNA		
1294	2130	5337	JMP	T27X	
1295	2131	7041	CIA		
1296	2132	3034	DCA	COUNT	
1297	2133	1131	TAD	P12	
1298	2134	4460	MLOAD		
1299	2135	2041	ISZ	TABPTR	
1300	2136	5257	JMP	T27A	
1301	2137	4461	T27X, PRINT		/PRINT LINE
1302	2140	5440	LF		
1303	2141	5465	EXIT		/EXIT TEST
1304					
1305	2142	0001	T27TAB, 1		
1306	2143	0002	2		
1307	2144	0004	4		
1308	2145	0010	10		
1309	2146	0020	20		
1310	2147	0040	40		
1311	2150	0000	0		/END OF TABLE
1312					
1313	2175	7744			


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1314 2176 2142
1315 2177 2047
1316 2200
1317
1318
1319
1320
1321
1322 /TEST 30 - RIBBON FEED TEST
1323 /
1324 /THIS TEST PRINTS A SINGLE COLUMN OF 24 LINES OF X'S DOWN THE
1325 /LEFT HAND MARGIN OF THE PAGE
1326
1327 2200 4462 TEST30, PRTHDR /PRINT TEST HEADER
1328 2201 1165 TAD M30 /SET LINE COUNT
1329 2202 3034 DCA COUNT
1330 2203 4461 T30A, PRINT /PRINT X=LF
1331 2204 2210 T30M
1332 2205 2034 ISZ COUNT /DEC LINE COUNT
1333 2206 5203 JMP T30A /FINISH TEST
1334 2207 5465 EXIT /EXIT TEST
1335
1336 2210 3073 T30M, TEXT /X:/
1337 2211 0000
1338
1339 /TEST 31 - BELL TEST
1340 /
1341 /THIS TEST WILL SOUND 5 BELLS BETWEEN PRINTING "BELL TEST"
1342
1343 2212 4462 TEST31, PRTHDR /PRINT TEST HEADER
1344 2213 1127 TAD P7
1345 2214 4456 LOAD /SEND BELL CODE
1346 2215 4461 PRINT /LOAD WORD "BELL"
1347 2216 2240 T31M1
1348 2217 1127 TAD P7
1349 2218 4456 LOAD /LOAD BELL CODE
1350 2219 2243 PRINT /LOAD WORD "TEST"
1351 2220 1127 T31M2
1352 2221 4456 TAD P7
1353 2222 4456 LOAD /LOAD
1354 2223 4461 PRINT /SEND CR
1355 2224 5437 CR
1356 2225 1127 TAD P7
1357 2226 4456 LOAD /LOAD BELL CODE
1358 2227 4461 PRINT /SEND LF
1359 2228 5440 LF
1360 2229 1127 TAD P7
1361 2230 4456 LOAD /LOAD BELL CODE
1362 2231 4461 PRINT /SEND CR
1363 2232 5437 CR
1364 2233 5465 EXIT /EXIT TEST
1365 2240 0205 T31M1, TEXT /BELL/
1366 2241 1414

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1367 2242 0000
1368 2243 4024 T31M2, TEXT / TEST/
1369 2244 0523
1370 2245 2400
1371
1372 /MAINTENANCE AIDS
1373
1374 /TEST 60 - LIFE TEST
1375 /
1376 /THIS TEST PRINTS 2 FULL LINES OF EACH PRINTABLE CHARACTER
1377 /THE SECOND LINE IS OVERPRINTED 4 TIMES TO CONSERVE PAPER
1378 /AT THE END OF EACH PASS THROUGH THE ENTIRE PRINTABLE CHARACTER
1379 /SET, THE PASS COUNT WILL BE PRINTED ON THE LA100.
1380
1381 2246 7300 TEST60, CLA CLL /CLEAR
1382 2247 3040 DCA PASCNT /CLEAR PASS COUNT
1383 2250 4462 T60A, PRTHDR /PRINT TEST HEADER ON BLANK LINES
1384 2251 1135 TAD /SET FIRST CHAR
1385 2252 3031 DCA CHAR /STORE IT
1386 2253 1026 T60B, TAD WIDTH /GET # COLUMNS
1387 2254 3034 DCA COUNT /STORE IT
1388 2255 1031 TAD CHAR /GET CHAR
1389 2256 4460 MLOAD /LOAD LINE
1390 2257 4461 PRINT /PRINT LINE
1391 2260 5440 LF
1392 2261 1377 TAD (-5 /SET OVERPRINT COUNT
1393 2262 3036 DCA LPCNT
1394 2263 1026 T60C, TAD WIDTH /SET # COLUMNS
1395 2264 3034 DCA COUNT
1396 2265 1031 TAD CHAR /GET CHAR
1397 2266 4460 MLOAD /LOAD LINE
1398 2267 4461 PRINT /PRINT LINE
1399 2270 5437 CR
1400 2271 2036 ISZ LPCNT /INC OVERPRINT COUNT, DONE?
1401 2272 5263 JMP T60C /NO, DO AGAIN
1402 2273 4461 PRINT /YES, ADVANCE PAPER
1403 2274 5440 LF
1404 2275 2031 ISZ CHAR /SET NEXT CHAR
1405 2276 1174 TAD M177 /CHECK IT
1406 2277 1031 TAD CHAR
1407 2300 7640 SEA CLA /CHAR=SUBOUT?
1408 2301 5253 JMP T60B /NO, CONTINUE THIS PASS
1409 2302 2040 ISZ PASCNT /YES, INC PASS COUNT
1410 2303 7000 NOP
1411 2304 4461 PRINT /PRINT PASS COUNT MSG
1412 2305 5057 PASM5G
1413 2306 3047 DCA THOUS /CLEAR CONVERSION COUNTERS
1414 2307 1040 TAD PASCNT /GET PASS COUNT & CONVERT TO DECIMAL
1415 2310 2047 ISZ THOUS
1416 2311 1376 TAD (-1750
1417 2312 7500 SNA
1418 2313 5310 JMP -3
1419 2314 1375 TAD (-1750

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1418 2315 3040 DCA PASCNT
1419 2316 1137 TAD P57
1420 2317 1047 TAD THOUS
1421 2320 4456 LOAD
1422 2321 1040 TAD PASCNT
1423 2322 4517 JMS I TCNVRT
1424 2323 4461 PRINT
1425 2324 5435 CNVMSG
1426 2325 4461 PRINT /PRINT LINE
1427 2326 5440 LF
1428 2327 5250 JMP T60A /CONTINUE TEST
1429
1430 2375 1750
1431 2376 6030
1432 2377 7773
1433 2400

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PAGE

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1433 /TEST 61 - SCOPE DRIVE ROUTINE
1434 /
1435 /THIS TEST WILL LOAD A CHARACTER SET IN SW REG BITS 05-11
1436 /IF SWITCH 04 IS DOWN, FULL LINES WILL BE LOADED & PRINTED
1437 /A LINEFEED WILL BE INSERTED AUTOMATICALLY IF LOADING PRINTABLE CHARACTERS.
1438 /IF SWITCH 04 IS UP, THE CHARACTER WILL BE LOADED ONCE & THE
1439 /PROGRAM WILL HALT; NO LINE FEEDS OF CARRIAGE RETURNS WILL BE SENT BY THE PROGRAM.
1440
1441
1442 2400 4462 TEST61, PRTHDR /PRINT HEADER
1443 2401 5225 JMP T61C /CHECK SWITCH 4 FIRST
1444 2402 1026 T61A, TAD WIDTH /GET # COLUMNS
1445 2403 3034 DCA COUNT /STORE IT
1446 2404 4521 T61B, GETSW /GET SW REG
1447 2405 0145 AND P177 /MARK CHAR
1448 2406 3031 DCA CHAR /SAVE IT
1449 2407 1031 TAD CHAR /GET CHAR
1450 2410 4456 LOAD /LOAD IT
1451 2411 1160 TAD M12 /CHECK CHAR
1452 2412 1031 TAD CHAR
1453 2413 7450 SNA /CHAR = LF?
1454 2414 5225 JMP T61C /YES, RESET COLUMN COUNT
1455 2415 1155 TAD M3
1456 2416 7450 SNA /CHAR = CR?
1457 2417 5225 JMP T61C /YES, RESET COLUMN COUNT
1458 2420 1163 TAD M23
1459 2421 7700 SNA CLA /NON-PRINTABLE CHAR?
1460 2422 2034 ISZ COUNT /NO, INC COLUMN COUNT
1461 2423 7000 NOP
1462 2424 5230 JMP T61D /CHECK SW 04
1463 2425 7300 T61C, CLA CLL /CLEAR
1464 2426 1026 TAD WIDTH /GET # COLUMNS
1465 2427 3034 DCA COUNT /STORE IT
1466 2430 7604 T61D, LAS /GET SW REG
1467 2431 0146 AND P200 /MASH SW 04
1468 2432 7650 SNA CLA /SWITCH 4 UP?
1469 2433 5236 JMP T61E /NO, CONTINUE
1470 2434 7402 HLT /YES, HALT
1471 2435 5204 JMP T61B /GET NEXT CHAR

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1472 2436 1034 T61E, TAD COUNT /GET COLUMN COUNT
1473 2437 7510 SPA /DONE LOAD?
1474 2440 5204 JMP T61B /NO, CONTINUE
1475 2441 7650 SNA CLA /TOO MANY LOADED?
1476 2442 5245 JMP T61F /NO, CONTINUE
1477 2443 1145 TAD P177 /YES, SET RUBOUT
1478 2444 4456 LOAD /CLEAR RUBOUT
1479 2445 4461 T61F, PRINT /PRINT LOADED CHARACTERS
1480 2446 5440 LF
1481 2447 5202 JMP T61A /CONTINUE TEST
1482

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/TEST 62 - LINE PRINT TEST

```

1483 /
1484 /THIS TEST PRINTS FULL LINES CONTINUOUSLY OF WHATEVER CHARACTER
1485 /IS TYPED ON THE CONSOLE KEYBOARD. TO CHANGE CHARACTERS,
1486 /RESELECT THIS TEST. AN ERROR MESSAGE WILL BE PRINTED
1487 /IF THIS TEST IS SELECTED AND A CONSOLE TERMINAL DOES NOT EXIST.
1488
1489
1490 2450 4462 TEST62, PRTHDR /PRINT TEST HEADER
1491 2451 1053 TAD TPFLG /CHECK IF TERM EXISTS
1492 2452 7650 SNA CLA
1493 2453 5341 JMP TERR /EXIT IF NONE
1494 2454 4455 TYPE /TYPE INSTR
1495 2455 5244 TCHAR
1496 2456 4472 JMS I TKSF /WAIT FOR KYBD FLAG
1497 2457 5256 JMP .-1
1498 2460 4464 CHECK /CHECK CHAR FOR CONTROL
1499 2461 4475 JMS I TKRB /READ CHAR
1500 2462 4501 JMS I TTLS /ECHO CHAR
1501 2463 4476 JMS I TTST
1502 2464 5263 JMP .-1
1503 2465 3031 DCA CHAR /SAVE CHAR
1504 2466 4455 TYPE /SEND CR-LF
1505 2467 5441 CRLF
1506 2470 1026 T62B, TAD WIDTH /SET COLUMN COUNT
1507 2471 3034 DCA COUNT
1508 2472 1031 TAD CHAR /GET CHAR
1509 2473 4460 MLOAD /LOAD LINE
1510 2474 4461 PRINT
1511 2475 5440 LF /PRINT LINE
1512 2476 5270 JMP T62B /CONTINUE
1513

```

/TEST 63 - CHARACTER PRINT TEST

```

1514 /
1515 /THIS TEST LOADS WHATEVER CHARACTER IS TYPED ON THE CONSOLE KEYBOARD
1516 /TO THE LA102, CHARACTER BY CHARACTER.
1517 /IF THIS TEST IS SELECTED AND A CONSOLE TERMINAL DOES NOT EXIST,
1518 /AN ERROR MSG WILL BE PRINTED.
1519
1520
1521 2477 4462 TEST63, PRTHDR /PRINT TEST HEADER
1522 2500 1053 TAD TPFLG /CHECK IF TERM EXISTS
1523 2501 7650 SNA CLA
1524 2502 5341 JMP TERR /EXIT IF NONE
1525 2503 4455 TYPE /TYPE INSTR
1526 2504 5244 TCHAR

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1527 2505 4455 TYPE
1528 2506 5441 CRLF
1529 2507 4472 T63B, JMS I TKSF /SEND CR-LF
1530 2510 5307 JMP .-1 /WAIT FOR KYBD FLAG
1531 2511 4464 CHECK /CHECK CHAR FOR CONTROL
1532 2512 4475 JMS I TKRB /READ CHAR
1533 2513 4145 AND P177 /MASK BIT 8
1534 2514 3031 DCA CHAR
1535 2515 1031 TAD CHAR
1536 2516 4501 T63A, JMS I TTLS /ECHO CHAR
1537 2517 4476 JMS I TTSP
1538 2520 5317 JMP .-1
1539 2521 4456 LOAD /LOAD CHAR
1540 2522 1031 TAD CHAR /CR-LF AFTER CR
1541 2523 1161 TAD M15
1542 2524 7650 SNA CLA
1543 2525 5336 JMP T63E
1544 2526 1031 T63C, TAD CHAR /CR-LF AFTER LF
1545 2527 1160 TAD M12
1546 2530 7650 SNA CLA
1547 2531 5336 JMP T63E
1548 2532 1031 T63D, TAD CHAR /CR-LF AFTER FF
1549 2533 1377 TAD (-14)
1550 2534 7640 SZA CLA
1551 2535 5307 JMP T63B
1552 2536 4455 T63E, TYPE
1553 2537 5441 CRLF
1554 2540 5307 JMP T63B
1555
1556 2541 4461 TERR, PRINT /PRINT ERROR MSG ON LA100
1557 2542 5231 NCMSG
1558 2543 5465 EXIT /EXIT TEST
1559 2577 7764 PAGE
1560
1561 /TTY I-O INSTRUCTIONS
1562
1563 2600 0000 RKSF, 0
1564 2601 6031 KSF /SKIP IF FLAG IS SET
1565 2602 7410 SKP
1566 2603 2200 ISZ RKSF /INC RETURN ADR
1567 2604 5600 JMP I RKSF /RETURN
1568
1569 2605 0000 RKCC, 0
1570 2606 6032 KCC /CLEAR FLAG
1571 2607 5605 JMP I RKCC /RETURN
1572
1573 2610 0000 RKRS, 0
1574 2611 6034 KRS /READ BUFFER (STATIC)
1575 2612 5610 JMP I RKRS /RETURN
1576
1577 2613 0000 RNRB, 0
1578 2614 6036 KRB /CLEAR AC, READ BUFFER & CLEAR FLAG
1579 2615 5613 JMP I RNRB /RETURN
1580

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/MAINDEC-00-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-29

1581 2616 0000 RTSF, 0
1582 2617 6041 TSF /SKIP IF FLAG IS SET
1583 2620 7410 SKP
1584 2621 2216 ISZ RTSF /INC RETURN ADR
1585 2622 5616 JMP I RTSF /RETURN
1586
1587 2623 0000 RTCF, 0
1588 2624 6042 TCF /CLEAR FLAG
1589 2625 5623 JMP I RTCF /RETURN
1590
1591 2626 0000 RTPC, 0
1592 2627 6044 TPC /LOAD BUFFER
1593 2630 5626 JMP I RTPC /RETURN
1594
1595 2631 0000 RTLS, 0
1596 2632 6046 TLS /PRINT CHAR
1597 2633 5631 JMP I RTLS /RETURN
1598
1599 /PRINTER INSTRUCTIONS
1600
1601 2634 0000 RPSKF, 0
1602 2635 4777 JMS OP1CHK /GO CHECK TO SEE IF RUNNING ON PAR I/O
1603 2636 2643 OPDBST /ON PARALLEL I/O
1604 2637 6661 PSKF /SKIP ON CHARACTER FLAG
1605 2640 7410 SKP
1606 2641 2234 ISZ RPSKF /INCREMENT RETURN ADDRESS FOR SKIP
1607 2642 5634 JMP I RPSKF /RETURN
1608 2643 6570 OPDBST, DBST /SKIP ON DATA ACCEPTED AND CLEAR IT
1609 2644 5634 JMP I RPSKF /FLAG NOT SET RETURN
1610 2645 5241 JMP .-4 /BUMP RETURN AND THEN RETURN
1611
1612 2646 0000 RPCLF, 0
1613 2647 4777 JMS OP1CHK /GO CHECK FOR PARALLEL I/O
1614 2650 2653 OPICLF /ADDRESS FOR PARALLEL I/O ROUTINE
1615 2651 6662 PCLF /CLEAR CHARACTER FLAG
1616 2652 5646 JMP I RPCLF /RETURN
1617 2653 6570 OPICLF, DBST /SKIP ON DATA ACCEPTED AND CLEAR IT
1618 2654 5646 JMP I RPCLF /RETURN FLAG WAS NOT SET
1619 2655 5646 JMP I RPCLF /RETURN FLAG IS NOW A ZERO
1620
1621 2656 0000 RPSTB, 0
1622 2657 4777 JMS OP1CHK /GO CHECK FOR PARALLEL I/O
1623 2660 2663 OPL0D1 /ADDRESS FOR PARALLEL I/O ROUTINE
1624 2661 6664 PSTB /LOAD BUFFER
1625 2662 5656 JMP I RPSTB /RETURN TO PROGRAM
1626 2663 7040 CMA /NEGATE THE WORD FOR PARALLEL I/O
1627 2664 6574 DBTD /LOAD THE 12 BIT PARALLEL I/O
1628 2665 7040 CMA /RESET THE WORD TO ORIGINAL WORD
1629 2666 6577 DBSS /ISSUE A DATA STROBE PULSE
1630 2667 5656 JMP I RPSTB /RETURN TO PROGRAM
1631
1632 2670 0000 RPSIE, 0
1633 2671 4777 JMS OP1CHK /GO CHECK FOR PARALLEL I/O
1634 2672 2675 OPSIC /ADDRESS FOR PARALLEL I/O ROUTINE
1635 2673 6665 PSIE /ENABLE INTERRUPTS
1636 2674 5670 JMP I RPSIE /RETURN

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/MAINDEC-00-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-30

1636 2675 7440 OPSCIE, SZA /CHECK DATA BIT 11
1637 2676 6575 DRSE /SET DATA BIT 11
1638 2677 7450 SNA
1639 2700 6576 DRCE /CLEAR PARALLEL I/O INT ENA
1640 2701 5670 JMP I RPSIE /RETURN TO THE PROGRAM
1641
1642 2702 0000 RPCLP, 0
1643 2703 4777 JMS OP1CHK /GO CHECK FOR PARALLEL I/O
1644 2704 2707 OPLD2 /ADDRESS FOR PARALLEL I/O ROUTINE
1645 2705 6666 PCLP /CLEAR FLAG AND LOAD BUFFER
1646 2706 5702 JMP I RPCLP /RETURN TO THE PROGRAM
1647 2707 6570 OPLD2, DRST /SKIP ON DATA ACCEPTED AND CLEAR IT
1648 2710 7000 NOP /USED IN CASE FLAG WAS SET
1649 2711 7040 CMA /NEGATE THE WORD TO LOAD FOR PAR I/O
1650 2712 6574 DBTD /LOAD THE PARALLEL I/O BUFFER
1651 2713 7040 CMA /RESET THE WORD BACK TO ORIGINAL WORD
1652 2714 6577 DBSS /ISSUE A DATA STROBE
1653 2715 5702 JMP I RPCLP /RETURN BACK TO PROGRAM
1654
1655 /ROUTINE TO MODIFY I=0 INSTRUCTIONS FOR SELECTED IOT CODES
1656 /ON CONSOLE TERMINAL & LA100 PRINTER
1657
1658 2716 0000 MIOT, 0
1659 2717 7300 CLA CLL /CLEAR
1660 2720 1156 TAD M4 /SET LOOP COUNT
1661 2721 3034 DCA COUNT
1662 2722 1376 TAD (IOTAB-1) /SET TABLE POINTER
1663 2723 3010 DCA AUTPTR
1664 2724 1030 TAD IOTSEL /GET IOT SELECTION
1665 2725 0172 AND M100 /MASK XMIT IOT
1666 2726 7110 CLL RAR
1667 2727 7112 CLL RTR
1668 2730 3033 MIOTB, DCA SAVE /STORE IOT
1669 2731 1410 MIOTA, TAD I AUTPTR /GET TABLE ENTRY
1670 2732 7450 SNA /DONE TTY IOT'S?
1671 2733 5350 JMP MIOTC /YES, DO PRINTER
1672 2734 3041 DCA TABPTR /NO, STORE INSTR ADR
1673 2735 1441 TAD I TABPTR /GET INSTR
1674 2736 0375 AND (7007) /MASK INSTR CODE
1675 2737 1033 TAD SAVE /ADD IOT
1676 2740 3441 DCA I TABPTR /STORE NEW IO INSTR
1677 2741 2034 ISZ COUNT /INC COUNT
1678 2742 5331 JMP MIOTA /CONTINUE THIS IOT
1679 2743 1030 TAD IOTSEL /GET IOT SELECTION
1680 2744 0142 AND P77 /MASK RCVR IOT
1681 2745 7106 CLL RTL
1682 2746 7104 CLL RAL
1683 2747 5330 JMP MIOTB /CONTINUE
1684 2750 1410 MIOTC, TAD I AUTPTR /GET TABLE ENTRY
1685 2751 7450 SNA /DONE?
1686 2752 5716 JMP I MIOT /YES, RETURN
1687 2753 3041 DCA TABPTR /NO, STORE INSTR ADR
1688 2754 1441 TAD I TABPTR /GET INSTR
1689 2755 0375 AND (7007) /MASK INSTR CODE
1690 2756 1027 TAD PTRIOT /ADD IOT

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/MAINDEC-00-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-31

1691 2757 3441 DCA I TABPTR /STORE NEW INSTR
1692 2760 5350 JMP MIOTC /CONTINUE
1693
1694 2775 7007
1695 2776 4534
1696 2777 3142
1697
1698
1699
1700
1701 3000 6133 CKSRV, CLSK /SKIP ON CLOCK FLAG
1702 3001 5213 JMP CKEXIT /RETURN IF NOT CLOCK INTERRUPT
1703 3002 2037 ISZ CKCNT /INC CLOCK COUNT
1704 3003 5213 JMP CKEXIT /RETURN IF COUNT IS NOT ZERO
1705 3004 2036 ISZ LPCNT /INC TIME COUNT
1706 3005 7410 SRP /CONTINUE IF NOT ZERO
1707 3006 5615 JMP I CKSTOP /END OF TIME - PRINT TIMING MSG
1708 3007 3216 DCA ISAVE /SAVE AC
1709 3010 1054 TAD CKFLAG /RESET CLOCK COUNT
1710 3011 3037 DCA CKCNT
1711 3012 1216 TAD ISAVE /RESTORE AC
1712 3013 6001 CKEXIT, ION /INTERRUPT SYSTEM ON
1713 3014 5400 JMP I 0000 /RETURN TO TEST
1714
1715 3015 1110 CKSTOP, T2SPDC /RETURN ADR - PRINT TIMING MSG
1716 3016 0000 ISAVE, 0 /SAVE AC
1717
1718 /TEST EXIT ROUTINE
1719
1720 3017 4507 REXIT, JMS I TKBFG /CHECK FOR KYBD FLAG
1721 3020 4521 GETSW /GET SW REG
1722 3021 0152 AND P1000 /MASK SW2
1723 3022 7640 SZA CLA /LOOP ON TEST?
1724 3023 5237 JMP EXIT3 /YES, RETURN TO TEST
1725 3024 4521 GETSW /GET SW REG
1726 3025 0151 AND P400 /MASK SW3
1727 3026 7640 SZA CLA /WANT SW REG CONTROL?
1728 3027 5467 JMP I TSELCT /YES, SELECT TEST HALT
1729 3030 1052 TAD TLOOP /KYBD CNTRL - LOOP ON TEST?
1730 3031 7640 SZA CLA
1731 3032 5237 JMP EXIT3 /YES, RETURN TO TEST
1732 3033 1051 TAD TRONE /KYBD CNTRL - RUN TEST ONCE?
1733 3034 7640 SZA CLA
1734 3035 5510 JMP I TSEL /YES, SELECT TEST
1735 3036 2023 EXIT1, ISZ TSTNM /INC TEST NUMBER
1736 3037 1070 EXIT3, TAD TTAT /GET TABLE ADR
1737 3040 1023 TAD TSTNM /ADD TEST NUMBER
1738 3041 3041 DCA TABPTR /STORE POINTER
1739 3042 1441 TAD I TABPTR /GET TEST ADR
1740 3043 7550 SNA SPA /SKIP IF OK
1741 3044 5247 JMP EXIT2 /CHECK IF NOT OK
1742 3045 3042 DCA TSTPTR /STORE ADR
1743 3046 5442 JMP I TSTPTR /GO TO TEST
1744 3047 7700 EXIT2, SZA CLA /-1 IN TABLE?

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/MAINDEC-08-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-32

1745 3050 5236 JMP EXIT1 /NO, INC TEST #
1746 3051 1377 TAD (20) /RESTART PRINTING TEST SEQUENCE
1747 3052 3023 DCA TSTNM
1748 3053 5237 JMP EXIT3
1749
1750 /SELECT TEST FROM CPU SW REG BITS 06-11
1751
1752 3054 6002 SELECT, IOF /DISABLE INTERRUPTS
1753 3055 6132 CLDI
1754 3056 7300 CLA CLL
1755 3057 4505 JMS I TPSIE
1756 3060 3050 DCA STRONE /CLEAR CONTROL FLAGS
1757 3061 3051 DCA TRONE
1758 3062 3052 DCA TLOOP
1759 3063 1125 TAD LIERR /RESET INTERRUPT ERROR
1760 3064 3002 DCA ISRV
1761 3065 4507 JMS I TKBFG /CHECK IF KYBD FLAG
1762 3066 7402 HLT /WAIT FOR OPERATOR TO SELECT TEST
1763 /PRESS CONTINUE WHEN READY
1764 3067 4521 GETSW /GET SW REG
1765 3070 0151 AND P400 /MASK SW3
1766 3071 7640 SZA CLA /WANT TO RUN TEST ONCE & HALT?
1767 3072 7040 CMA /YES, SET FLAG
1768 3073 3050 DCA STRONE /STORE FLAG
1769 3074 4521 GETSW /GET SW REG
1770 3075 0142 AND P77 /SAVE TEST #
1771 3076 3023 DCA TSTNM /STORE TEST #
1772 3077 1070 TAD TTAT /GET TABLE ADDRESS
1773 3100 1023 TAD TSTNM /ADD TEST NUMBER
1774 3101 3041 DCA TABPTR /STORE POINTER
1775 3102 1441 TAD I TABPTR /GET TEST ADR
1776 3103 7550 SNA SPA /CHECK IT - OK?
1777 3104 5254 JMP SELECT /NO, GET NEW SELECTION
1778 3105 3042 DCA TSTPTR /OK, STORE ADR
1779 3106 5442 JMP I TSTPTR /GO TO TEST
1780
1781 /ROUTINE TO CHECK FOR KYBD OR SW REG CONTROL
1782 /CALL: CHECK = JMS I TCHECK
1783
1784 3107 0000 RCHECK, 0
1785 3110 3033 DCA SAVE /SAVE AC
1786 3111 4507 JMS I TKBFG /CHECK FOR KYBD FLAG
1787 3112 4521 GETSW /GET SW REG
1788 3113 0151 AND P400 /MASK SW3
1789 3114 7640 SZA CLA /SW3 UP?
1790 3115 7001 IAC /YES, SET AC = +1
1791 3116 1050 TAD STRONE /ADD ONE RUN FLAG
1792 3117 7640 SZA CLA /CHANGE IN SWITCH SETTING?
1793 3120 5467 JMP I TSELECT /YES, SELECT TEST
1794 3121 1033 TAD SAVE /RESTORE AC
1795 3122 5707 JMP I RCHECK /NO, RETURN
1796
1797 /ROUTINE TO WAIT FOR OPERATOR ACTION
1798
1799

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/MAINDEC-08-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-33

1800 3123 0000 RHOLD, 0
1801 3124 3341 DCA HOLDCH /SAVE AC
1802 3125 1053 TAD TPFLG /TERMINAL THERE?
1803 3126 7650 SNA CLA /BRANCH IF YES
1804 3127 5336 JMP RHOLDA /HALT IF NO TERMINAL
1805 3130 4455 TYPE /TYPE WAIT MSG
1806 3131 4777 WTMMSG
1807 3132 1341 TAD HOLDCH /RESTORE AC
1808 3133 4472 JMS I TKSF /WAIT FOR KYBD FLAG
1809 3134 5333 JMP /-1
1810 3135 5723 JMP I RHOLD /RETURN
1811 3136 1341 RHOLDA, TAD HOLDCH /RESTORE AC
1812 3137 7402 HLT /HALT
1813 3140 5723 JMP I RHOLD /RETURN
1814
1815 3141 0000 HOLDCH, 0 /SAVE AC
1816
1817 /ROUTINE TO CHECK FOR PARALLEL I/O
1818
1819 3142 0000 OP1CHK, 0
1820 3143 3356 DCA SAVEAC /SAVE THE ENTERING AC
1821 3144 1021 TAD PARAM /GET HARDWARE WORD 1
1822 3145 7004 RAL /PUT OPTION 1 BIT INTO BIT 0
1823 3146 7710 SPA CLA /IS LA100 RUNNING ON PARALLEL I/O
1824 3147 5353 JMP ,+4 /YES-GO GET ADDRESS FOR PARALLEL I/O
1825 3150 2342 ISZ OP1CHK /BUMP RETURN POINTER
1826 3151 1356 TAD SAVEAC /RESTORE THE AC
1827 3152 5742 JMP I OP1CHK /RETURN TO IOT SUBROUTINE
1828 3153 1742 TAD I OP1CHK /GET ADDRESS OF PARALLEL I/O
1829 3154 3342 DCA OP1CHK /SAVE IT FOR RETURN
1830 3155 5351 JMP ,+4 /RETURN TO EXECUTE PARALLEL I/O CODE
1831
1832 3156 0000 SAVEAC, 0
1833
1834 3177 0020 PAGE
1835 3200 PAGE
1836
1837 /ROUTINE TO CHECK FOR KYBD FLAG
1838 /WHEN LOOKING FOR CONTROL FROM THE CONSOLE DEVICE KEYBOARD
1839 /ALSO CHECKS FOR DYNAMIC SOFTWARE SWITCH REGISTER CONTROL WHEN
1840 /USING SOFTWARE SWITCHES
1841 3200 0000 KYBDF, 0
1842 3201 7300 CLA CLL /CLEAR
1843 3202 1053 TAD TPFLG /GET TERMINAL FLAG
1844 3203 7650 SNA CLA /TERMINAL THERE?
1845 3204 5600 JMP I KYBDF /NO, RETURN
1846 3205 4472 JMS I TKSF /KYBD FLAG SET?
1847 3206 5600 JMP I KYBDF /NO, RETURN
1848 3207 4475 JMS I TKRB /YES, READ CHAR
1849 3210 0145 AND P177 /MASK BIT 0
1850 3211 3324 DCA KYBDC /SAVE CHAR
1851 3212 1021 TAD PARAM /USING SOFTWARE SWITCH REG?
1852 3213 7710 SPA CLA
1853 3214 5313 JMP KFA /NO, CONTINUE

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/MAINDEC-08-DILAC-B-L			PAL10	V142A	20-DEC-76	9116	PAGE 1-34
1854	3215	1324		TAD	KYBDC	/YES, GET CHAR	
1855	3216	1157		TAD	M7	/CHAR = BEL <007> ?	
1856	3217	7640		SZA CLA			
1857	3220	5313		JMP	KFA	/NO, CHECK CHAR AGAIN FOR OTHER CONTROLS	
1858	3221	7300	KFB,	CLA CLL		/CLEAR AC AND LINK	
1859	3222	3325		DCA	TTYIN	/CLEAR NEW SWITCH SETTINGS	
1860	3223	3326		DCA	INFLAG	/CLEAR INPUT FLAG	
1861	3224	4455		TYPE		/TYPE MSG	
1862	3225	4766		DSMSG1			
1863	3226	1020		TAD	SWITCH	/GET CURRENT SOFTWARE SWITCH SETTING	
1864	3227	4523		JMS I	TPOCT	/TYPE IT	
1865	3230	4455		TYPE		/TYPE REST OF MSG	
1866	3231	4772		DSMSG2			
1867	3232	4472	KFF,	JMS I	TKSF	/KYBD FLAG?	
1868	3233	5232		JMP	,-1	/NO, WAIT	
1869	3234	4475		JMS I	TKRB	/YES, READ CHAR	
1870	3235	0145		AND	P177	/MASK CHAR - MAKE 7-BIT ASCII	
1871	3236	3324		DCA	KYBDC	/SAVE CHAR	
1872	3237	1164		TAD	M25	/CHECK CHAR	
1873	3240	1324		TAD	KYBDC		
1874	3241	7640		SZA CLA		/CHAR = CONTROL-U	
1875	3242	5246		JMP	KFC	/NO, CHECK AGAIN	
1876	3243	4455		TYPE		/YES, TYPE CONTROL-U, CR-LF	
1877	3244	5445		CNTLU			
1878	3245	5221		JMP	KFB	/RESTART ROUTINE	
1879	3246	1161	KFC,	TAD	M15	/CHECK IF CHAR = CR?	
1880	3247	1324		TAD	KYBDC		
1881	3250	7640		SZA CLA		/CHAR = CR?	
1882	3251	5262		JMP	KFD	/NO, CHECK AGAIN	
1883	3252	4455		TYPE		/YES, ECHO CR-LF	
1884	3253	5441		CRLF			
1885	3254	1326		TAD	INFLAG	/CHECK INPUT FLAG	
1886	3255	7650		SNA CLA			
1887	3256	5600		JMP I	KYBDF	/LEAVE SW SETTINGS ALONE IF NO INPUT	
1888	3257	1325		TAD	TTYIN	/SET NEW SWITCH SETTINGS	
1889	3260	3020		DCA	SWITCH		
1890	3261	5600		JMP I	KYBDF	/RETURN TO TEST	
1891	3262	1160	KFD,	TAD	M12	/CHECK IF CHAR = LF	
1892	3263	1324		TAD	KYBDC		
1893	3264	7640		SZA CLA			
1894	3265	5276		JMP	KFE	/NO, CHECK AGAIN	
1895	3266	4455		TYPE		/YES, ECHO CR-LF	
1896	3267	5441		CRLF			
1897	3270	1326		TAD	INFLAG	/CHECK INPUT FLAG	
1898	3271	7650		SNA CLA			
1899	3272	5510		JMP I	TTSEL	/LEAVE SW SETTINGS ALONE IF NO INPUT	
1900	3273	1325		TAD	TTYIN	/SET NEW SWITCH SETTINGS	
1901	3274	3020		DCA	SWITCH		
1902	3275	5510		JMP I	TTSEL	/SELECT TEST	
1903	3276	1324	KFE,	TAD	KYBDC	/GET CHAR	
1904	3277	4522		JMS I	PDIGIT	/PRINT OCTAL DIGIT ALWAYS AS BEING STORED	
1905	3300	1324		TAD	KYBDC	/GET CHAR AGAIN	
1906	3301	0127		AND	P7	/MASK OCTAL DIGIT FROM ASCII CODE	
1907	3302	3324		DCA	KYBDC	/SAVE IT	
1908	3303	1325		TAD	TTYIN	/GET CURRENT SWITCH SETTING	

/MAINDEC-08-DILAC-B-L			PAL10	V142A	20-DEC-76	9116	PAGE 1-35
1909	3304	7104		CLL RAL		/ROTATE SWITCH SETTINGS TO ADD NEW ONE	
1910	3305	7104		CLL RAL			
1911	3306	7104		CLL RAL			
1912	3307	1324		TAD	KYBDC	/ADD NEW SWITCHES	
1913	3310	3325		DCA	TTYIN	/SAVE NEW SETTING	
1914	3311	2326		ISZ	INFLAG	/SET INPUT FLAG	
1915	3312	5232		JMP	KFF	/CONTINUE	
1916	3313	1324	KFA,	TAD	KYBDC	/GET CHAR AGAIN	
1917	3314	1174		TAD	M177	/CHAR = RUBOUT?	
1918	3315	7650		SNA CLA			
1919	3316	5510		JMP I	TTSEL	/YES, GET TEST SELECTION	
1920	3317	1324		TAD	KYBDC	/NO, GET CHAR AGAIN	
1921	3320	1155		TAD	M3	/CHAR = CNTL C ?	
1922	3321	7650		SNA CLA			
1923	3322	5466		JMP I	TKBDST	/YES, GET # COLUMNS	
1924	3323	5600		JMP I	KYBDF	/NO, RETURN	
1925							
1926	3324	0000	KYBDC,	0		/INPUT CHAR	
1927	3325	0000	TTYIN,	0		/SOFTWARE SWITCH INPUT	
1928	3326	0000	INFLAG,	0		/INPUT FLAG	
1929		3400	PAGE				
1930							
1931							
1932	3400	4451	KBTAB,	READQ		/INPUT ERROR	
1933	3401	3422		KYBDAA		/3 DIGIT # INPUT	
1934	3402	3433		KYBDA		/2 DIGIT # INPUT	
1935	3403	3447		KYBDB		/1 DIGIT # INPUT	
1936	3404	4451		READQ		/INPUT ERROR	
1937							
1938							
1939							
1940							
1941	3405	4455	KYBDST,	TYPE		/TYPE COLUMNS MSG	
1942	3406	4746		COLUMN			
1943	3407	3026		DCA	WIDTH	/CLEAR COLUMN COUNT	
1944	3410	4511		JMS I	READ	/READ # COLUMNS	
1945	3411	1377		TAD	(READT-1	/GET TABLE ADR	
1946	3412	3010		DCA	AUTPTR	/SET TABLE POINTER	
1947	3413	1034		TAD	COUNT	/GET CHAR COUNT FROM INPUT ROUTINE	
1948	3414	7041		CIA		/MAKE IT POSITIVE	
1949	3415	1376		TAD	(KBTAB	/ADD TABLE STARTING ADR	
1950	3416	3033		DCA	SAVE	/SAVE TABLE ENTRY ADR	
1951	3417	1433		TAD I	SAVE	/GET TABLE ENTRY	
1952	3420	3033		DCA	SAVE	/SAVE ADR FOR CONVERSION ROUTINE	
1953	3421	5433		JMP I	SAVE	/CONVERT INPUT NUMBER TO BINARY (OCTAL)	
1954	3422	1410	KYBDAA,	TAD I	AUTPTR	/GET CHAR	
1955	3423	4514		JMS I	CHKNR	/CHECK IF NUMBER & MAKE OCTAL	
1956	3424	7450		SNA		/ZERO?	
1957	3425	5233		JMP	KYBDA	/YES, CONTINUE	
1958	3426	7041		CIA		/NEGATE #	
1959	3427	3034		DCA	COUNT	/STORE IN COUNT	
1960	3430	1173		TAD	M144	/CONVERT TO BINARY	
1961	3431	2034		ISZ	COUNT		
1962	3432	5230		JMP	,-2		
1963	3433	3026	KYBDA,	DCA	WIDTH	/STORE #	

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1964 3434 1410 TAD I AUTPTR /GET NEXT DIGIT
1965 3435 4514 JMS I CHKNR /CHECK IF #
1966 3436 7450 SNA /ZERO?
1967 3437 5247 JMP KYBDB /YES, CONTINUE
1968 3440 7841 CIA /NEGATE #
1969 3441 3034 DCA COUNT /STORE IN COUNT
1970 3442 1160 TAD M12 /CONVERT TO BINARY
1971 3443 2034 ISZ COUNT
1972 3444 5242 JMP ,=2
1973 3445 1026 TAD WIDTH /ADD TO CURRENT TOTAL
1974 3446 3026 DCA WIDTH /STORE NEW #
1975 3447 1410 KYBDB, TAD I AUTPTR /GET LAST DIGIT
1976 3450 4514 JMS I CHKNR /CHECK IF #
1977 3451 7841 CIA /NEGATE IT
1978 3452 1826 TAD WIDTH /ADD TO CURRENT TOTAL
1979 3453 3026 DCA WIDTH /STORE WIDTH
1980 3454 1126 TAD P2 /CHECK COLUMN SELECTION
1981 3455 1026 TAD WIDTH
1982 3456 7740 SNA SZA CLA /# COLUMNS <2?
1983 3457 5512 JMP I TREADQ /YES, INPUT ERROR
1984 3460 1147 TAD P204
1985 3461 1026 TAD WIDTH
1986 3462 7710 SPA CLA /# COLUMNS >132 (10)?
1987 3463 5512 JMP I TREADQ /YES, INPUT ERROR
1988 3464 5510 JMP I TSEL /NO, GO TO TEST SELECT
1989
1990 /ROUTINE TO SELECT TEST FROM CONSOLE DEVICE KYBD
1991 /AND DETERMINE TEST ACTION BY INPUT CONTROL CHAR
1992 /TEST NUMBER MUST BE A 3 DIGIT OCTAL NUMBER, FOLLOWED
1993 /BY ONE OF THE CONTROL CHARACTERS BELOW:
1994
1995 /PERIOD . = RUN TEST ONCE & SELECT NEXT TEST
1996 /L = LOOP ON SELECTED TEST
1997 /S = START TEST SEQUENCE WITH SELECTED TEST
1998
1999 3465 6002 TSEL, IOF /DISABLE INTERRUPTS
2000 3466 6132 CLDI
2001 3467 7300 CLA CLL
2002 3470 4505 JMS I TPSIE
2003 3471 3051 DCA TRONE /CLEAR PROGRAM CONTROL FLAGS
2004 3472 3052 DCA TLOOP
2005 3473 3050 DCA STRONE
2006 3474 1125 TAD L1ERR /SET INTERRUPT ERROR ADR
2007 3475 3002 DCA ISRV
2008 3476 4455 TYPE /TYPE SELECT TEST MSG
2009 3477 4755 SELTST
2010 3500 4511 JMS I READ /GET SELECTION
2011 3501 1524 TAD I LREADT /FIRST CHAR = CONTROL-C ?
2012 3502 1155 TAD M3
2013 3503 7650 SNA CLA
2014 3504 5466 JMP I TKBDST /YES, GET # COLUMNS
2015 3505 2034 ISZ COUNT /CORRECT # CHAR'S INPUT?
2016 3506 5512 JMP I TREADQ /NO, INPUT ERROR
2017 3507 1377 TAD (READT-1) /GET TABLE ADR
2018 3510 3010 DCA AUTPTR /SET POINTER

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2019 3511 1410 TAD I AUTPTR /GET FIRST DIGIT
2020 3512 4513 JMS I CHKOCT /CHECK IF OCTAL
2021 3513 7106 CLL RTL /SHIFT TO CORRECT POSITION
2022 3514 7104 CLL RAL
2023 3515 3023 DCA TSTNM /STORE
2024 3516 1410 TAD I AUTPTR /GET SECOND DIGIT
2025 3517 4513 JMS I CHKOCT /CHECK & MAKE OCTAL
2026 3520 1023 TAD TSTNM /ADD TO CURRENT #
2027 3521 3023 DCA TSTNM /STORE SELECTED TEST #
2028 3522 1070 TAD TTAT /GET TEST ADR TABLE ADR
2029 3523 1023 TAD TSTNM /ADD TEST #
2030 3524 3041 DCA TABPTR /STORE POINTER
2031 3525 1441 TAD I TABPTR /GET TEST ADR
2032 3526 7550 SNA SPA /TEST IN TABLE?
2033 3527 5512 JMP I TREADQ /NO = INVALID TEST #
2034 3530 3042 DCA TSTPTR /YES, STORE TEST ADR
2035 3531 1410 TAD I AUTPTR /GET CONTROL CHAR
2036 3532 3033 DCA SAVE /SAVE CONTROL CHAR
2037 3533 1171 TAD M56 /CHECK IF PERIOD
2038 3534 1033 TAD SAVE
2039 3535 7640 SZA CLA /PERIOD?
2040 3536 5342 JMP TSEL1 /NO, CONTINUE
2041 3537 7240 CLA CMA /YES, SET ONE-RUN FLAG
2042 3540 3051 DCA TRONE
2043 3541 5355 JMP TSELX /GO TO TEST
2044
2045 3542 1033 TSEL1, TAD SAVE /GET CHAR
2046 3543 0375 AND (137 /ALLOW LOWER CASE
2047 3544 1374 TAD (-114 /CHECK CHAR
2048 3545 7440 SZA /CHAR=L?
2049 3546 5352 JMP TSEL2 /NO, CONTINUE
2050 3547 7240 CLA CMA /YES, SET LOOP ON TEST FLAG
2051 3550 3052 DCA TLOOP
2052 3551 5355 JMP TSELX /GO TO TEST
2053 3552 1157 TSEL2, TAD M7 /CHECK CHAR
2054 3553 7640 SZA CLA /CHAR=S?
2055 3554 5512 JMP I TREADQ /INVALID INPUT, READ AGAIN
2056 3555 4455 TSELX, TYPE /YES, TYP CR-LF AND GO TO TEST
2057 3556 5441 CRLF
2058 3557 5442 JMP I TSTPTR
2059
2060 3574 7664
2061 3575 0137
2062 3576 3400
2063 3577 4503
2064
2065 PAGE
2066 /ERROR ROUTINE, ERROR MSG IS IN FORM:
2067 /
2068 /TEST #XX, PC=XXXX, ERROR #XXXX, MESSAGE>>>>>
2069
2070 3600 0000 RERROR, S
2071 3601 7240 CLA CMA /GET ERROR PC
2072 3602 1200 TAD RERROR
2073 3603 3025 DCA ERRPC /SAVE IT

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/MAINDEC-08-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-38

2073 3604 1600 TAD I RERROR /GET ERROR NUMBER
2074 3605 3024 DCA ERRNM /SAVE IT
2075 3606 4521 GETSW /GET SW REG
2076 3607 7004 RAL /GET SW 1
2077 3610 7710 SPA CLA /WANT ERROR MSG?
2078 3611 5250 JMP IERRT /NO, SKIP PRINT OUT
2079 3612 1053 TAD TPFLG /CHECK IF TERMINAL EXISTS
2080 3613 7650 SMA CLA
2081 3614 5250 JMP IERRT /NO, SKIP PRINT OUT
2082 3615 4455 TYPE /PRINT FIRST PART OF MSG
2083 3616 5036 ETSTNO
2084 3617 1023 TAD TSTNM /GET TEST #
2085 3620 7012 RTR /GET FIRST DIGIT
2086 3621 7010 RAR
2087 3622 4522 JMS I PDIGIT /PRINT IT
2088 3623 1023 TAD TSTNM /GET TEST #
2089 3624 4522 JMS I PDIGIT /PRINT SECOND DIGIT
2090 3625 4455 TYPE /TYPE MORE OF MSG
2091 3626 5043 PCMSG
2092 3627 1025 TAD ERRPC /GET ERROR PC
2093 3630 4523 JMS I TPOCT /PRINT IT
2094 3631 4455 TYPE /TYPE MORE OF MSG
2095 3632 5047 ERR
2096 3633 1024 TAD ERRNM /GET ERROR #
2097 3634 4523 JMS I TPOCT /TYPE IT
2098 3635 4455 TYPE /TYPE SPACES
2099 3636 5055 ERRS
2100 3637 1377 TAD (EMAT-1 /GET ERROR MSG ADR TABLE
2101 3640 1024 TAD ERRNM /ADD ERROR #
2102 3641 3245 DCA RSAVE /STORE POINTER
2103 3642 1645 TAD I RSAVE /GET MSG ADR
2104 3643 3245 DCA RSAVE /SET FOR TYPE
2105 3644 4455 TYPE /TYPE END OF MSG
2106 3645 0000 RSAVE, 0
2107 3646 4455 TYPE /TYPE CR-LF
2108 3647 5441 CRLF
2109 3650 4521 IERRT, GETSW /GET SW REG
2110 3651 7700 SMA CLA /STOP ON ERROR?
2111 3652 5255 JMP ,+3 /NO, RETURN
2112 3653 1024 TAD ERRNM /YES, GET ERROR #
2113 3654 4457 HOLD /STOP
2114 3655 2200 ISZ RERROR /SET RETURN ADR
2115 3656 7300 CLA CLL /CLEAR AC AND LINK
2116 3657 5600 JMP I RERROR /RETURN
2117
2118 /ROUTINE TO PRINT AN OCTAL DIGIT ON THE CONSOLE DEVICE
2119
2120 3660 0000 RPDIGT, 0
2121 3661 0127 AND P7 /MASK DIGIT
2122 3662 1140 TAD P00 /MAKE ASCII
2123 3663 4515 JMS I GOUT /PRINT IT
2124 3664 5660 JMP I RPDIGT /RETURN
2125
2126 /ROUTINE TO CONVERT 4 DIGIT OCTAL NUMBER TO ASCII AND TYPE ON CONSOLE
2127

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/MAINDEC-08-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-39

2128
2129 3665 0000 POCT, 0
2130 3666 3312 DCA OCTSAV /SAVE NUMBER
2131 3667 1312 TAD OCTSAV /GET NUMBER AGAIN
2132 3670 7012 RTR /GET FIRST DIGIT
2133 3671 7012 RTR
2134 3672 7012 RTR
2135 3673 7012 RTR
2136 3674 7010 RAR
2137 3675 4522 JMS I PDIGIT /PRINT IT
2138 3676 1312 TAD OCTSAV /GET NUMBER
2139 3677 7012 RTR /GET SECOND DIGIT
2140 3700 7012 RTR
2141 3701 7012 RTR
2142 3702 4522 JMS I PDIGIT /PRINT IT
2143 3703 1312 TAD OCTSAV /GET NUMBER
2144 3704 7012 RTR /GET THIRD DIGIT
2145 3705 7010 RAR
2146 3706 4522 JMS I PDIGIT /PRINT IT
2147 3707 1312 TAD OCTSAV /GET NUMBER
2148 3710 4522 JMS I PDIGIT /PRINT LAST DIGIT
2149 3711 5665 JMP I POCT /RETURN
2150
2151 3712 0000 OCTSAV, 0
2152
2153 /ROUTINE TO CONVERT OCTAL NUMBER TO 3 DIGIT DECIMAL NUMBER IN ASCII STRING
2154 /RETURN WITH CONVERT NUMBER STRING IN CNVMSG,
2155
2156 3713 0000 CNVRT, 0
2157 3714 3361 DCA CNVNM /SAVE NUMBER
2158 3715 3046 DCA HUNDS /CLEAR CONVERSION COUNTERS
2159 3716 3045 DCA TENS
2160 3717 3044 DCA ONES
2161 3720 1361 TAD CNVNM /GET NUMBER
2162 3721 2046 ISZ HUNDS /GET HUNDREDS DIGIT
2163 3722 1173 TAD M144
2164 3723 7500 SMA
2165 3724 5321 JMP ,+3
2166 3725 1376 TAD (144
2167 3726 2045 ISZ TENS /GET TENS DIGIT
2168 3727 1160 TAD M12
2169 3730 7500 SMA
2170 3731 5326 JMP ,+3
2171 3732 3044 DCA ONES /STORE ONES DIGIT -12
2172 3733 1375 TAD (CNVMSG /SET MSG ADR
2173 3734 3362 DCA MSGPTR
2174 3735 1046 TAD HUNDS /GET HUNDREDS DIGIT
2175 3736 1137 TAD P57 /MAKE ASCII
2176 3737 7006 RTL /SET FIRST CHAR
2177 3740 7006 RTL
2178 3741 7006 RTL
2179 3742 0172 AND M100 /MASK OTHER BITS
2180 3743 3762 DCA I MSGPTR /STORE CHAR IN MSG
2181 3744 1045 TAD TENS /GET TENS DIGIT
2182 3745 1137 TAD P57 /MAKE ASCII

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2183 3746 1762 TAD I MSGPTR /ADD FIRST CHAR
2184 3747 3762 DCA I MSGPTR /STORE CHAR PAIR
2185 3750 2362 ISZ MSGPTR /INC MSG POINTER
2186 3751 1944 TAD ONES /GET ONES DIGIT
2187 3752 1141 TAD P72 /MAKE ASCII
2188 3753 7306 RTL /ROTATE TO CORRECT POSITION
2189 3754 7006 RTL
2190 3755 7006 RTL
2191 3756 8172 AND M100 /MASK OTHER BITS (NULL = TERMINATOR)
2192 3757 3762 DCA I MSGPTR /STORE CHAR
2193 3760 5713 JMP I CNVRT /RETURN
2194
2195 3761 0000 CNVNM, 0 /SAVE NUMBER
2196 3762 0000 MSGPTR, 0 /MSG POINTER
2197
2198 3775 5435
2199 3776 8144
2200 3777 4677
2200 4000

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2201
2202 /TYPE ROUTINE = TO TYPE ASCII MESSAGES
2203 /CALL: TYPE = JUMP TO TYPE ROUTINE
2204 / MESADR = MESSAGE ADDRESS
2205 /RETURN WITH CLEAR AC AND LINK
2206
2207 4000 0000 RTYPE, 0
2208 4001 7300 CLA CLL /CLEAR
2209 4002 1053 TAD TPFLG /GET TERMINAL FLAG
2210 4003 7640 SZA CLA /TERMINAL THERE?
2211 4004 5207 JMP ,+3 /YES, CONTINUE
2212 4005 2200 ISZ RTYPE /INC RETURN ADR
2213 4006 5600 JMP I RTYPE /RETURN
2214 4007 1600 TAD I RTYPE /GET MSG ADR
2215 4010 3043 DCA MSGADR /STORE
2216 4011 1443 RT1, TAD I MSGADR /GET CHAR PAIR
2217 4012 7112 CLL RTR
2218 4013 7112 CLL RTR
2219 4014 7112 CLL RTR
2220 4015 4222 JMS OUT /PRINT CHAR
2221 4016 1443 TAD I MSGADR /GET CHAR PAIR
2222 4017 4222 JMS OUT /PRINT CHAR
2223 4020 2043 ISZ MSGADR /ADR NEXT CHAR PAIR
2224 4021 5211 JMP RT1 /CONTINUE
2225
2226 4022 0000 OUT, 0
2227 4023 8142 AND P77 /MASK CHAR
2228 4024 7450 SNA /CONTINUE IF NOT END
2229 4025 5205 JMP RT2 /ZERO, RETURN
2230 4026 3033 DCA SAVE /SAVE CHAR
2231 4027 1033 TAD SAVE /GET CHAR
2232 4030 1377 TAD (-53 /CHECK CHAR
2233 4031 7450 SNA /WANT CR-LF?
2234 4032 5244 JMP OUTCL /YES, DO CR-LF
2235 4033 1162 TAD M20 /CHECK CHAR
2236 4034 7650 SNA CLA /WANT LF?

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2237 4035 5251 JMP OUTLF /YES, DO LF
2238 4036 1033 TAD SAVE /GET CHAR AGAIN
2239 4037 8134 AND P40 /MAKE ASCII
2240 4040 7650 SNA CLA
2241 4041 1143 TAD P100
2242 4042 1033 TAD SAVE
2243 4043 5253 JMP OUTCHR /PRINT CHAR
2244
2245 4044 7300 OUTCL, CLA CLL /CLEAR
2246 4045 1132 TAD P15 /GET CR
2247 4046 4501 JMS I TTLS /PRINT
2248 4047 4476 JMS I TTST /WAIT FOR READY
2249 4050 5247 JMP ,+1
2250 4051 7300 OUTLF, CLA CLL /CLEAR
2251 4052 1131 TAD P12 /GET LF
2252 4053 4501 OUTCHR, JMS I TTLS /PRINT CHR
2253 4054 4476 JMS I TTST /WAIT FOR READY
2254 4055 5254 JMP ,+1
2255 4056 7300 CLA CLL /CLEAR
2256 4057 5622 JMP I OUT /RETURN
2257
2258 /ROUTINE TO LOAD SINGLE CHARACTERS TO LA100 PRINTER
2259 /CALL: LOAD
2260
2261 4060 0000 RLOAD, 0
2262 4061 4464 CHECK /CHECK FOR CONTROL
2263 4062 7300 RLA, CLA CLL /CHECK READY TIME
2264 4063 3303 DCA RLDC
2265 4064 1376 TAD (-300
2266 4065 3304 DCA RLDC
2267 4066 2303 ISZ RLDC
2268 4067 5275 JMP RLC
2269 4070 2304 ISZ RLDC
2270 4071 5275 JMP RLC
2271 4072 4463 ERROR /PRINTER NOT READY
2272 4073 0016 16
2273 4074 5660 JMP I RLOAD /EXIT
2274 4075 4502 JMS I TPSKF /CHECK FOR PRINTER READY
2275 4076 5266 JMP RLB /WAIT FOR READY
2276 4077 1033 TAD SAVE
2277 4100 4506 JMS I TPCLP /LOAD CHAR
2278 4101 7300 CLA CLL /CLEAR AC AND LINK
2279 4102 5660 JMP I RLOAD /RETURN
2280
2281 4103 0000 RLDC, 0 /DELAY COUNT,
2282 4104 0000 RLDC, 0
2283
2284
2285
2286 /ROUTINE TO LOAD MULTIPLE CHARACTERS (NOT TEXT STRINGS) TO LA100
2287 /WILL LOAD CHAR ONCE IT COUNT = 0
2288 /PUT CHAR IN AC AND CHAR COUNT IN "COUNT" (NEGATIVE NUMBER)
2289 /CALL: MLOAD
2290
2291 4105 0000 RMLOAD, 0

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/MAINDEC-08-DILAC-B-L PAL10 V142A 20-DEC-76 9116 PAGE 1-42

2292 4106 3033 DCA SAVE /SAVE CHAR
2293 4107 1033 TAD SAVE /GET CHAR
2294 4110 4456 LOAD /LOAD CHAR
2295 4111 2034 ISZ COUNT /INC COUNT
2296 4112 1034 TAD COUNT /CHECK IF WAS ZERO
2297 4113 7710 SPA CLA /SKIP IF WAS ZERO OR IS ZERO
2298 4114 5307 JMP RMLoad+2 /CONTINUE
2299 4115 5705 JMP I RMLoad /RETURN
2300 4176 7500
2301 4177 7725
2302 4200

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2302 /ROUTINE TO PRINT ASCII MESSAGES ON THE LA180 PRINTER
2303 /SPECIAL CHARACTERS ARE LISTED AT THE BEGINNING OF THE
2304 /PROGRAM MESSAGE AREA.
2305 /CALL: PRINT - CALL TO SUBROUTINE
2306 /MESADR - MESSAGE ADDRESS
2307 /RETURN WITH CLEAR AC AND LINK
2308
2309

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2310 4200 0000 RPRINT, 0
2311 4201 7300 CLA CLL /CLEAR
2312 4202 1600 TAD I RPRINT /GET MESG ADR
2313 4203 3043 DCA MSGADR /STORE
2314 4204 2200 ISZ RPRINT /INC RETURN ADR
2315 4205 1443 RP1, TAD I MSGADR /GET CHAR PAIR
2316 4206 7112 CLL RTR
2317 4207 7112 CLL RTR
2318 4210 7112 JMS PRT /LOAD CHAR
2319 4211 4216 TAD I MSGADR /GET PAIR AGAIN
2320 4212 1443 JMS PRT /LOAD CHAR
2321 4213 4216 ISZ MSGADR /SET NEXT CHAR ADR
2322 4214 2043 JMP RP1 /CONTINUE
2323 4215 5205
2324
2325 4216 0000 PRT, 0
2326 4217 0142 AND P77 /MASK CHAR
2327 4220 7450 SNA /CONTINUE IF NOT END
2328 4221 5600 JMP I RPRINT /ZERO, RETURN
2329 4222 3033 DCA SAVE /SAVE CHAR
2330 4223 1033 TAD SAVE /GET AGAIN
2331 4224 1377 TAD (-41 /CHECK CHAR
2332 4225 7450 SNA /WANT FF?
2333 4226 5246 JMP PRTFF /YES, DO FF
2334 4227 1160 TAD M12 /CHECK AGAIN
2335 4230 7450 SNA /WANT CRLF?
2336 4231 5254 JMP PRTCL /YES, DO CRLF
2337 4232 1376 TAD (-17 /CHECK AGAIN
2338 4233 7450 SNA /WANT CR ONLY?
2339 4234 5251 JMP PRTCR /YES, DO CR
2340 4235 1153 TAD M1 /CHECK AGAIN
2341 4236 7650 SNA CLA /WANT LF ONLY?
2342 4237 5257 JMP PRTLF /YES, DO LF
2343 4240 1033 TAD SAVE /GET CHAR AGAIN
2344 4241 0134 AND P40 /MAKE ASCII
2345 4242 7650 SNA CLA

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2346 4243 1143 TAD P100
2347 4244 1033 TAD SAVE
2348 4245 5260 JMP PRTCHR /LOAD CHAR
2349
2350 4246 7300 PRTFF, CLA CLL /CLEAR
2351 4247 1375 TAD (-14 /GET FF
2352 4250 5260 JMP PRTCHR /GO LOAD FF
2353 4251 7300 PRTCR, CLA CLL /CLEAR
2354 4252 1132 TAD P15 /GET CR
2355 4253 5260 JMP PRTCHR /GO LOAD CR
2356 4254 7300 PRTCL, CLA CLL /CLEAR
2357 4255 1132 TAD P15 /GET CR
2358 4256 4456 LOAD /LOAD CR
2359 4257 1131 PRTLF, TAD P12 /GET LF
2360 4260 4456 PRTCHR, LOAD /LOAD CHAR
2361 4261 5616 JMP I PRT /RETURN
2362
2363 /ROUTINE TO PRINT TEST HEADER ON LA180
2364 /# OF COLUMNS WILL ALSO BE PRINTED FOR TEST 25 ONLY
2365
2366 4262 0000 RPRHDR, 0
2367 4263 7300 CLA CLL /CLEAR
2368 4264 1145 TAD P177 /SET RUBOUT
2369 4265 4456 LOAD /CLEAR LA180 CHAR BUFFER
2370 4266 1331 TAD SVTST /GET SAVED TEST #
2371 4267 7041 CIA /NEGATE IT
2372 4270 1023 TAD TSTNM /ADD CURRENT TEST #
2373 4271 7650 SNA CLA /CHECK IF PRINTED THIS # LAST
2374 4272 5326 JMP HDRX /YES, PRINT BLANK LINE & EXIT
2375 4273 1023 TAD TSTNM /NO, STORE NEW NUMBER
2376 4274 3331 DCA SVTST
2377 4275 4461 PRINT /LOAD TEST # MSG
2378 4276 5020 TSTNO
2379 4277 1023 TAD TSTNM /GET TEST #
2380 4300 7012 RTR /GET FIRST DIGIT
2381 4301 7010 RAR
2382 4302 0127 AND P7 /MAKE ASCII
2383 4303 1140 TAD P60
2384 4304 4456 LOAD /LOAD IT
2385 4305 1023 TAD TSTNM /GET TEST #
2386 4306 0127 AND P7 /GET LAST DIGIT
2387 4307 1140 TAD P60 /MAKE ASCII
2388 4310 4456 LOAD /LOAD IT
2389 4311 4461 PRINT /PRINT LINE
2390 4312 5440 LF
2391 4313 1164 TAD M25 /CHECK IF TEST 25
2392 4314 1023 TAD TSTNM
2393 4315 7640 SZA CLA /IS IT?
2394 4316 5326 JMP HDRX /NO, PRINT BLANK LINE & EXIT
2395 4317 1026 TAD WIDTH /GET NUMBER OF COLUMNS
2396 4320 7041 CIA /MAKE POSITIVE
2397 4321 4517 JMS I TCNVRT /CONVERT NUMBER TO DECIMAL, ASCII STRING
2398 4322 4461 PRINT /PRINT IT
2399 4323 5435 CNVMSG
2400 4324 4461 PRINT

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2401 4325 5030 COLMN
2402 4326 4461 HDRX, PRINT /BLANK LINE
2403 4327 5440 LF
2404 4330 5662 JMP I RPRHDR /RETURN
2405
2406 4331 0000 SVTST, 0 /SAVE TEST # FOR CHECK
2407
2408 4375 0014
2409 4376 7761
2410 4377 7737
2411 4400 PAGE
2412 /ROUTINE TO READ 4 CHARS FROM THE CONSOLE KEYBOARD
2413 /
2414 /RUBOUTS DELETE CHARACTERS
2415 /CONTROL-U ("U) RESTARTS INPUT ROUTINE
2416
2417 4400 0000 TREAD, 0
2418 4401 7300 READ0, CLA CLL /CLEAR
2419 4402 3303 DCA RFLAG /CLEAR RUBOUT FLAG
2420 4403 1156 READ1, TAD M4 /SET # CHARS TO READ
2421 4404 3034 DCA COUNT /STORE
2422 4405 1124 TAD LREADT /GET CHAR STORE TABLE ADR
2423 4406 3041 DCA TABPTR /SET POINTER
2424 4407 4472 READ2, JMS I TKSF /KYBD FLAG SET?
2425 4410 5207 JMP ,=1 /NO, WAIT
2426 4411 4475 JMS I TKRB /YES, READ CHAR
2427 4412 0145 AND P177 /MAKE ASCII
2428 4413 3441 DCA I TABPTR /SAVE CHAR
2429 4414 1170 TAD M40 /CHECK CHAR
2430 4415 1441 TAD I TABPTR
2431 4416 7650 SNA CLA /CHAR=SPACE?
2432 4417 5207 JMP READ2 /YES, IGNORE IT
2433 4420 1164 TAD M25 /CHAR = CONTROL-U
2434 4421 1441 TAD I TABPTR
2435 4422 7650 SNA CLA
2436 4423 5254 JMP READU /YES, TYPE IT AND RESTART
2437 4424 1174 TAD M177 /CHECK CHAR
2438 4425 1441 TAD I TABPTR
2439 4426 7650 SNA CLA /CHAR=RUBOUT?
2440 4427 5257 JMP READD /YES, DELETE LAST CHAR
2441 4430 1161 TAD M15 /CHECK FOR CR- END OF INPUT
2442 4431 1441 TAD I TABPTR
2443 4432 7650 SNA CLA /CHAR=CR?
2444 4433 5600 JMP I TREAD /YES, RETURN
2445 4434 1303 TAD RFLAG /CHECK RUBOUT FLAG
2446 4435 7650 SNA CLA /RECEIVED RUBOUT?
2447 4436 5241 JMP ,+3 /NO, CONTINUE
2448 4437 1144 TAD P134 /GET BACKSLASH
2449 4440 4515 JMS I GOUT /PRINT IT
2450 4441 3303 DCA RFLAG /CLEAR RUBOUT FLAG
2451 4442 1441 TAD I TABPTR /GET CHAR
2452 4443 4501 JMS I TTLS /ECHO CHAR
2453 4444 4476 JMS I TTSP
2454 4445 5244 JMP ,=1

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2455 4446 2041 ISZ TABPTR /INC TABLE POINTER
2456 4447 2034 ISZ COUNT /INC CHAR COUNT
2457 4450 5207 JMP READ2 /READ CHAR
2458
2459 4451 4455 READQ, TYPE /TYPE QUESTION MASK
2460 4452 5443 QUES
2461 4453 5201 JMP READ0 /READ NEW STRING
2462 4454 4455 READU, TYPE /TYPE CONTROL-U
2463 4455 5445 CNTLU
2464 4456 5201 JMP READ0 /RESTART ROUTINE
2465 4457 7240 READD, CLA CMA /SET AC=-1
2466 4460 1034 TAD COUNT /ADD COUNT
2467 4461 3034 DCA COUNT /STORE NEW COUNT
2468 4462 1377 TAD (4 /CHECK CHAR COUNT
2469 4463 1034 TAD COUNT
2470 4464 7710 SPA CLA /LESS THAN -5?
2471 4465 5203 JMP READ1 /YES, RESTART READ ROUTINE
2472 4466 7240 CLA CMA /SET AC=-1
2473 4467 1041 TAD TABPTR /SUBTRACT ONE FROM TABLE POINTER
2474 4470 3041 DCA TABPTR /STORE NEW POINTER
2475 4471 1303 TAD RFLAG /CHECK RUBOUT FLAG
2476 4472 7640 SZA CLA /SET?
2477 4473 5276 JMP ,+3 /YES, SKIP BACKSLASH
2478 4474 1144 TAD P134 /NO, PRINT BACKSLASH
2479 4475 4515 JMS I GOUT
2480 4476 1441 TAD I TABPTR /GET DELETED CHAR
2481 4477 4515 JMS I GOUT /PRINT IT
2482 4500 7240 CLA CMA /SET RUBOUT FLAG
2483 4501 3303 DCA RFLAG
2484 4502 5207 JMP READ2 /READ NEXT CHAR
2485
2486 4503 0000 RFLAG, 0
2487
2488 4504 0000 READT, 0
2489 4505 0000 0
2490 4506 0000 0
2491 4507 0000 0
2492
2493 /ROUTINE TO CHECK FOR OCTAL DIGIT INPUT
2494
2495 4510 0000 TCKOUT, 0
2496 4511 4320 JMS TCKNR /CHECK IF NUMBER FIRST
2497 4512 0130 AND P10 /CHECK IF OCTAL
2498 4513 7640 SZA CLA /# = 8 OR 9?
2499 4514 5512 JMP I TREAD0 /YES, INPUT ERROR
2500 4515 1033 TAD SAVE /OK, GET #
2501 4516 0127 AND P7 /MAKE OCTAL
2502 4517 5710 JMP I TCKOUT /RETURN
2503
2504
2505
2506 /ROUTINE TO CHECK INPUTTED CHAR IF A NUMBERI
2507
2508
2509 4520 0000 TCKNR, 0

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2510	4521	3033	DCA	SAVE	/SAVE CHAR
2511	4522	1376	TAD	(-60	/CHECK CHAR
2512	4523	1033	TAD	SAVE	
2513	4524	7710	SPA CLA		/NUMBER?
2514	4525	5512	JMP I	TREADQ	/NO, INPUT ERROR
2515	4526	1375	TAD	(-72	/CHECK AGAIN
2516	4527	1033	TAD	SAVE	
2517	4530	7700	SMA CLA		/NUMBER?
2518	4531	5512	JMP I	TREADQ	/NO, INPUT ERROR
2519	4532	1033	TAD	SAVE	/SET CHAR
2520	4533	0374	AND	(17	/MASK NOT EQUAL
2521	4534	5720	JMP I	TCHKNR	/RETURN
2522					
2523					
2524	4535	2601	IOTAB,	RKSF+1	/I-O INSTRUCTION ADDRESS TABLE
2525	4536	2606		RKCC+1	
2526	4537	2611		RKRS+1	
2527	4540	2614		RKPB+1	
2528	4541	2617		RTSF+1	
2529	4542	2624		RTCF+1	
2530	4543	2627		RTPC+1	
2531	4544	2632		RTLS+1	
2532	4545	0000		0	/END OF TTY IOT'S
2533	4546	2637		RPSKF+3	
2534	4547	2651		RPCLF+3	
2535	4550	2661		RPSFB+3	
2536	4551	2673		RPSIE+3	
2537	4552	2705		RPCLP+3	
2538	4553	0000		0	/END OF TABLE
2539					
2540					
2541	4574	0017			
2542	4575	7706			
2543	4576	7720			
2544	4577	0004			
		4600			

PAGE

2545			/TEST ADDRESS TABLE	
2546			/	
2547			/0 = NON-EXISTENT TEST, SKIP IN SEQUENCE	
2548			/-1 = END OF TEST SEQUENCE, RESTART WITH TEST #20	
2549				
2550				
2551	4600	0400	TAT,	TEST0
2552	4601	0714		TEST1
2553	4602	1000		TEST2
2554	4603	0000		0
2555	4604	0000		0
2556	4605	0000		0
2557	4606	0000		0
2558	4607	0000		0
2559	4610	0000		0
2560	4611	0000		0
2561	4612	0000		0
2562	4613	0000		0
2563	4614	0000		0

2564	4615	0000		0	/TEST15
2565	4616	0000		0	/TEST16
2566	4617	0000		0	/TEST17
2567	4620	1200	TEST20		
2568	4621	1227	TEST21		
2569	4622	1274	TEST22		
2570	4623	1331	TEST23		
2571	4624	1400	TEST24		
2572	4625	1600	TEST25		
2573	4626	2000	TEST26		
2574	4627	2054	TEST27		
2575	4630	2200	TEST28		
2576	4631	2212	TEST31		
2577	4632	7777	-1		/TEST32
2578	4633	0000	0		/TEST33
2579	4634	0000	0		/TEST34
2580	4635	0000	0		/TEST35
2581	4636	0000	0		/TEST36
2582	4637	0000	0		/TEST37
2583	4640	0000	0		/TEST40
2584	4641	0000	0		/TEST41
2585	4642	0000	0		/TEST42
2586	4643	0000	0		/TEST43
2587	4644	0000	0		/TEST44
2588	4645	0000	0		/TEST45
2589	4646	0000	0		/TEST46
2590	4647	0000	0		/TEST47
2591	4650	0000	0		/TEST50
2592	4651	0000	0		/TEST51
2593	4652	0000	0		/TEST52
2594	4653	0000	0		/TEST53
2595	4654	0000	0		/TEST54
2596	4655	0000	0		/TEST55
2597	4656	0000	0		/TEST56
2598	4657	0000	0		/TEST57
2599					
2600	4660	2246	TEST60		
2601	4661	2400	TEST61		
2602	4662	2450	TEST62		
2603	4663	2477	TEST63		
2604	4664	0000	0		/TEST64
2605	4665	0000	0		/TEST65
2606	4666	0000	0		/TEST66
2607	4667	0000	0		/TEST67
2608	4670	0000	0		/TEST70
2609	4671	0000	0		/TEST71
2610	4672	0000	0		/TEST72
2611	4673	0000	0		/TEST73
2612	4674	0000	0		/TEST74
2613	4675	0000	0		/TEST75
2614	4676	0000	0		/TEST76
2615	4677	0000	0		/TEST77
2616					
2617					
2618					

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2619      /ERPOR MESSAGE ADDRESS TABLE
2620
2621      4700  5476  EMAT,  ERR1
2622      4701  5511  ERR2
2623      4702  5527  ERR3
2624      4703  5546  ERR4
2625      4704  5561  ERR5
2626      4705  5602  ERR6
2627      4706  5617  ERR7
2628      4707  5640  ERR10
2629      4710  5655  ERR11
2630      4711  5676  ERR12
2631      4712  5711  ERR13
2632      4713  5733  ERR14
2633      4714  5755  ERR15
2634      4715  5777  ERR16
2635
2636      /PROGRAM MESSAGES
2637
2638      /SPECIAL CHARACTERS AND FUNCTIONS:
2639
2640      /      +      =      CRLF
2641      /      !      =      CR
2642      /      ,      =      LF
2643      /      .      =      FF
2644
2645      4716  5315  HEADER, TEXT  '+MAINDEC-08-DILAC-B+LA100 PRINTER DIAGNOSTIC+;'
2646      4717  0111
2647      4720  1604
2648      4721  0503
2649      4722  5560
2650      4723  7055
2651      4724  0411
2652      4725  1401
2653      4726  0355
2654      4727  0253
2655      4730  1401
2656      4731  6170
2657      4732  6040
2658      4733  2022
2659      4734  1116
2660      4735  2405
2661      4736  2240
2662      4737  0411
2663      4740  0107
2664      4741  1617
2665      4742  2324
2666      4743  1103
2667      4744  5373
2668      4745  0000
2669      4746  5343  COLUMN, TEXT  '+# COLUMNS = '
2670      4747  4003
2671      4750  1714
2672      4751  2515
2673      4752  1623

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2647      4753  4075
2648      4754  4000
2649      4755  5323  SELTST, TEXT  '+SELECT TEST # '
2650      4756  0514
2651      4757  0503
2652      4760  2440
2653      4761  2405
2654      4762  2324
2655      4763  4043
2656      4764  4040
2657      4765  0000
2658      4766  5323  DMSG1, TEXT  '/+SWR = /
2659      4767  2722
2660      4770  4075
2661      4771  4000
2662      4772  4040  DMSG2, TEXT  '/ NEW = /
2663      4773  4016
2664      4774  0527
2665      4775  4075
2666      4776  4000
2667      4777  2701  WMSG, TEXT  '/WAITING, TYPE SPACE TO CONTINUE+/
2668      5000  1124
2669      5001  1116
2670      5002  0754
2671      5003  4024
2672      5004  3120
2673      5005  0540
2674      5006  2320
2675      5007  0103
2676      5010  0540
2677      5011  2417
2678      5012  4003
2679      5013  1716
2680      5014  2411
2681      5015  1625
2682      5016  0553
2683      5017  0000
2684      5020  7373  TSTNO, TEXT  ';;TEST NUMBER '
2685      5021  2405
2686      5022  2324
2687      5023  4016
2688      5024  2515
2689      5025  0205
2690      5026  2240
2691      5027  4000
2692      5030  4040  COLMN, TEXT  ' COLUMNS;
2693      5031  0317
2694      5032  1425
2695      5033  1516
2696      5034  2373
2697      5035  0000
2698      5036  5324  ETSTNO, TEXT  '+TEST # '
2699      5037  0523
2700      5040  2440
2701      5041  4340

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2654	5042 0000 5043 5440 5044 4020 5045 0375 5046 0000	PCMSG, TEXT	', PC='
2655	5047 5440 5050 4025 5051 2222 5052 1722 5053 4043 5054 0000	ERR, TEXT	', ERROR #'
2656	5055 5440 5056 4000	ERRS, TEXT	', '
2657	5057 7305 5060 1604 5061 4017 5062 0640 5063 2001 5064 2323 5065 4040 5066 4300	PASMSG, TEXT	'END OF PASS #'
2658	5067 2022 5070 1116 5071 2440 5072 2320 5073 0505 5074 0440 5075 1501 5076 1625 5077 0114 5100 4024 5101 1115 5102 1116 5103 0753 5104 0000	T2M1, TEXT	'PRINT SPEED MANUAL TIMING+'
2659	5105 2025 5106 2440 5107 2327 5110 1124 5111 0310 5112 4064 5113 4025 5114 2040 5115 2417 5116 4023 5117 2401 5120 2224 5121 4024 5122 1115 5123 1116 5124 0753 5125 0000	T2M2, TEXT	'PUT SWITCH 4 UP TO START TIMING+'
2660	5126 2025 5127 2440 5130 2327	T2M3, TEXT	'PUT SWITCH 4 DOWN AT END OF 1 MINUTE+'

2661	5131 1124 5132 0310 5133 4064 5134 4004 5135 1727 5136 1640 5137 0124 5140 4005 5141 1604 5142 4017 5143 0640 5144 6140 5145 1511 5146 1625 5147 2405 5150 5300 5151 1617 5152 4015 5153 0524 5154 1017 5155 0440 5156 1706 5157 4024 5160 1115 5161 1116 5162 0740 5163 0126 5164 0111 5165 1401 5166 0214 5167 0553 5170 0000	T2EM, TEXT	/NO METHOD OF TIMING AVAILABLE+/'
2662	5171 5320 5172 2211 5173 1624 5174 4023 5175 2005 5176 0504 5177 4011 5200 2340 5201 0000	PRSP1, TEXT	'PRINT SPEED IS '
2663	5202 0120 5203 2022 5204 1730 5205 4000	PRSP2, TEXT	'APPROX '
2664	5206 4040 5207 1411 5210 1605 5211 2357 5212 1511 5213 1625 5214 2405 5215 4054 5216 4027 5217 1124	PRSP3, TEXT	' LINES/MINUTE , WITH '

	5220	1040		
	5221	0000		
2665	5222	4040	PRSP4, TEXT	' CHARS/LINE+'
	5223	0310		
	5224	0122		
	5225	2357		
	5226	1411		
	5227	1605		
	5230	5300		
2666				
2667	5231	7316	NCMSG, TEXT	';NO CONSOLE TERMINAL;'
	5232	1740		
	5233	0317		
	5234	1623		
	5235	1714		
	5236	0540		
	5237	2405		
	5240	2215		
	5241	1116		
	5242	0114		
	5243	7300		
2668	5244	0310	TCHAR, TEXT	'CHAR = '
	5245	0122		
	5246	4075		
	5247	4000		
2669	5250	2425	T0MSG0, TEXT	/TURN POWER OFF & SET OFF LINE+/'
	5251	2216		
	5252	4020		
	5253	1727		
	5254	0522		
	5255	4017		
	5256	0606		
	5257	4046		
	5260	4023		
	5261	0524		
	5262	4017		
	5263	0606		
	5264	4014		
	5265	1116		
	5266	0553		
	5267	0000		
2670	5270	1713	T0MSG1, TEXT	/OK, TURN POWER ON+/'
	5271	5440		
	5272	2425		
	5273	2216		
	5274	4020		
	5275	1727		
	5276	0522		
	5277	4017		
	5300	1653		
	5301	0000		
2671	5302	1713	T0MSG2, TEXT	/OK, SET PRINTER TO ON-LINE+/'
	5303	5440		
	5304	2305		
	5305	2440		

	5306	2022		
	5307	1116		
	5310	2405		
	5311	2240		
	5312	2417		
	5313	4017		
	5314	1655		
	5315	1411		
	5316	1605		
	5317	5300		
2672	5320	1713	T0MSG3, TEXT	/OK, TRY PAPER OUT SWITCH+/'
	5321	5440		
	5322	2422		
	5323	3140		
	5324	2001		
	5325	2005		
	5326	2240		
	5327	1725		
	5330	2440		
	5331	2327		
	5332	1124		
	5333	0310		
	5334	5300		
2673	5335	1713	T0MSG4, TEXT	/OK, RESTORE PRINTER TO ON-LINE+/'
	5336	5440		
	5337	2205		
	5340	2324		
	5341	1722		
	5342	0540		
	5343	2022		
	5344	1116		
	5345	2405		
	5346	2240		
	5347	2417		
	5350	4017		
	5351	1655		
	5352	1411		
	5353	1605		
	5354	5300		
2674	5355	5555	T1MSG1, TEXT	'-----'
	5356	5555		
	5357	5540		
	5360	0000		
2675	5361	4011	T1MSG2, TEXT	' INCH FORM FEED -----!'
	5362	1603		
	5363	1040		
	5364	0617		
	5365	2215		
	5366	4006		
	5367	0505		
	5370	0440		
	5371	5555		
	5372	5555		
	5373	5572		
	5374	0000		

2676	5375 2305	TIMSG3, TEXT	'SET FORM FEED SWITCH TO '
	5376 2440		
	5377 0617		
	5400 2215		
	5401 4006		
	5402 0505		
	5403 0440		
	5404 2327		
	5405 1124		
	5406 0310		
	5407 4024		
	5410 1740		
	5411 4000		
2677	5412 4040	TIMSG4, TEXT	' INCHES & DEPRESS TOF RESET SWITCH+'
	5413 1116		
	5414 0310		
	5415 0523		
	5416 4046		
	5417 4004		
	5420 0520		
	5421 2705		
	5422 2323		
	5423 4024		
	5424 1706		
	5425 4022		
	5426 0523		
	5427 0524		
	5430 4023		
	5431 2711		
	5432 2403		
	5433 1053		
	5434 0000		
2678	5435 4040	CNVMSG, TEXT	/ /
	5436 4000		
2679	5437 7200	CR, TEXT	'1'
2680	5440 7300	LF, TEXT	'1'
2681	5441 5300	CRLF, TEXT	'1'
2682	5442 4100	FF, TEXT	'1'
2683	5443 5377	QUES, TEXT	'1+'
	5444 5300		
2684	5445 3625	CNTLU, TEXT	'U+/'
	5446 5300		
2685			
2686	5447 4063	TITAB, TEXT	' 3 '
	5450 4000		
2687	5451 6356	TEXT	'3.5'
	5452 6500		
2688	5453 4064	TEXT	' 4 '
	5454 4000		
2689	5455 6556	TEXT	'5.5'
	5456 6500		
2690	5457 4066	TEXT	' 6 '
	5460 4000		
2691	5461 4067	TEXT	' 7 '
	5462 4000		

2692	5463 4070	TEXT	' 8 '
	5464 4000		
2693	5465 7056	TEXT	'8.5'
	5466 6500		
2694	5467 6161	TEXT	'11 '
	5470 4000		
2695	5471 6162	TEXT	'12 '
	5472 4000		
2696	5473 6164	TEXT	'14 '
	5474 4000		
2697			
2698	5475 0000	0	/END OF TABLE
2699			
2700		/ERROR MESSAGES	
2701			
2702	5476 2205	ERR1, TEXT	/READY SET, POWER OFF/
	5477 0104		
	5500 3140		
	5501 2305		
	5502 2454		
	5503 4020		
	5504 1727		
	5505 0522		
	5506 4017		
	5507 0606		
	5510 0000		
2703	5511 2205	ERR2, TEXT	/READY SET, PRINTER OFF LINE/
	5512 0104		
	5513 3140		
	5514 2305		
	5515 2454		
	5516 4020		
	5517 2211		
	5520 1624		
	5521 0522		
	5522 4017		
	5523 0606		
	5524 4014		
	5525 1116		
2704	5526 0500	ERR3, TEXT	/READY CLEAR, PRINTER ON LINE/
	5527 2205		
	5530 0104		
	5531 3140		
	5532 0314		
	5533 0501		
	5534 2254		
	5535 4020		
	5536 2211		
	5537 1624		
	5540 0522		
	5541 4017		
	5542 1640		
	5543 1411		
	5544 1605		
	5545 0000		

2705	5546 2205	ERR4, TEXT	/READY SET, PAPER OUT/
	5547 0104		
	5550 3140		
	5551 2305		
	5552 2454		
	5553 4020		
	5554 0120		
	5555 0522		
	5556 4017		
	5557 2524		
	5560 0000		
2706	5561 2205	ERR5, TEXT	/READY NOT SET AFTER ERROR CLEARED/
	5562 0104		
	5563 3140		
	5564 1617		
	5565 2440		
	5566 2305		
	5567 2440		
	5570 0106		
	5571 2405		
	5572 2240		
	5573 0522		
	5574 2217		
	5575 2240		
	5576 0314		
	5577 0501		
	5600 2205		
	5601 0400		
2707	5602 2003	ERR6, TEXT	/PCLF DID NOT CLEAR READY/
	5603 1406		
	5604 4004		
	5605 1104		
	5606 4016		
	5607 1724		
	5610 4003		
	5611 1405		
	5612 0122		
	5613 4022		
	5614 0501		
	5615 0431		
	5616 0000		
2708	5617 2205	ERR7, TEXT	/READY DID NOT SET AFTER CHAR LOAD/
	5620 0104		
	5621 3140		
	5622 0411		
	5623 0440		
	5624 1617		
	5625 2440		
	5626 2305		
	5627 2440		
	5630 0106		
	5631 2405		
	5632 2240		
	5633 0310		
	5634 0122		

2709	5635 4014	ERR10, TEXT	/PCLP DID NOT CLEAR READY/
	5636 1701		
	5637 0400		
	5640 2003		
	5641 1420		
	5642 4004		
	5643 1104		
	5644 4016		
	5645 1724		
	5646 4003		
	5647 1405		
	5650 0122		
	5651 4022		
	5652 0501		
	5653 0431		
	5654 0000		
2710	5655 2205	ERR11, TEXT	/READY DID NOT SET AFTER CHAR LOAD/
	5656 0104		
	5657 3140		
	5660 0411		
	5661 0440		
	5662 1617		
	5663 2440		
	5664 2305		
	5665 2440		
	5666 0106		
	5667 2405		
	5670 2240		
	5671 0310		
	5672 0122		
	5673 4014		
	5674 1701		
	5675 0400		
2711	5676 2516	ERR12, TEXT	/UNEXPECTED INTERRUPT/
	5677 0530		
	5700 2005		
	5701 0324		
	5702 0504		
	5703 4011		
	5704 1624		
	5705 0522		
	5706 2225		
	5707 2024		
	5710 0000		
2712	5711 1116	ERR13, TEXT	/INTER - READY CLEAR, ENABLED & ION/
	5712 2405		
	5713 2240		
	5714 5540		
	5715 2205		
	5716 0104		
	5717 3140		
	5720 0314		
	5721 0501		
	5722 2254		
	5723 4005		

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5724 1601
5725 0214
5726 0504
5727 4046
5730 4011
5731 1716
5732 0000
2713 5733 1617 ERR14, TEXT /NO INTER - READY SET, ENABLED & ION/
5734 4011
5735 1624
5736 0522
5737 4055
5740 4022
5741 0501
5742 0431
5743 4023
5744 0524
5745 5440
5746 0516
5747 0102
5750 1405
5751 0440
5752 4640
5753 1117
5754 1600
2714 5755 1116 ERR15, TEXT /INTER - READY SET, ENABLED BUT IOF/
5756 2405
5757 2240
5760 5540
5761 2705
5762 0104
5763 3140
5764 2305
5765 2454
5766 4005
5767 1601
5770 0214
5771 0504
5772 4002
5773 2524
5774 4011
5775 1706
5776 0000
2715 5777 2022 ERR16, TEXT /PRINTER NOT READY/
6000 1116
6001 2405
6002 2240
6003 1617
6004 2440
6005 2205
6006 0104
6007 3100
2716
2717
2718
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2719

AUTPTR	0010	ERR6	5602	M20	0162	PARAM	0021
CHAR	0031	ERR7	5617	M23	0163	PASCNT	0040
CHAR2	0032	ERRNM	0024	M25	0164	PASMSG	5057
CHECK	4464	ERROR	4463	M3	0155	PCLF	6662
CHKNR	0114	ERRPC	0025	M30	0165	PCLP	6666
CHKOCT	0113	ERRS	5055	M35	0166	PCMSG	5043
CKCNT	0037	ETSTNO	5036	M36	0167	PDIGIT	0122
CKEXIT	3013	EXIT	5465	M4	0156	POCT	3665
CKFLAG	0054	EXIT1	3036	M40	0170	PRINT	4461
CKSRV	3000	EXIT2	3047	M56	0171	PRSP1	5171
CKSTOP	3015	EXIT3	3037	M7	0157	PRSP2	5202
CLDI	6132	FF	5442	MIOT	2716	PRSP3	5206
CLEI	6131	GETSW	4521	MIOTA	2731	PRSP4	5222
CLSK	6133	GOUT	0115	MIOTB	2730	PRT	4216
CNTLU	5445	HDRX	4326	MIOTC	2750	PRTCHR	4260
CNVMSG	5435	HEADER	4716	MLOAD	4460	PRTCL	4254
CNVNM	3761	HOLD	4457	MSGADR	0043	PRTCR	4251
CNVRT	3713	HOLDCH	3141	MSGPTR	3762	PRTFF	4246
COLUMN	5030	HUNDS	0046	NCMSG	5231	PRTHDR	4462
COLUMN	4746	IERROR	0347	OCTSAV	3712	PRTL	4257
CONTRL	0217	IERRT	3650	ONES	0044	PSIE	6665
COUNT	0034	INFLAG	3326	OP1CHK	3142	PSKF	6661
COUNT2	0035	IOTAB	4535	OP1CLF	2653	PSTB	6664
CR	5437	IOTSEL	0030	OPDBST	2643	PTRIOT	0027
CRLF	5441	ISAVE	3016	OPLD1	2663	QUES	5443
DBCE	6576	ISRV	0002	OPLD2	2707	RCHECK	3107
DBCF	6573	KBTAB	3400	OPSCIE	2675	READ	0111
DBRD	6572	KFA	3313	OUT	4022	READ0	4401
DBSE	6575	KFB	3221	OUTCHR	4053	READ1	4403
DBSK	6571	KFC	3246	OUTCL	4044	READ2	4407
DBSS	6577	KFD	3262	OUTLF	4051	READD	4457
DBST	6570	KFE	3276	P10	0130	READQ	4451
DBTD	6574	KFF	3232	P100	0143	READT	4504
DELAY	0333	KYBDA	3433	P1000	0152	READU	4454
DELAY0	0345	KYBDAA	3422	P12	0131	RERROR	3600
DELAY1	0346	KYBDB	3447	P134	0144	RESTR	0213
DSMSG1	4766	KYBDC	3324	P15	0132	REXIT	3017
DSMSG2	4772	KYBDF	3200	P177	0145	RFLAG	4503
EMAT	4700	KYBDST	3405	P2	0126	RGETSW	0322
ERR	5047	LF	5440	P200	0146	RHOLD	3123
ERR1	5476	LIERR	0125	P204	0147	RHOLDA	3136
ERR10	5640	LOAD	4456	P36	0133	RKCC	2605
ERR11	5655	LPCNT	0036	P377	0150	RKR8	2613
ERR12	5676	LREADT	0124	P40	0134	RKR8	2610
ERR13	5711	LT9Q	0573	P400	0151	RKSF	2600
ERR14	5733	M1	0153	P41	0135	RLA	4062
ERR15	5755	M100	0172	P55	0136	RLB	4066
ERR16	5777	M12	0160	P57	0137	RLC	4075
ERR2	5511	M144	0173	P60	0140	RLDC	4103
ERR3	5527	M15	0161	P7	0127	RLDCC	4104
ERR4	5546	M177	0174	P72	0141	RLOAD	4060
ERR5	5561	M2	0154	P77	0142	RMLOAD	4105

RP1	4205	T00	0552	T27B	2075	TERR	2541
RPCLF	2646	T0P	0570	T27C	2107	TERPOR	0063
RPCLP	2702	T0Q	0600	T27D	2115	TEST0	0400
RPDIGT	3660	T0R	0620	T27DA	2122	TEST1	0714
RPRHOR	4262	T0S	0625	T27E	2123	TEST2	1000
RPRINT	4200	T0U	0660	T27TAB	2142	TEST20	1200
RPSIE	2670	T0V	0707	T27X	2137	TEST21	1227
RPSKF	2634	T0W	0656	T2A	1015	TEST22	1274
RPSTB	2656	T1A	0725	T2B	1023	TEST23	1331
RSAVE	3645	T1MSG1	5355	T2C	1030	TEST24	1400
RT1	4011	T1MSG2	5361	T2EM	5151	TEST25	1600
RT2	4005	T1MSG3	5375	T2M1	5067	TEST26	2000
RTCF	2623	T1MSG4	5412	T2M2	5105	TEST27	2054
RTL5	2631	T1TAB	5447	T2M3	5126	TEST30	2200
RTPC	2626	T20A	1203	T2PA	1047	TEST31	2212
RTSF	2616	T20B	1211	T2PC	1053	TEST60	2246
RTYPE	4000	T20C	1216	T2PD	1070	TEST61	2400
SAVE	0033	T20D	1222	T2PE	1102	TEST62	2450
SAVEAC	3156	T21B	1232	T261	1132	TEST63	2477
SELECT	3054	T21C	1243	T26P	1044	TEXIT	0065
SELTST	4755	T21D	1247	T26PD	1114	TGETSW	0121
SETSKP	1540	T21W	1273	T26PDC	1110	THOLD	0057
START	0210	T22A	1277	T30A	2203	THOUS	0047
START2	0241	T22B	1307	T30M	2210	TKBDST	0066
START5	0274	T22C	1324	T31M1	2240	TKBFG	0107
START7	0306	T23A	1334	T31M2	2243	TKCC	0073
START8	0303	T24A	1410	T30B	2250	TKRB	0075
START9	0277	T24B	1415	T60B	2253	TKRS	0074
STARTB	0266	T24C	1417	T60C	2263	TKSF	0072
STARTX	0221	T24D	1431	T61A	2402	TLOAD	0056
STRONE	0050	T24E	1446	T61B	2404	TLOOP	0052
SVTST	4331	T24F	1466	T61C	2425	TNIOT	0071
SWITCH	0020	T24G	1476	T61D	2430	TNLOAD	0060
T8AA	0415	T24H	1483	T61E	2436	TPCLF	0103
T8AB	0420	T24S	1477	T61F	2445	TPCLP	0106
T8AC	0403	T24SA	1505	T62A	2462	TPFLG	0053
T8B	0432	T24SB	1512	T62B	2470	TPOCT	0123
T8C	0435	T24SC	1504	T63A	2516	TPRHDR	0062
T8E	0456	T25A	1630	T63B	2507	TPRINT	0061
T8F	0461	T25B	1665	T63C	2526	TPSIE	0105
T8H	0472	T25D	1701	T63D	2532	TPSKF	0102
T8I	0475	T25E	1702	T63E	2536	TPST8	0104
T8K	0510	T25F	1715	TABPTR	0041	TREAD	4400
T8L	0517	T25G	1727	TAT	4600	TREADQ	0112
T8M	0532	T25H	1740	TCHAR	5244	TRONE	0051
T8NIOT	0536	T25S	1745	TCHECK	0064	TSEL	3465
T8MSG0	5250	T26A	2003	TCHKNR	4820	TSEL1	3542
T8MSG1	5270	T26B	2005	TCKOUT	4510	TSEL2	3552
T8MSG2	5302	T26C	2007	TCKSRV	0120	TSELCT	0067
T8MSG3	5320	T26D	2037	TCNVRT	0117	TSELX	3555
T8MSG4	5335	T26TAB	2047	TDELAY	0116	TSTNM	0023
T8N	0543	T27A	2057	TENS	0045	TSTNO	5020

TSTPTR	0042
TTAT	0070
TTCF	0077
TTLS	0101
TTPC	0100
TTSEL	0110
TTSF	0076
TTYIN	3325
TTYE	0055
TYPE	4455
WIDTH	0026
WTMSG	4777

ERRORS DETECTED: 0

LINKS GENERATED: 12

RUN-TIME: 17 SECONDS

3K CORE USED

[illegible]

[illegible]

1746 1834#

1098 1106 1121 1145 1190#

2515 2542*