

LP11/LP05

LINE PRINTER TEST
MD-11-DZLPK-G

EP-DZLPK-G-DL-C
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The image displays a grid of 12 columns and 12 rows of small, illegible text fragments. These fragments appear to be individual lines of data or test output from a line printer, arranged in a structured format. The text is too small and faded to be read, but the layout suggests a table or a series of related data points. The fragments are distributed across the left side of the page, with the right side being mostly blank.

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1.0 ABSTRACT

THE LINE PRINTER DIAGNOSTIC PROGRAM IS DIVIDED INTO THREE SECTIONS. INTERNALLY DETECTED ERROR CONDITIONS ARE DISPLAYED ON THE TELEPRINTER, WHILE BRIEF DESCRIPTIONS OF EACH ERROR ARE PRESENTED IN THE LISTING. PRINT PATTERNS USED IN THESE TESTS HAVE BEEN CHOSEN FOR EASE OF VISUAL VERIFICATION.

THE FIRST SECTION IS DESIGNED TO CHECK-OUT THE PROCESSOR INTERFACE CONTROL ELECTRONICS AND THE INTER-COMMUNICATIONS DATA PATHS. IT WILL ALSO PERFORM ALL TESTS THAT REQUIRE OPERATOR INTERVENTION. THE SECOND SECTION IS A PRINTING TEST DESIGNED TO TEST THE LINE PRINTER MECHANISM ITSELF. THE LAST SECTION IS A SCOPE DRIVER ROUTINE FOR USE IN TROUBLE SHOOTING THE PRINTER INTERFACE.

2.0 REQUIREMENTS

2.1 EQUIPMENT

THIS DIAGNOSTIC SHOULD RUN ON ALL PDP-11 FAMILY COMPUTERS HAVING LINE PRINTER CONTROLS, LINE PRINTERS, AND TELETYPES COMPATIBLE WITH THE FOLLOWING:

LPC11	LINE PRINTER INTERFACE
LP05	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
LP11	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
LP14	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
TELETYPE	MODEL 33 OR EQUIVALENT CONSOLE UNIT

2.2 STORAGE

MEMORY LOCATIONS 0 - 10 - 17012 ARE USED BY THIS DIAGNOSTIC.

2.3 PRELIMINARY PROGRAMS

ALL APPLICABLE PDP-11 DIAGNOSTICS SHOULD RUN ON THE PROCESSOR AND TELETYPE.

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3.0 LOADING PROCEDURE

3.1 METHOD

POWER DOWN THE LINE PRINTER
 POWER UP THE PROCESSOR ONLY
 LOAD THE BOOTSTRAP AND ABSOLUTE LOADERS
 LOAD THE LP11/LPOS DIAGNOSTIC PROGRAM TAPE

4.0 STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SET CONTROL SWITCHES AS DESIRED - (SEE SECTION 5.1 FOR DESCRIPTION OF SWITCH FUNCTIONS) MAKE SURE SWITCH 0 IS DOWN BEFORE STARTING THE TEST.

4.2 STARTING ADDRESS OR ADDRESSES

THE INITIAL STARTING ADDRESS TO RUN THE ENTIRE LP14/LP11/LPOS DIAGNOSTIC IS LOCATION 200(8). TO SKIP THE OPERATOR INTERVENTION TESTS AND START WITH THE PRINTING TESTS, START AT LOCATION 600(8). TO RUN THE SPECIAL SCOPE DRIVER ROUTINE USE START ADDRESS 700(8) OR 720(8). TO START AT ANY OTHER TEST USE THE START ADDRESS FROM THE FOLLOWING TABLE:

START ADDRESS	TEST
300	DAVFU ILLEGAL LOAD TEST
304	DAVFU NO STOP BIT TEST
310	DAVFU LINE COUNT SLEW TEST
314	DAVFU CHANNEL SLEW TEST
400	PRINT SPEED TEST USING MANUAL TIMING
404	PRINT SPEED TEST USING KW11-L
410	PRINT SPEED TEST USING KW11-P
414	CHECK TOP OF FORM SWITCH SETTINGS

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600	TEST 2 INTERFACE & DATA PATHS TEST (ALSO GENERAL PRINT TEST STARTING ADDRESS)
610	TEST 3 CHAR COMPARATOR TEST
614	TEST 4 OVER PRINT TEST
620	TEST 5 SHUTTLE POSITIONING TEST
624	TEST 6 PRINT CONTROL TEST
630	TEST 7 MULTIPLE LINE ADVANCE TEST
634	TEST 8 HIGH SPEED PRINT TEST
640	TEST 9 SINGLE CHAR, ALL COLUMNS
644	TEST 10 DRUM PATTERN CHAR TEST
650	TEST 11 SPURIOUS HAMMER FIRING TESTS (LEFT & RIGHT WEDGES)
654	TEST 12 HAMMER ALIGNMENT
700	SCOPE DRIVER ROUTINE
720	SCOPE DRIVER WITHOUT LINE FEEDS

THE PROGRAM WILL START THROUGH THE TEST SEQUENCE BEGINNING WITH THE SELECTED TEST UNLESS SWITCH 12 IS SET TO LOOP ON TEST (SEE SECTION 5.1)

4.3 PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF THE LINE PRINTER DIAGNOSTIC TEST, THE HEADER MESSAGE "LP05/LP11/LP14 LINE PRINTER TEST" WILL BE TYPED OUT ON THE TELEPRINTER FOLLOWED BY EXECUTION OF THE PRINTER READY PORTION OF TEST 1. PRINTING OF THE MESSAGE "POWER-UP" ON THE TELEPRINTER FOLLOWING THE TEST HEADER PRINT-OUT INDICATES START OF THIS TEST SEQUENCE. THIS TEST IS CARRIED OUT BY AN INTERACTIVE EXCHANGE BETWEEN THE OPERATOR AND THE TEST PROGRAM. THE OPERATIONAL DESCRIPTION OF THIS TEST APPEARS AS PART OF THE TEST DESCRIPTION FOR TEST 1 (SEE SECTION 7.1.1). AFTER SUCCESSFUL COMPLETION OF THIS SECTION OF TEST 1, THE PRINT SPEED AND TOP OF FORM SWITCH SETTINGS TESTS WILL BE PERFORMED. (SEE SECTIONS 7.1.2 AND 7.1.3 RESPECTIVELY.) IF THE DAYFU IS AVAILABLE AND SWITCH 14 IS SET, THE DAYFU TESTS WILL ALSO BE PERFORMED. AFTER COMPLETION OF ALL OF TEST 1, PRESS CONTINUE TO ENTER THE PRINTING TESTS DIRECTLY. NO OTHER OPERATOR ACTION WILL BE REQUIRED.

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5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

THE USE OF THIS PROGRAM ON PROCESSORS NOT HAVING A HARDWARE SWITCH REGISTER NECESSITATES OPERATOR INTERACTION; THE OPERATOR MUST SET UP LOCATION 174 WITH THE SOFTWARE DISPLAY VALUES AND LOCATION 176 WITH THE SOFTWARE SWITCH VALUES. (SEE SECTION 5.2)

SWITCH	FUNCTION IN "UP" POSITION
15	LOOP ON ERROR (IN TEST 1 ONLY)
14	OPTIONAL DAVFU AVAILABLE
13	DOWN - 64 CHARACTER SET UP - 96 CHARACTER SET
12	LOOP ON TEST
11	SEND ONLY ONE CHARACTER TO LINE PRINTER IN SCOPE DRIVER - THEN HALT
10	UP - LP14 DOWN - LPO5/LP11
9	INHIBIT ERROR REPORTS
0	USED FOR PRINT SPEED MANUAL TIMING IF NO CLOCK AVAILABLE

1. SWITCH - 0

TO START PRINTING IN THE MANUAL PRINT SPEED TEST, PLACE SWITCH 0 IN THE UP POSITION. AT THE END OF ONE MINUTE PUT SWITCH 0 DOWN. THE APPROXIMATE PRINT SPEED WILL BE PRINTED ON BOTH THE LINE PRINTER AND THE TELEPRINTER. SWITCH 0 IS NOT USED IN ANY OTHER TESTS. MAKE SURE SWITCH 0 IS DOWN AT THE START OF THE TEST IF USING MANUAL TIMING OR UP IF USING AN INTERNAL CLOCK OPTION (KW11-L OR KW11-P).

2. SWITCH - 9

SWITCH 9 IN THE UP POSITION WILL INHIBIT ERROR REPORTS ON THE TTY .

3. SWITCH - 10

SWITCH 10 SHOULD BE SET IN THE UP FOR TESTING THE LP14

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LINE PRINTER. SWITCH 10 SHOULD BE SET DOWN FOR TESTING THE LPOS/LP11 LINE PRINTER.

4. SWITCH - 11

SWITCH 11 IN THE UP POSITION CAUSES THE CONTENTS OF THE SWITCH REGISTER TO BE SENT ONLY ONCE TO THE LINE PRINTER THEN HALT IN THE SCOPE DRIVER ROUTINE. TO SEND ANOTHER CHARACTER, RESET SWITCHES AND DEPRESS CONTINUE. WITH SWITCH 11 DOWN, THE SWITCH REGISTER IS SENT CONTINUOUSLY TO THE LINE PRINTER WITH A LINE FEED SENT AFTER EVERY 132 CHARACTERS. TO STOP SENDING CHARACTERS, PUT SWITCH 11 UP.

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4. SWITCH - 12

SWITCH 12 IN THE UP POSITION IS USED TO AUTOMATICALLY LOOP ON THE CURRENT TEST IF IN TESTS 2 TO 12. PLACING SWITCH 12 IN THE UP POSITION WILL FORCE THE PROGRAM TO CONSTANTLY LOOP ON THE CURRENT TEST. REPLACING THE SWITCH TO THE DOWN POSITION WILL MAKE THE PROGRAM RESUME ITS NORMAL TEST SEQUENCE AT THE COMPLETION OF THE CURRENT TEST.

6. SWITCH - 13

SWITCH 13 SHOULD BE SET UP IF THE 96 CHARACTER SET IS AVAILABLE. IF THE 64 CHARACTER SET IS USED SWITCH 13 SHOULD BE DOWN.

7. SWITCH - 14

SWITCH 14 SHOULD BE SET UP IF THE OPTIONAL DAVFU IS AVAILABLE AND IT IS DESIRED TO RUN THE DAVFU DIAGNOSTIC TESTS.

8. SWITCH - 15

WITH SWITCH 15 IN THE DOWN POSITION THE PROGRAM WILL HALT AFTER AN ERROR TYPE OUT IN TEST 1. WITH SWITCH 15 IN THE UP POSITION, THE PROGRAM WILL LOOP ON THE ERROR IN TEST 1.

REFER TO SECTION 6.1 TO CONTINUE AFTER AN ERROR DURING ANY OTHER TESTS.

5.2 ABSENCE OF HARDWARE SWITCH REGISTER

WHEN THE DIAGNOSTIC IS STARTED AT ADDRESS 200(8), IT WILL DETERMINE IF THE PROCESSOR HAS A HARDWARE (H/W) SWITCH REGISTER (SWR). IF THERE IS NO H/W SWR, THE DIAGNOSTIC WILL USE THE SOFTWARE (S/W) SWR LOCATED AT ADDRESS 176(8).

THE DIAGNOSTIC WILL PROMPT THE OPERATOR WITH THE MESSAGE:

SWR = XXXXXX NEW SWR =

THE FIRST TIME THE SWR VALUE IS NEEDED. ANY TIME THEREAFTER, EXCEPT DURING TEST #1, SECTION 1. THE OPERATOR MAY CHANGE THE VALUE OF THE SWR BY ENTERING A CONTROL-G (↑G) AT THE CONSOLE.

IF THERE IS NO H/W SWITCH REGISTER AND THE DIAGNOSTIC IS TO BE STARTED AT AN ADDRESS OTHER THAN 200(8):

ENTER THE NUMBER 176(8) IN LOCATION 1004(8)

ENTER THE INITIAL VALUE OF THE SWR IN LOCATION 176(8).

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AFTER EXECUTION BEGINS, THE OPERATOR MAY CHANGE THE VALUE OF THE SWR BY ENTERING A CONTROL-G (↑G) AT THE CONSOLE.
NOTE: THE OPERATOR CANNOT CHANGE THE VALUE OF THE SWR DURING TEST #1, SECTION 1 WITH THIS METHOD.

THE FOLLOWING COMMANDS ALLOW THE OPERATOR TO MODIFY THE S/W SWR:

CONTROL-G (↑G): ALLOWS MODIFICATION OF THE S/W SWR. ENTERING A ↑G WILL RESULT IN THE FOLLOWING MESSAGE OUTPUT AT THE CONSOLE

SWR = XXXXXX NEW SWR =

THE OPERATOR MAY THEN ENTER UP TO SIX (6) OCTAL DIGITS. THE DIGITS MAY BE ANY COMBINATION OF :0,1,2,3,4,5,6,7, OR NO ENTRY AT ALL.
ALL SWR VALUES ENTERED WILL BE TRUNCATED TO THE LOWER SIXTEEN (16) BITS.
ENTERING MORE THAN SIX DIGITS OR A CHARACTER OTHER THAN A DIGIT RESULTS IN A "?" OUTPUT ON THE CONSOLE AND A REPEAT OF THE PROMPTING MESSAGE.

CARRIAGE RETURN (CR): ENTERS THE NEW SWR VALUE. IF NO DIGITS HAVE BEEN ENTERED, THE SWR VALUE REMAINS UNCHANGED.

CONTROL-U (↑U): ERASES THE SWR VALUE BEING ENTERED. A CARRIAGE RETURN AND LINE FEED WILL BE OUTPUT AT THE CONSOLE. THE CORRECT SWR VALUE MAY THEN BE ENTERED.

ENTERING ANY CHARACTER BEFORE A CONTROL-G (↑G) HAS BEEN ENTERED WILL RESULT IN A "?" OUTPUT AT THE CONSOLE.

NOTE: IT IS POSSIBLE FOR THE DIAGNOSTIC TO OUTPUT MESSAGES AT THE CONSOLE BEFORE THE NEW SWR VALUE HAS BEEN ENTERED. SHOULD THIS HAPPEN, THE OPERATOR SHOULD ENTER A CONTROL-U (↑U) AND THEN ENTER THE CORRECT SWR VALUE.

5.3 IOT CHANGES

THE LINE PRINTER STATUS IS LOCATION 177514 AS USED BY THE PROGRAM.
THE LINE PRINTER VECTOR ADDRESS IS LOCATION 1030 AS USED BY THE PROGRAM.
THE LINE PRINTER PSW IS LOCATION 1032 AS USED BY THE PROGRAM
THE LINE PRINTER BUFFER IS LOCATION 177516 AS USED BY THE PROGRAM.

FOR OTHER THAN THESE, PLACE THE CORRECT STATUS LOCATION IN LOCATION 1000(B) AND THE CORRECT BUFFER LOCATION IN LOCATION 1002(B), THE CORRECT VECTOR ADDRESS IN LOCATION 1030(B) AND THE CORRECT PSW IN LOCATION 1032(B) .

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6.0 ERRORS

6.1 COMPUTER DETECTED ERRORS

THE FOLLOWING DISCUSSION DESCRIBES (IN GENERAL) THE METHOD USED FOR INTERNAL ERROR DETECTION AND ERROR DISPLAY BY THE LINE PRINTER DIAGNOSTIC PROGRAM. MONITORING OF THE CURRENT CONDITION OF THE READY LINE AFTER EACH OPERATION IS CARRIED ON CONTINUOUSLY DURING ALL TESTS WHERE APPROPRIATE AND IS DESCRIBED IN THE FOLLOWING PARAGRAPHS. HOWEVER, ADDITIONAL TESTING IS PERFORMED ESPECIALLY DURING EXECUTION OF THE FIRST TEST. FOR A COMPLETE DESCRIPTION OF THE TESTING PROCEDURES USED IN TEST 1 AND THE CORRESPONDING ERROR CONDITIONS, THE READER IS REFERRED TO THE DESCRIPTION OF THE TEST AND THE TEST LISTING.

ERROR PRINT-OUTS ARE LIMITED TO THE ERROR NUMBER (ERROR COUNT). ADDITIONAL INFORMATION MAY BE OBTAINED FROM THE TEST DESCRIPTION OR FROM THE LISTING. TO FIND THE ERROR IN THE LISTING, SEE THE SYMBOL TABLE AT THE END OF THE LISTING TO FIND THE LOCATION OF THE ERROR.

ERROR TAGS WILL BE LISTED AS "ERRXX" WHERE XX = ERROR NUMBER.

IN GENERAL, THE TEST PROGRAM MONITORS PROPER OPERATION OF THE LINE PRINTER AFTER EACH PRINTER OPERATION HAS BEEN COMPLETED, THROUGH THE PRINTER "READY" LINE AND THE SETTING OF THE CHARACTER FLAG OF THE PRINTER "DEMAND" RETURN LINE. WITH REGARDS TO THE READY LINE, THE FOLLOWING ERROR CONDITIONS, IF DETECTED WITHIN THE LINE PRINTER ITSELF, WILL CAUSE THE READY LINE TO DROP:

1. PAPER OUT OR TORN
2. DRUM GATE OPEN
3. RIBBON STALL CONDITION
4. POWER SUPPLY FAULT
5. HAMMER BANK FAULT
6. DAVFU ERROR (IF AVAILABLE)
7. SWITCHED OFF LINE

IT SHOULD BE NOTED THAT THE "DEMAND" RETURN FROM THE PRINTER IS CONDITIONAL UPON THE PRINTER "READY" AND THEREFORE THESE ITEMS SHOULD BE CHECKED FIRST IN CASE OF DIFFICULTY.

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6.2 VISUALLY DETECTED ERRORS

SINCE THE COMPUTER CAN ONLY DETECT THE CURRENT CONDITION OF THE READY AND DEMAND RETURN LINES AND DOES NOT RECEIVE ANY ADDITIONAL DATA BACK FROM THE LINE PRINTER, IT IS NECESSARY TO EXAMINE THE PRINT PATTERNS PRODUCED BY THE VARIOUS TEST ROUTINES OR RESORT TO MANUAL SCOPING PROCEDURES, AS PROVIDED BY THE SCOPE DRIVER ROUTINE, TO DETECT AND DIAGNOSE ADDITIONAL DIFFICULTIES. DETAILED DESCRIPTIONS OF EACH TEST PATTERN APPEARS IN THE DESCRIPTION OF THE CORRESPONDING TEST ROUTINES.

7.0 TEST DESCRIPTIONS

7.1 TEST 1 - CONTROL TESTS AND OPERATOR INTERACTIVE TESTS

TEST 1 IS MADE UP OF FOUR SECTIONS LINKED TOGETHER AND EXECUTED IN SEQUENCE AS A SINGLE TEST. THE FOLLOWING DESCRIPTIONS TREAT EACH SECTION SEPARATELY.

7.1.1 TEST 1 - SECTION 1 - COMMAND DECODE, CONTROL INTERFACE

THIS PORTION OF TEST 1 IS DESIGNED AS A COMMAND DECODE AND CONTROL INTERFACE TEST AND INCLUDES CHECKOUT OF THE PRINTER INTERRUPT FACILITY. UPON INITIAL ENTRY INTO THIS ROUTINE, MANUAL INTERVENTION IS REQUIRED TO TEST THE VARIOUS TESTABLE ERROR (NON-READY) CONDITIONS OF THE PRINTER. THE OPERATING SEQUENCE IS DESCRIBED IN DETAIL BELOW.

THE PRINTER READY LINE CONTINUOUSLY MONITORS THE FOLLOWING CONDITIONS WITHIN THE PRINTER AND ITS TRUE STATE AT THE CONTROL ELECTRONICS INTERFACE IS CONDITIONAL UPON NONE OF THEM EXISTING:

1. PAPER OUT OR TORN
2. DRUM GATE OPEN
3. RIBBON STALL CONDITION
4. POWER SUPPLY FAULT
5. HAMMER BANK FAULT
6. DAVFU ERROR (IF AVAILABLE)
7. SWITCHED OFF LINE

THE MANUAL-INTERACTIVE TEST SEQUENCE WHICH FOLLOWS IS DESIGNED TO TEST THE PROPER OPERATION OF THE READY LINE AS IT APPEARS AT THE INTERFACE ELECTRONICS WITH RESPECT TO THOSE OF THE ABOVE ITEMS WHICH ARE TESTABLE (I.E. - A,B,F&G) INITIAL MANUAL TEST SEQUENCE:

1. AFTER "POWER ON - TURN ON LINE" HAS BEEN TYPED ON THE TELEPRINTER BRING POWER - UP ON THE LINE PRINTER AND TURN ON LINE, MAKING SURE THAT THE PAPER IS IN PLACE IN THE TRACTORS AND THAT THE DRUM GATE IS CLOSED.

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2. DEPRESS CONTINUE, "READY SET OK - TRY TORN PAPER SWITCH" WILL BE TYPED OUT IF PRINTER IS ON LINE AND NO ERRORS EXIST.
3. PAPER - TEAR THE PAPER OFF BELOW THE PRINTER DRUM GATE AND USE THE MANUAL TOP OF FORM SWITCH TO DRIVE ALL THE PAPER OUT OF THE PRINTER AND OBSERVE THAT THE PRINTER READY LIGHT GOES OUT AND THE PAPER ERROR LIGHT GOES ON ON THE PRINTER CONTROL PANEL. ATTEMPT TO PLACE THE PRINTER ON LINE. THE ON-LINE AND READY LIGHTS ON THE PRINTER CONTROL PANEL SHOULD REMAIN OFF.
4. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 2) WILL OCCUR IF THE PRINTER READY LINE REMAINS HIGH AT THE INTERFACE ELECTRONICS.
5. READY - AFTER SUCCESSFUL COMPLETION OF STEPS 3 AND 4 THE MESSAGE "ERROR SET OK - TURN ON LINE" WILL BE TYPED. RESTORE PAPER TO THE TRACTORS, CLOSE THE DRUM GATE AND PLACE THE PRINTER IN THE READY-ON LINE STATE. OBSERVE THAT BOTH THE ON-LINE AND READY LIGHTS COME ON ON THE PRINTER CONTROL PANEL.
6. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 4) WILL OCCUR IF THE PRINTER READY LINE DOES NOT GO HIGH AT THE INTERFACE ELECTRONICS.
7. DRUM GATE - AFTER SUCCESSFUL COMPLETION OF STEPS 5 & 6 THE MESSAGE "READY SET OK-TRY, DRUM GATE SWITCH" WILL BE TYPED. OPEN THE PRINTER DRUM GATE AND OBSERVE THAT THE ON-LINE AND READY LIGHTS GO OUT AND THE DRUM GATE ERROR LIGHT GOES ON ON THE PRINTER CONTROL PANEL.
8. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 5) WILL OCCUR IF THE PRINTER READY LINE APPEARS TO REMAIN HIGH AT THE INTERFACE ELECTRONICS.
9. READY - AFTER SUCCESSFUL COMPLETION OF STEPS 7 & 8 THE MESSAGE "ERROR SET OK - TURN ON LINE" WILL BE TYPED.
10. DEPRESS CONTINUE TO COMPLETE THE COMMAND AND REGISTER TESTING ALONG WITH THE INTERRUPT TESTING. IF ANY ERROR CONDITIONS EXIST, ERROR TYPE-OUTS GIVING THE ERROR COUNT WILL BE PRINTED. CHECK THE LISTING FOR DESCRIPTIONS OF THESE ERRORS.
11. SECTION 2 OF TEST 1 WILL BE ENTERED DIRECTLY UPON COMPLETION OF SECTION 1.

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7.1.2 TEST 1 - SECTION 2 - PRINT SPEED TIMING TEST.

THIS SECTION OF TEST 1 IS DESIGNED TO TIME THE PRINTER FOR ONE FULL MINUTE. DURING THIS TIME THE PRINTER WILL PRINT THE DIAGNOL OF THE DRUM PATTERN SO THAT ONLY TWO HAMMERS (MAXIMUM) WILL FIRE AT ANY GIVEN INSTANT AND MAXIMUM PRINT TIME IS USED FOR EACH LINE.

IF A KW11-L OR KW11-P ARE AVAILABLE THEY WILL BE USED TO TIME THE PRINTER. IF BOTH ARE AVAILABLE, THE KW11-L WILL BE USED. IF NEITHER ARE AVAILABLE, MANUAL TIMING WILL BE USED. WHEN MANUAL TIMING IS USED INSTRUCTIONS WILL BE TYPED ON THE TELEPRINTER. TO START THE TIMING PLACE SWITCH 0 IN THE UP POSITION. AT THE END OF ONE FULL MINUTE PLACE SWITCH 0 IN THE DOWN POSITION TO STOP THE TIMING. IF USING AN INTERNAL CLOCK FOR TIMING, PLACE SWITCH 0 IN THE UP POSITION BEFORE STARTING THE TEST. WHICH EVER METHOD OF TIMING IS USED, AT THE END OF ONE FULL MINUTE THE APPROXIMATE PRINT SPEED WILL BE TYPED ON BOTH THE TELEPRINTER AND LINE PRINTER.

IF BOTH A KW11-L OR KW11-P ARE AVAILABLE OR IT IS DESIRED TO MANUALLY TIME THE PRINTER IF EITHER IS AVAILABLE USE THE FOLLOWING START ADDRESSES TO RUN THE DESIRED PRINT SPEED TIMING TEST:

400 FOR MANUAL TIMING
404 FOR KW11-L
410 FOR KW11-P

NOTE: IF THE LINE FREQUENCY IS 50 HZ. CHANGE THE CONTENTS OF "MINCNT TO 5670(8) ... REFER TO THE END OF THE PRINTING ROUTINE. (SEARCH FOR "MINCNT" IN THE CROSS REFERENCE LISTING)

SECTION 3 OF TEST 1 WILL BE ENTERED DIRECTLY AFTER COMPLETION OF SECTION 2.

7.1.3 TEST 1 - SECTION 3 - TOP OF FORM SWITCH TEST

THIS TEST CHECKS ALL POSITIONS OF THE TOP OF FORM SWITCH. THE PROGRAM WILL GIVE THE CORRECT SETTINGS FOR THE TOP OF FORM SWITCH ON THE TELETYPE AND THEN WAIT FOR THE OPERATOR. AFTER SETTING THE SWITCH, DEPRESS CONTINUE TO TEST THAT SWITCH POSITION. AFTER CHECKING ALL POSITIONS THE PRINTER OUTPUT CAN BE MANUALLY VERIFIED. A LINE OF ALL DASHES IS PRINTED AS A STARTING POINT FOR EACH SETTING AND THEN A LINE IS PRINTED TELLING THE PROPER SPACING (IN INCHES) FROM THE DASHED LINE TO THAT LINE.

UPON COMPLETION OF THIS SECTION OF TEST 1 THE MESSAGE "TURN ON DAVFU IF AVAILABLE AND RESET TOP OF FORM SWITCH TO 11 INCHES" WILL BE TYPED. THEN THE PROGRAM WILL HALT. RESET THE TOP OF FORM SWITCH TO 11 INCHES AND TURN ON THE DAVFU (IF AVAILABLE).

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DEPRESS CONTINUE TWICE TO ENTER DIRECTLY INTO THE PRINTING TEST SEQUENCE STARTING WITH TEST 2 IF THE DAVFU IS NOT AVAILABLE (SWITCH 14 DOWN). IF THE DAVFU IS AVAILABLE (SWITCH 14 UP) SECTION 4 OF TEST 1 WILL BE ENTERED DIRECTLY AFTER DEPRESSING CONTINUE.

7.1.4 TEST 1 - SECTION 4 - DAVFU ERROR TESTS

THIS SECTION OF TEST 1 CONTAINS TWO PARTS DESIGNED TO TEST THE DAVFU ERROR CONDITIONS. THE FIRST PART OF THIS TEST ATTEMPTS TO LOAD THE DAVFU WITH INCOMPLETE DATA (AN ODD NUMBER OF DATA WORDS) BETWEEN THE START LOAD AND STOP LOAD COMMANDS. THIS SHOULD CAUSE A FORMAT ERROR TO OCCUR IN THE LINE PRINTER. FAILURE TO CAUSE AN ERROR IN THE LINE PRINTER WILL CAUSE AN ERROR TYPE-OUT "ERROR COUNT 27" TO OCCUR. UPON SUCCESSFUL COMPLETION OF THIS PART OF THE TEST THE MESSAGE "ERROR SET OK - CLEAR AND TURN ON LINE" WILL BE TYPED. CLEAR THE FORMAT ERROR IN THE PRINTER AND PLACE THE PRINTER IN THE READY - ON LINE STATE. PART TWO OF THIS TEST WILL NOW BE EXECUTED TO TEST THAT CHANNEL SLEW COMMANDS REFERENCING CHANNELS WITH NO STOP BITS WILL CAUSE AN ERROR IN THE LINE PRINTER. THE DAVFU WILL BE LOADED WITH ALL ZEROS BETWEEN THE START LOAD AND STOP LOAD COMMANDS. EACH CHANNEL WILL THEN BE TESTED IN SEQUENCE STARTING WITH CHANNEL 0. IF THE ERROR DOES NOT OCCUR MESSAGE "ERROR COUNT 31" WILL BE TYPED. UPON SUCCESSFUL COMPLETION OF THE TEST ON EACH CHANNEL A MESSAGE "ERROR SET OK - CLEAR AND TRY NEXT CHANNEL" WILL BE TYPED. AFTER THIS MESSAGE, CLEAR THE PRINTER ERROR AND PRESS CONTINUE. THE DAVFU WILL THEN BE RELOADED WITH ALL ZEROS AND THE NEXT CHANNEL WILL BE TESTED. UPON SUCCESSFUL COMPLETION OF THIS TEST, THE MESSAGE "ERROR SET OK - CLEAR AND TURN ON LINE" WILL BE TYPED. CLEAR THE PRINTER ERROR AND PLACE THE PRINTER IN THE READY, ON-LINE STATE. DEPRESS CONTINUE TO ENTER THE PRINTING TEST SEQUENCE DIRECTLY STARTING WITH TEST 2.

7.2 LINE PRINTER PRINTING TESTS

TESTS 2 TO 12 PRODUCE VARIOUS PRINT PATTERNS DESIGNED FOR EASE OF VISUAL VERIFICATION. THESE TESTS CHECK ALL OF THE VARIOUS PRINTING ASPECTS OF THE PRINTER. DETAILED DESCRIPTIONS OF EACH INDIVIDUAL TEST FOLLOWS.

7.2.1 TEST 2 - DATA TRANSFER PATHS TEST

THIS TEST IS DESIGNED TO TEST THE DATA TRANSFER PATHS (WITH ALTERNATING ONES AND ZEROS), FROM THE PROCESSOR INTERFACE, THRU THE LINE PRINTER INPUT REGISTER, AND INTO THE PRINTER'S BUFFER. AN ALTERNATING STRING OF "*" AND "U" CHARACTERS ARE TRANSMITTED TO THE PRINTER ON A FULL 132 COLUMN BASIS. SINCE THESE CHARACTERS ARE COMPLIMENTARY BITWISE, THEY PROVIDE BOTH A ONES AND ZEROES CHECK OF ALL TRANSMISSION LINES. END OF LINE IS SENSED WITHIN THE PROCESSOR AND A LINE FEED CHARACTER IS TRANSMITTED TO PRINT EACH LINE. PRINTING OF THE TEST LINE IS REPEATED 32 TIMES, ALTERNATING THE COLUMN POSITIONS OF THE "*" AND "U" CHARACTERS TO PRODUCE A CHECKER-BOARD PATTERN.

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7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

TEST 3 IS DESIGNED PRIMARILY TO TEST THE LINE PRINTER CHARACTER GENERATOR AND COMPARATOR LOGIC AND ITS ABILITY TO DETECT AND ACT UPON BOTH PRINTABLE AND ILLEGAL (NON-PRINTING) CHARACTERS. A SERIES OF ALL 64 OR 96 PRINTABLE CHARACTERS ARE TRANSMITTED IN SEQUENCE TO THE LINE PRINTER AND PRINTED ON A SINGLE LINE BEGINNING WITH THE SPACE CHARACTER. THIS IS FOLLOWED BY AN ALTERNATE LINE OF ALL 64 OR 32 ILLEGAL CHARACTERS, EACH OF WHICH SHOULD BE CONVERTED TO A SPACE CHARACTER PRODUCING NO VISIBLE PRINTING. THIS SEQUENCE OF ALTERNATING ALL PRINTABLE CHARACTERS FOLLOWED BY ALL ILLEGAL CHARACTERS IS REPEATED 10 TIMES ALONG WITH AN EXTRA LINE OF ILLEGAL CHARACTERS INSERTED AT THE BEGINNING OF THE TEST TO PRODUCE 21 LINES OF PRINT (11 OF WHICH WILL BE BLANK).

7.2.3 TEST 4 - OVER PRINT TEST

THIS TEST CHECKS THE CARRIAGE RETURN (015) CONTROL FOR OVERPRINTING A LINE. THE TEST PRODUCES 24 LINES OF ALTERNATING E'S AND SPACES, OVERPRINTED WITH E'S AND SPACES IN THE SAME LOCATIONS. THE STARTING CHARACTER FOR EACH LINE IS ALSO ALTERNATED PRODUCING A CHECKERBOARD PATTERN. OVERPRINTED E'S SHOULD BE ALIGNED WITH THE FIRST E'S PRINTED.

7.2.4 TEST 5 - SHUTTLE POSITIONING TEST

THIS TEST CHECKS THE HAMMER SHUTTLE FOR CORRECT OPERATION. FULL LINES OF E'S ARE PRINTED BY PRINTING A PAIR OF E'S AT A TIME THEN OVERPRINTING THOSE E'S PRINTED WITH SPACES AND ADDING ANOTHER PAIR OF E'S TO THE LINE UNTIL THE LINE IS COMPLETED. THEN A FULL LINE OF M'S ARE PRINTED FOR COMPARISON. A TOTAL OF 16 LINES ARE PRINTED DURING THIS TEST. THERE IS NO SHUTTLE IN THE LP14 LINE PRINTER. EACH COLUMN HAS A HAMMER. THE PRINTER LOGIC SELECTS WHICH HAMMER IS TO FIRE.

7.2.5 TEST 6 - PRINT CONTROL TEST

THIS TEST CHECKS THE PRINT CONTROL LOGIC BY SENDING MORE THAN 132 CHARACTERS BEFORE SENDING A PRINT COMMAND. THE PRINTER SHOULD SAVE THE FIRST 132 CHARACTERS RECEIVED AND PRINT THEM CORRECTLY WHEN THE PRINT COMMAND IS RECEIVED. ALL CHARACTERS AFTER THE FIRST 132 SHOULD BE LOST. THE PROGRAM SENDS A FULL LINE OF 132 ZEROS THEN THE FULL CHARACTER SET BEFORE SENDING A LINE FEED TO PRINT THE LINE. THE PRINTED LINE SHOULD CONTAIN ONLY ZEROS. THIS IS REPEATED USING ONES, TWOS, THREES, FOURS, AND FIVES. THEN A LINE OF SPACES ARE SENT AND THE FULL CHARACTER SET BEFORE THE LINE FEED. A BLANK LINE SHOULD BE PRINTED. AFTER THE BLANK LINE, THE NUMBERS 6 TO 9 ARE SENT AS BEFORE. A TOTAL OF 11 LINES WILL BE PRINTED WITH THE MIDDLE LINE BLANK.

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7.2.6 TEST 7 - MULTIPLE LINE ADVANCE TEST

THIS TEST CHECKS THE MULTIPLE LINE ADVANCE OF THE LINE PRINTER. A LINE OF NUMBERS IS PRINTED THEN THE PAPER IS ADVANCED THAT NUMBER OF LINES. THUS THE NUMBER PRINTED WILL INDICATE THE NUMBER OF BLANK LINES FOLLOWING THAT LINE. THE NUMBER IS VARIED BETWEEN 2 AND 9, AND A LINE OF ALL ZEROS WILL END THE TEST.

7.2.7 TEST 8 - HIGH SPEED PRINT TEST

THIS TEST PRINTS AT A SPEED GREATER THAN 300 LINES PER MINUTE (APPROXIMATELY 500 LINES PER MINUTE) BY PRINTING A FULL LINE OF THE DRUM PATTERN AND THEN SKIPPING FOUR (4) LINES AND PRINTING THAT DRUM LINE, ETC. THIS WILL TEST THE HAMMER SUPPLY FOR MAXIMUM CURRENT SURGE AND WILL TEST FOR WORST CASE NOISE SINCE ALL HAMMERS WILL FIRE AT ONCE ON EACH LINE.

7.2.8 TEST 9 - SINGLE CHAR, ALL COLUMNS TEST

THIS TEST IS DESIGNED AS AN ENDURANCE TEST OF THE LINE PRINTER AS WELL AS A CHARACTER CHECK OF THE DRUM. 132 COLUMNS OF EACH OF THE 64 OR 96 CHARACTERS ARE TRANSMITTED TO THE LINE PRINTER AND PRINTED IN ROTATION. A SAMPLE OF THE PRINT OUT FOLLOWS:

```
?????-----?????  
zzzzz-----zzzzz  
AAAAA-----AAAAA  
BBBBB-----BBBBB  
-----  
ZZZZZ-----ZZZZZ
```

7.2.9 TEST 10 - DRUM PATTERN TEST

THIS TEST IS DESIGNED TO PRODUCE AN IMAGE OF THE ENTIRE DRUM PATTERN. THIS IS A WORST CASE NOISE AND ENDURANCE TEST, AND A CHECK OF THE DRUM PATTERN.

7.2.10 TEST 11 - SPURIOUS HAMMER FIRING TEST

THIS TEST IS DESIGNED TO DETECT SPURIOUS HAMMER FIRINGS AND DEFECTIVE HAMMER DRIVERS DURING OPERATION OF THE LINE PRINTER. THE PATTERNS WHICH ARE PRODUCED ARE RIGHT AND LEFT HAND WEDGES, EACH COMPOSED OF 132 LINES OF PRINT AS FOLLOWS:

LEFT HAND WEDGE - WILL END EACH LINE WITH A "?" CHARACTER.

RIGHT HAND WEDGE - WILL START EACH LINE WITH A "?" CHARACTER.

ANY PRINT OUTSIDE OF THE WEDGE WILL BE CAUSED BY A HAMMER MISFIRE OR HAMMER BOUNCE.

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7.2.11 TEST 12 - HAMMER ALIGNMENT TEST

THIS ROUTINE IS DESIGNED TO BE USED AS A DRIVER FOR MANUAL HAMMER ALIGNMENT AND INTENSITY ADJUSTMENTS ON THE LINE PRINTER. THIS TEST PRINTS A FULL 132 COLUMN LINE OF "E" CHARACTERS FOR 63 LINES.

7.2.12 TESTS D1 & D2 - DAVFU LINE COUNT SLEWING TESTS

THIS TEST IS DESIGNED TO TEST THE LINE COUNT METHOD OF PAPER CONTROL USING THE DAVFU. BEFORE STARTING THIS TEST, A MESSAGE WILL BE TYPED INSTRUCTING THE OPERATOR THAT THE DAVFU TESTS ARE BEING RUN. THE DAVFU MEMORY WILL BE LOADED WITH DUMMY DATA, THEN EACH OF THE LINE COUNT SLEWING COMMANDS WILL BE TESTED IN TURN STARTING WITH A SLEW OF ZERO (0) LINES. IF THE SLEW OF ZERO LINES OPERATES CORRECTLY, THE MESSAGE "THIS LINE SHOULD BE PRINTED ALL ON ONE LINE --- IF SLEWED 0 LINES" WILL BE PRINTED ALL ON ONE LINE. THEN EACH OF THE REMAINING COMMANDS WILL BE TESTED. AFTER EACH SLEW, A LINE WILL BE PRINTED INDICATING THE CORRECT NUMBER OF BLANK LINES BETWEEN THE LAST PRINTED LINE AND THAT LINE. AFTER COMPLETION OF TEST D1, THE SEQUENCE IS REPEATED (TEST D2), CHANGING THE TWO (2) UNUSED BITS IN THE PAPER INSTRUCTION TO INSURE THEY HAVE NO EFFECT ON THE DAVFU. UPON COMPLETION OF TEST D2, TEST D3 IS ENTERED DIRECTLY.

7.2.13 TEST D3 - DAVFU CHANNEL SLEW COMMAND TEST

THIS TEST IS DESIGNED TO TEST THE CHANNEL SLEW COMMANDS ON THE DAVFU. THE DAVFU IS FIRST LOADED, THEN EACH OF THE CHANNELS IS TESTED IN TURN STARTING WITH CHANNEL 0. THE DATA PATTERNS (STOP BITS) LOADED INTO THE DAVFU ARE CHOSEN SUCH THAT NO TWO ADJACENT CHANNELS HAVE THE SAME PATTERN. CHANNELS 1 AND 7 WILL CAUSE ONE BLANK LINE BETWEEN EACH PRINTED LINE. CHANNELS 2 AND 8 WILL CAUSE TWO BLANK LINES BETWEEN EACH PRINTED LINE. CHANNELS 3 AND 9 WILL CAUSE THREE BLANK LINES BETWEEN EACH PRINTED LINE. CHANNELS 4 AND 10 WILL CAUSE SIX BLANK LINES BETWEEN EACH LINE. CHANNELS 5 AND 11 WILL CAUSE 24 LINES BETWEEN EACH PRINTED LINE. CHANNELS 6 AND 12 WILL CAUSE 143 BLANK LINES BETWEEN THE HEADER AND THE PRINTED REFERENCeline. BEFORE TESTING EACH CHANNEL, A HEADER MESSAGE IS PRINTED TELLING WHICH CHANNEL IS BEING TESTED. AFTER TESTING EACH SLEW COMMAND, A LINE IS PRINTED GIVING THE CORRECT NUMBER OF BLANK LINES FROM THE LAST PRINTED LINE TO THAT LINE. UPON COMPLETION OF THIS TEST THE DIAGNOSTIC WILL RESTART THE PRINTING TESTS WITH TEST 2.

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7.3 SCOPE DRIVE ROUTINE

THE PRUPOSE OF THIS TEST SEQUENCE IS TO PROVIDE THE OPERATOR WITH A SHORT BUT COMPREHENSIVE SCOPE DRIVER ROUTINE FOR USE IN TROUBLE SHOOTING THE PRINTER INTERFACE CONTROL MODULE WITH THE SCOPE. DEPENDING ON THE SETTING OF SWITCH 11 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. (SEE DESCRIPTION OF SWITCH 11 OPERATION IN SECTION 5.1)

TO INSERT A LINE FEED CHARACTER AFTER EVERY 132 CHARACTERS, WHEN SENDING CHARACTERS CONTINUOUSLY, START AT LOCATION 700(B).

TO LEAVE OUT THE LINE FEED, START AT LOCATION 710(B). THIS ROUTINE SHOULD BE USEFUL WHEN TROUBLE SHOOTING THE DAVFU.

WHEN SWITCH 11 IS UP, TO SEND ONLY ONE CHARACTER THEN HALT, DEPRESS CONTINUE TO SEND THE NEXT CHARACTER AFTER SETTING THE SWITCH REGISTER AS DESIRED. TO RESUME SENDING CONTINUOUS CHARACTERS, PLACE SWITCH 11 DOWN, SET THE SWITCHES, AND DEPRESS CONTINUE. TO STOP SENDING CONTINUOUSLY PLACE SWITCH 11 UP.

:ENDR
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.TITLE MAINDEC-11-DZLPK-G-D
.NLIST MC
;COPYRIGHT (C) 1977,1974 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
;***** LP14/LP11/LPOS LINE PRINTER TEST *****

;LIST OF SWITCH SETTINGS USED IN THIS TEST

SWITCH NO.	DESCRIPTION
15	LOOP ON ERROR IN TEST 1 ONLY !!!
14	OPTIONAL DAYFU AVAILABLE
13	"DOWN" 64 CHAR./"UP"-96 CHAR OPTION
12	LOOP ON TEST
11	SEND ONLY ONE CHAR TO LINE PRINTER IN SCOPE TEST - THEN HALT
10	DOWN - LPOS/LP11, UP - LP14
9	"UP" - INHIBIT ERROR REPORTS
0	USED TO TEST PRINT SPEED IN TEST 1 IF NO CLOCK IS AVAILABLE

000000
000001
000002
000003
000004
000005
000006
000007
000006
000007

R0=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
R6=%6
R7=%7
SP=R6
PC=R7

100000
040000
020000
010000
004000
002000
001000
000400
000200
000100
000040
000020
000010
000004
000002
000001

BIT15 =100000
BIT14 =40000
BIT13 =20000
BIT12 =10000
BIT11 =4000
BIT10 =2000
BIT9 =1000
BIT8 =400
BIT7 =200
BIT6 =100
BIT5 =40
BIT4 =20
BIT3 =10
BIT2 =4
BIT1 =2
BIT0 =1

.ENABLE ABS
.ENABLE AMA

000000

.=0

```

969
970          000030          . = 30
971
972 000030 011524          TYP
973 000032 000340          340
974
975
976          000042          . = 42
977
978 000042 000000          0
979
980          000046          . = 46
981 000046 011316          LOGICAL
982          000052          . = 52
983 000052 040000          BIT14
984
985
986          000060          . = 60
987 000060 011762          TKINT          ; KEYBOARD INTERRUPT ROUTINE
988 000062 000300          300
989
990
991          000100          . = 100
992
993 000100 003220          LKSRV          ; LINE CLOCK SERVICE ROUTINE
994 000102 000340          340
995
996 000104 003230          CONVRT
997 000106 000340          340
998
999          000174          . = 174
1000 000174 000000          DISPRG: 0
1001 000176 000000          SWREG: 0
1002
1003          000200          . = 200
1004
1005 000200 012706 001000          MOV          #1000,%6
1006 000204 000137 001100          JMP          SETUP
1007
1008
1009          000300          . = 300
1010
1011          ; START FOR DAVFU TESTS
1012 000300 000137 004042          JMP          INDAT          ; ILLEGAL LOAD TEST
1013 000304 000137 004230          JMP          NODAT          ; NO STOP BIT - CHANNEL SLEW TEST
1014 000310 000137 014576          JMP          DAVFU          ; LINE COUNT SLEW TEST
1015 000314 000137 015332          JMP          DAV2          ; CHANNEL SLEW TEST
1016
1017
1018          000400          . = 400
1019
1020          ; 1 MINUTE PRINT SPEED CHECK
1021 000400 000137 002452          JMP          SWTIME          ; START FOR USING SWITCH REG FOR TIMING
1022 000404 000137 002612          JMP          KW11L          ; START FOR KW11-L LINE CLOCK
1023 000410 000137 002532          JMP          KW11P          ; START FOR KW11-P LINE CLOCK
1024 000414 000137 003430          JMP          SLEWCK          ; CHECK TOP OF FORM SWITCH
  
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1025
1026
1027
1028      000600      . = 600
1029
1030      000600      012706      001000      MOV      #1000,%6      ; START OF PRINTING TESTS SEQUENCE
1031      000604      000137      004534      JMP      TEST2        ; TEST 2
1032      000610      000137      004776      JMP      TEST3        ; TEST 3
1033      000614      000137      005352      JMP      CHRCHK       ; TEST 4
1034      000620      000137      005634      JMP      OVRPRT       ; TEST 5
1035      000624      000137      006132      JMP      PRTCTL       ; TEST 6
1036      000630      000137      006432      JMP      MLF          ; TEST 7
1037      000634      000137      006646      JMP      HSPRT        ; TEST 8
1038      000640      000137      007450      JMP      SNGCHR       ; TEST 9
1039      000644      000137      007644      JMP      ROTATE       ; TEST 10
1040      000650      000137      010406      JMP      LFTTR        ; TEST 11
1041      000654      000137      011122      JMP      HAMALN      ; TEST 12
1042
1043
1044      000700      . = 700
1045
1046      000700      012737      017006      017032      MOV      #LSCA,LOSCOP ; SEND LF AFTER 132 CHARS
1047      000706      000137      016664      JMP      SCOPE
1048
1049      000720      . = 720
1050
1051      000720      012737      016664      017032      MOV      #SCOPE,LOSCOP ; NO LF'S SENT IN SCOPE ROUTINE
1052      000726      000137      016664      JMP      SCOPE        ; DO SCOPE ROUTINE
1053
1054
1055      001000      . = 1000
1056
1057      ;LINE PRINTER HARDWARE REGISTERS
1058
1059      001000      177514      LPS:      177514      ; STATUS REGISTER
1060      ; BIT 15=ERROR
1061      ; BIT 7=READY
1062      ; BIT 6=INTERRUPT ENABLE
1063
1064      001002      177516      LPB:      177516      ; DATA BUFFER REGISTER
1065      ; BITS 0-6=7 BIT ASCII CHARACTER BUFFER
1066      ; BITS 7-15=NOT USED
1067
1068
1069      001004      177570      SWR:      177570
1070      001006      177570      DISPLAY: 177570
1071      001010      177776      PSW:      177776
1072      001012      177566      TPB:      177566
1073      001014      177562      TKB:      177562
1074      001016      177564      TPS:      177564
1075      001020      177560      TKS:      177560
1076      001022      172542      CSBR:     172542
1077      001024      172540      PLKS:     172540
1078      001026      177546      LKS:      177546
1079      001030      000200      PTRVEC:   .WORD 200
1080      001032      000202      PTRPSW:   .WORD 202
    
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1081      000240      NOP      =240
1082      000000      N        =0
1083      000002      M        =2
1084
1085      ;MACRO FOR SETTING UP ERROR COUNT
1086
1087      .LIST ME
1088
1089      .MACR  SERROR X
1090      ERR'X': MOV    BX,    ERCOUNT      ;SET UP ERROR COUNT X
1091      N=N+1
1092      .ENDM  SERROR
1093
1094
1095      ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1096
1097      .LIST ME
1098
1099      .MACR  SPRINT Y
1100      MOV    TNO'Y',MES15      ;SET TEST NUMBER FOR MESSAGE
1101      JSR    %4,PRINT          ;PRINT TEST NUMBER
1102      M=M+1
1103      .ENDM  SPRINT
1104
1105
1106      ;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW
1107
1108      .LIST ME
1109
1110      .MACR  SWAIT
1111      TSTB  ALPS              ;TEST READY
1112      BPL   -4                ;WAIT FOR READY
1113      .ENDM  SWAIT
1114
1115
1116
1117      ;MACRO FOR ENABLING KEYBOARD INTERRUPT IF THERE IS NO
1118      ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1119
1120
1121      .LIST ME
1122
1123
1124      .MACR  SENABLE
1125      CMP   #176,SWR          ;S/W SWR ?
1126      BNE   .+10              ;NO- CONTINUE
1127      BIS   #100,JKS          ;ENABLE KEYBOARD INTERRUPT
1128      .ENDM  SENABLE
1129
1130
1131
1132      ;MACRO USED TO LOAD THE PSW WITH THE
1133      ;CORRECT PROCESSOR PRIORITY LEVEL
1134
1135
1136      .LIST ME
  
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1183
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1187
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1189
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.MACR \$SETPSW
MOV PC,-(SP)
ADD #6,(SP)
RTI
.ENOM \$SETPSW

;MOVE PRESENT LOCATION TO STACK
;SET UP FOR NEXT INSTRUCTION
;LOAD PSW

;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

SEGCNT: 0
CHRCNT: 0
CHRGEN: 0
LINCNT: 0
CYCCNT: 0
WORK: 0
SAVE: 0
ERCOUNT: 0
STRCHR: 0
STRCNT: 0
LEGCHR: 0
NUMCHR: 0
OFFSET: 0
DIGITS: 0
SIGNAL: 0
SET: 0
CHAR: 0
OCT: 0

;ROUTINE TO TEST THE MECH. OPERATION OF THE LPOS

SETUP: JSR %4,TYPINT
RESET ;CLEAR WORLD
MOV 4,-(SP) ;SAVE CURRENT VECTORS
MOV 6,-(SP)
MOV #1\$ 4 ;SET UP TIMEOUT VECTOR
TST #SWR ;TRY TO ACCESS HARDWARE SWR
BR 2\$;IF THERE, GO TO 2\$
1\$: MOV #SWREG,SWR ;POINT TO SOFTWARE SWR
MOV #DISPREG,DISPLAY ;POINT TO SOFTWARE DISPLAY
CMP (SP)+,(SP)+ ;RESTORE STACK
2\$: MOV (SP)+,6 ;RESTORE TIMEOUT VECTORS
MOV (SP)+,4 ;
EMT +0
MES1 ;TYPE DIAGNOSTIC TITLE
EMT +0
MES2 ;TYPE RESTART ADDRESS INFO

001034 000000
001036 000000
001040 000000
001042 000000
001044 000000
001046 000000
001050 000000
001052 000000
001054 000000
001056 000000
001060 000000
001062 000000
001064 000000
001066 000000
001070 000000
001072 000000
001074 000000
001076 000000

001100 004437 011506
001104 000005
001106 013746 000004
001112 013746 000006
001116 012737 001132 000004
001124 005777 177654
001130 000407
001132
001132 012737 000176 001004
001140 012737 000174 001006
001146 022626
001150 012637 000006
001154 012637 000004

001160 104000
001162 012741
001164 104000
001166 013004

```

1193
1194
1195
1196
1197
1198
1199
1200
1201 001170 022737 000176 001004      CMP      #176,SWR      ;S/W SWR ?
1202 001176 001044      BNE      SKIP        ;NO- CONTINUE
1203 001200 005037 001070      CLR      SIGNAL      ;INITIALIZE INTERRUPT ROUTINE
1204 001204 005037 001066      CLR      DIGITS
1205 001210 005037 001072      CLR      SET
1206 001214 005037 001074      CLR      CHAR
1207 001220 013746 000034      MOV      34,-(SP)    ;SAVE VECTOR
1208 001224 013746 000036      MOV      36,-(SP)    ;SAVE VECTOR
1209 001230 012737 011762 000034      MOV      #TKINT,34   ;SET UP NEW VECTOR
1210 001236 012737 000300 000036      MOV      #300,36     ;SET UP NEW VECTOR
1211 001244 005237 001072      INC      SET         ;SET HEADER FLAG
1212 001250 104400      TRAP    +0          ;ENTER INTERRUPT ROUTINE
1213 001252 005037 001072      CLR      SET         ;CLEAR HEADER FLAG
1214 001256 012637 000036      MOV      (SP)+,36    ;RESTORE VECTOR
1215 001262 012637 000034      MOV      (SP)+,34    ;RESTORE VECTOR
1216 001266 012777 000100 177524      MOV      #100,ATKS  ;ENABLE KEYBOARD INTERRUPT
1217 001274 000001      WT:    WAIT
1218 001276 000240      NOP
1219 001300 022737 000001 001070      CMP      #1,SIGNAL  ;SWR VALUE ENTERED ?
1220 001306 001772      BEQ    WT           ;NO- WAIT
1221 001310 000240      SKIP:  NOP
1222
1223
1224
1225 001312 000005      RESET
1226
1227
1228
1229 001314 104000      EMT     +0          ;TYPE MESSAGE
1230 001316 013031      MES3
1231 001320 000000      HALT    ;POWER UP
1232                                     ;DEPRESS CONTINUE WHEN READY TO START TEST
1233
1234
1235
1236
1237 001322 005777 177452      STP1:  TST     @LPS   ;TEST FOR ERROR
1238 001326 100006      BPL     STP2        ;NO ERROR TEST FOR READY
1239 001330 012737 000000 001052  ERRO:  MOV     #0,    ERCOUNT ;SET UP ERROR COUNT 0
1240 (1) 001336 004537 011722      JSR     %S STAER    ;REPORT ERROR BIT SET
1241 001342 000767      BR     STP1         ;GO TEST FOR ERROR
1242 001344 105777 177430      STP2:  TSTB  @LPS   ;TEST FOR READY
1243 001350 100406      BMI     STP3        ;READY SET OK
1244 001352 012737 000001 001052  ERR1:  MOV     #1,    ERCOUNT ;SET UP ERROR COUNT 1
1245 (1) 001360 004537 011722      JSR     %S STAER    ;REPORT READY NOT SET
1246 001364 000767      BR     STP2        ;GO TEST FOR READY

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1247 001366 104000 STP3:  EMT      +0          ;TYPE MESSAGE
1248 001370 013063      MES4
1249 001372 000000      HALT          ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1250 001374      ;DEPRESS CONTINUE WHEN READY
1251 001374 012777 000014 177400 STP4:  MOV      #14,ALPB      ;SEND A "FF" TO THE PRINTER
1252 001402 012777 000015 177372      MOV      #15,ALPB      ;ATTEMPT "FF" BY SENDING A "CR"
1253 001410 005777 177364      TST      ALPS          ;TEST FOR ERROR
1254 001414 100406      BMI      STP5          ;BRANCH IF ERROR SET
1255 001416 012737 000002 001052 ERR2:  MOV      #2,      ERCOUNT ;SET UP ERROR COUNT 2
(1) 000003
1256 001424 004537 011722      JSR      %5,STAER      ;REPORT ERROR NOT SET
1257 001430 000761      BR       STP4          ;LOOP ON ERROR
1258 001432 104000      STP5:  EMT      +0          ;TYPE MESSAGE
1259 001434 013174      MES6
1260 001436 000000      HALT          ;ERROR SET OK - TURN ON LINE
1261      ;WAIT FOR OPERATOR
1262 001440 005777 177334      STPSA: TST      ALPS          ;TEST FOR ERROR
1263 001444 100006      BPL      STPSB         ;NO ERROR CONTINUE
1264 001446 012737 000003 001052 ERR3:  MOV      #3,      ERCOUNT ;SET UP ERROR COUNT 3
(1) 000004
1265 001454 004537 011722      JSR      %5,STAER      ;REPORT ERROR SET
1266 001460 000767      BR       STPSA         ;LOOP ON ERROR
1267 001462 105777 177312      STPSB: TSTB     ALPS          ;TEST READY
1268 001466 100406      BMI      STPSC         ;READY SET OK
1269 001470 012737 000004 001052 ERR4:  MOV      #4,      ERCOUNT ;SET UP ERROR COUNT 4
(1) 000005
1270 001476 004537 011722      JSR      %5,STAER      ;REPORT ERROR NOT SET
1271 001502 000767      BR       STPSB         ;LOOP ON ERROR
1272 001504 104000      STPSC: EMT      +0          ;TYPE MESSAGE
1273 001506 013127      MESS
1274 001510 000000      HALT          ;READY SET OK - TRY DRUM DATE SWITCH
1275      ;DEPRESS CONTINUE WHEN READY
1276 001512 005777 177262      STP6:  TST      ALPS          ;TEST FOR ERROR
1277 001516 100406      BMI      STP7          ;BRANCH IF ERROR SET
1278 001520 012737 000005 001052 ERR5:  MOV      #5,      ERCOUNT ;SET UP ERROR COUNT 5
(1) 000006
1279 001526 004537 011722      JSR      %5,STAER      ;REPORT ERROR NOT SET
1280 001532 000767      BR       STP6          ;LOOP ON ERROR
1281 001534 104000      STP7:  EMT      +0          ;TYPE MESSAGE
1282 001536 013174      MES6
1283 001540 000000      HALT          ;ERROR SET OK - TURN ON LINE
1284      ;DEPRESS CONTINUE WHEN READY
1285      ;TEST 1
1286      ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING.
1287      ;IS THE PRINTER FREE OF ERRORS
1288
1289
1290 001542 000005      TEST1: RESET          ;CLEAR THE WORLD
1291 001544 005777 177230      TST      ALPS          ;IS ERROR FLAG CLEAR
1292 001550 100006      BPL      TEST1A        ;ERROR IS CLEAR OK
1293 001552 012737 000006 001052 ERR6:  MOV      #6,      ERCOUNT ;SET UP ERROR COUNT 6
(1) 000007
1294 001560 004537 011722      JSR      %5,STAER      ;REPORT ERROR SET
1295 001564 000766      BR       TEST1         ;LOOP ON ERROR
1296
1297      ;IS READY SET (NO ERRORS EXIST)
    
```

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1298
1299 001566 000005          TEST1A: RESET          ;CLEAR THE WORLD
1300 001570 105777 177204    TSTB          2ALPS      ;IS READY SET
1301 001574 100406          BMI          TEST1B     ;READY SET! PRINTER OK
1302 001576 012737 000007 001052 ERR7:  MOV          #7,          ERCOUNT ;SET UP ERROR COUNT 7
      (1) 000010
1303 001604 004537 011722    JSR          %5,STAER    ;REPORT READY NOT SET
1304 001610 000766          BR          TEST1A      ;LOOP ON ERROR
1305
1306          ;DOES LOADING THE BUFFER RESET READY
1307
1308 001612 005037 001046    TEST1B: CLR          WORK      ;CLEAR COUNTER
1309 001616 012777 000012 177156  MOV          #12,2ALPB    ;LOAD LINE FEED INTO BUFFER
1310 001624 105777 177150    TSTB          2ALPS      ;IS READY CLEAR
1311 001630 100006          BPL          LP1         ;READY TO CLEAR OK!
1312 001632 012737 000010 001052 ERR10: MOV          #10,          ERCOUNT ;SET UP ERROR COUNT 10
      (1) 000011
1313 001640 004537 011722    JSR          %5,STAER    ;REPORT READY STILL SET
1314 001644 000762          BR          TEST1B      ;LOOP ON ERROR
1315 001646 005777 177126    LP1:  TST          2ALPS    ;IS THERE AN ERROR
1316 001652 100006          BPL          LP2         ;NO ERROR CONTINUE
1317 001654 012737 000011 001052 ERR11: MOV          #11,          ERCOUNT ;SET UP ERROR COUNT 11
      (1) 000012
1318 001662 004537 011722    JSR          %5,STAER    ;REPORT ERROR OCCURRED
1319 001666 000751          BR          TEST1B      ;LOOP ON ERROR
1320 001670 105777 177104    LP2:  TSTB          2ALPS    ;IS THE PRINTER STILL BUSY
1321 001674 100411          BMI          TEST1C     ;NO! GO TO NEXT TEST
1322 001676 005237 001046    INC          WORK        ;YES! GO CHECK FLAGS
1323 001702 001361          BNE          LP1         ;PRINTER STILL BUSY WAIT
1324 001704 012737 000012 001052 ERR12: MOV          #12,          ERCOUNT ;SET UP ERROR COUNT 12
      (1) 000013
1325 001712 004537 011722    JSR          %5,STAER    ;ERROR REPORT TIME OUT
1326 001716 000735          BR          TEST1B      ;LOOP ON ERROR
1327
1328          ;CHECK INTERRUPT LEVEL OF PRINTER
1329          ;THE PRINTER SHOULD BE AT LEVEL 4
1330
1331          ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
1332
1333 001720 012777 002204 177102 TEST1C: MOV          #INT1C,2PTRVEC ;SET UP INT VECTOR
1334 001726 012777 000340 177076  MOV          #340,2PTRPSW ;SET PRIORITY
1335 001734 005777 177040    TST          2ALPS      ;TEST FOR ERROR
1336 001740 100006          BPL          LP3         ;NO ERROR CONTINUE
1337 001742 012737 000013 001052 ERR13: MOV          #13,          ERCOUNT ;SET UP ERROR COUNT 13
      (1) 000014
1338 001750 004537 011722    JSR          %5,STAER    ;REPORT ERROR SET
1339 001754 000761          BR          TEST1C     ;LOOP ON ERROR
1340 001756 105777 177016    LP3:  TSTB          2ALPS    ;TST FOR READY
1341 001762 100406          BMI          LP3X        ;READY SET OK
1342 001764 012737 000014 001052 ERR14: MOV          #14,          ERCOUNT ;SET UP ERROR COUNT 14
      (1) 000015
1343 001772 004537 011722    JSR          %5,STAER    ;REPORT READY NOT SET
1344 001776 000750          BR          TEST1C     ;LOOP ON ERROR
1345 002000
      (1) 002000 012737 000015 001052 LP3X:  MOV          #15,          ERCOUNT ;SET UP ERROR COUNT 15
      (1) 000016

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1346 002006 012746 000340      MOV      #340, -(SP)      ;LOCKUP PROCESSOR, NEW PRIORITY
1347 002012 010746      MOV      PC, -(SP)      ;MOVE PRESENT LOCATION TO STACK
(1) 002014 062716 000006      ADD      #6, (SP)      ;SET UP FOR NEXT INSTRUCTION
(1) 002020 000002      RTI      ;LOAD PSW
1348 002022 052777 000100 176750      BIS      #100, 2LPS      ;SET PRINTER INTO ENABLE
1349 002030 000240      NOP      ;WAIT
1350 002032 042777 000100 176740      BIC      #100, 2LPS      ;CLEAR PRINTER INT. ENABLE
1351
1352      ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
1353
1354 002040 012737 000016 001052 ERR16: MOV      #16,   ERCOUNT      ;SET UP ERROR COUNT 16
(1) 000017      N=N+1
1355 002046 012746 000300      MOV      #300, -(SP)     ;SET PROCESSOR PRIORITY LEVEL 6
1356 002052 010746      MOV      PC, -(SP)     ;MOVE PRESENT LOCATION TO STACK
(1) 002054 062716 000006      ADD      #6, (SP)     ;SET UP FOR NEXT INSTRUCTION
(1) 002060 000002      RTI      ;LOAD PSW
1357 002062 052777 000100 176710      BIS      #100, 2LPS      ;SET PRINTER INT ENABLE
1358 002070 000240      NOP      ;WAIT
1359 002072 042777 000100 176700      BIC      #100, 2LPS      ;CLEAR PRINTER INT. ENABLE
1360
1361      ;TEST THAT THE PRINTER WILL NOT INT. AT
1362      ;PROCESSOR LEVEL 5
1363
1364 002100 012737 000017 001052 ERR17: MOV      #17,   ERCOUNT      ;SET UP ERROR COUNT 17
(1) 000020      N=N+1
1365 002106 012746 000240      MOV      #240, -(SP)    ;SET UP PROCESSOR TO LEVEL 5
1366 002112 010746      MOV      PC, -(SP)    ;MOVE PRESENT LOCATION TO STACK
(1) 002114 062716 000006      ADD      #6, (SP)    ;SET UP FOR NEXT INSTRUCTION
(1) 002120 000002      RTI      ;LOAD PSW
1367 002122 052777 000100 176650      BIS      #100, 2LPS      ;SET PRINTER INT ENABLE
1368 002130 000240      NOP      ;WAIT
1369 002132 042777 000100 176640      BIC      #100, 2LPS      ;CLEAR INT ENABLE PRINTER OK
1370
1371      ;TEST THAT THE PRINTER WILL NOT INTERRUPT
1372      ;WHEN THE PROCESSOR IS AT LEVEL 4
1373
1374 002140 012737 000020 001052 ERR20: MOV      #20,   ERCOUNT      ;SET UP ERROR COUNT 20
(1) 000021      N=N+1
1375 002146 012746 000200      MOV      #200, -(SP)   ;SET PROCESSOR TO LEVEL 4
1376 002152 010746      MOV      PC, -(SP)   ;MOVE PRESENT LOCATION TO STACK
(1) 002154 062716 000006      ADD      #6, (SP)   ;SET UP FOR NEXT INSTRUCTION
(1) 002160 000002      RTI      ;LOAD PSW
1377 002162 052777 000100 176610      BIS      #100, 2LPS      ;SET PRINTER INT. ENABLE
1378 002170 000240      NOP      ;WAIT
1379 002172 042777 000100 176600      BIC      #100, 2LPS      ;CLEAR PRINTER INT ENABLE
1380 002200 000137 002216      JMP      TEST1D      ;PRINTER OK CONTINUE
1381
1382      ;INTERRUPT HANDLE FOR TESTIC
1383      ;RESTORE STACK AND REPORT ERROR
1384
1385 002204 022626      INT1C: CMP      (6)+, (6)+      ;RESTORE STACK
1386 002206 004537 011722      JSR      %5, STAER      ;REPORT ERROR
1387 002212 000137 001720      JMP      TESTIC      ;RE-ENTER TESTIC
1388
1389      ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
1390      ;AT PRIORITY LEVEL 4
    
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1391
1392 002216 012777 002336 176604 TEST1D: MOV #INT1D, @PTRVEC ;SET UP INTERRUPT VECTOR
1393 002224 012777 000340 176600 MOV #340, @PTRPSW ;LOCK UP PRIORITIES
1394 002232 005777 176542 TST @LPS ;IS THERE A PRINTER ERROR
1395 002236 100006 BPL LP4 ;NO! CONTINUE
1396 002240 012737 000021 001052 ERR21: MOV #21, ERCOUNT ;SET UP ERROR COUNT 21
(1) 000022 N=N+1
1397 002246 004537 011722 JSR %S, STAER ;REPORT PRINTER ERROR
1398 002252 000761 BR TEST1D ;LOOP ON ERROR
1399 002254 105777 176520 LP4: TSTB @LPS ;IS READY SET
1400 002260 100406 BMI LPS ;YES - PRINTER READY
1401 002262 012737 000022 001052 ERR22: MOV #22, ERCOUNT ;SET UP ERROR COUNT 22
(1) 000023 N=N+1
1402 002270 004537 011722 JSR %S, STAER ;REPORT READY NOT SET
1403 002274 000750 BR TEST1D ;LOOP ON ERROR
1404 002276 012746 000140 LPS: MOV #140, -(SP) ;SET PRIORITY TO LEVEL 3
1405 002302 010746 MOV PC, -(SP) ;MOVE PRESENT LOCATION TO STACK
(1) 002304 062716 000006 ADD #6, (SP) ;SET UP FOR NEXT INSTRUCTION
(1) 002310 000002 RTI ;LOAD PSW
1406 002312 052777 000100 176460 BIS #100, @LPS ;SET PRINTER INTERRUPT ENABLE
1407 002320 000240 NOP ;WAIT
1408 002322 012737 000023 001052 ERR23: MOV #23, ERCOUNT ;SET UP ERROR COUNT 23
(1) 000024 N=N+1
1409 002330 004537 011722 JSR %S, STAER ;REPORT ERROR
1410 002334 000730 BR TEST1D ;LOOP ON ERROR
1411
1412 ;INTERRUPT HANDLER FOR TEST1D
1413
1414 002336 022626 INT1D: CMP (6)+, (6)+ ;RESET STACK
1415 002340 042777 000100 176432 BIC #100, @LPS ;CLEAR INT. ENABLE FOR PRINTER
1416 002346 012746 000000 MOV #0, -(SP) ;CLEAR PROCESSOR STATUS
1417 002352 010746 MOV PC, -(SP) ;MOVE PRESENT LOCATION TO STACK
(1) 002354 062716 000006 ADD #6, (SP) ;SET UP FOR NEXT INSTRUCTION
(1) 002360 000002 RTI ;LOAD PSW
1418 002362 012777 012706 176440 MOV #12706, @PTRVEC ;RESET INSTRUCTION AT 200
1419 002370 012777 001000 176434 MOV #1000, @PTRPSW ;RESET INSTRUCTION AT 202
1420
1421
1422
1423
1424
1425
1426
1427
1428 ;1 MINUTE PRINT SPEED CHECK
1429 ;IF A KW11-L OR KW11-P ARE NOT AVAILABLE, THE SR BIT0 IS USED
1430 ;FOR MANUAL TIMING OF THE PRINTER.
1431
1432 002376 012737 000002 000006 CLCKAV: MOV #RTI, @#6 ;SET TRAP TO RETURN
1433 002404 012737 000006 000004 MOV #6, @#4
1434 002412 000261 SEC
1435 002414 105777 176406 TSTB @LKS ;KW11-L AVAILABLE?
1436 002420 103404 BCS 1$ ;NO, BRANCH
1437 002422 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1438 002426 000137 002612 JMP KW11L ;USE KW11L FOR TIMING
1439 002432 000261 1$: SEC

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1440 002434 105777 176364      TSTB      @PLKS      ;KW11-P AVAILABLE?
1441 002440 103404      BCS      SWTIME     ;NO. USE SWITCH REG FOR TIMING
1442 002442 005037 000004      CLR      @#4       ;RESET TRAP VECTOR TO HALT
1443 002446 000137 002532      JMP      KW11P     ;USE KW11-P FOR TIMING
1444 002452
(1) 002452 022737 000176 001004      SWTIME:  CMP      @176,SWR      ;S/W SWR ?
(1) 002460 001003      BNE      .+10      ;NO- CONTINUE
(1) 002462 052777 000100 176330      BIS      @100,@TKS  ;ENABLE KEYBOARD INTERRUPT
1445 002470 005037 001042      CLR      LINCNT    ;CLEAR LINE COUNT
1446 002474 004437 011506      JSR      %4,TYPINT
1447 002500 005037 000004      CLR      @#4
1448 002504 104000      EMT      +0
1449 002506 012522      MESC
1450 002510 012737 000002 003216      MOV      @2,DIA
1451 002516 032777 000001 176260      1$:     BIT      @BIT0,@SWR
1452 002524 001774      BEQ      1$
1453 002526 000137 002666      JMP      STARD
1454
1455
1456      ;START FOR KW11-P.....
1457
1458 002532      KW11P:
(1) 002532 022737 000176 001004      CMP      @176,SWR      ;S/W SWR ?
(1) 002540 001003      BNE      .+10      ;NO- CONTINUE
(1) 002542 052777 000100 176250      BIS      @100,@TKS  ;ENABLE KEYBOARD INTERRUPT
1459 002550 005037 001042      CLR      LINCNT    ;CLEAR LINE COUNT
1460 002554 004437 011506      JSR      %4,TYPINT
1461 002560 012706 001000      MOV      @1000,%6
1462 002564 013777 003212 176230      MOV      MINCNT,@CSBR ;RESET STACK
1463 002572 013737 001024 003216      MOV      PLKS,DIA    ;SET CLOCK COUNT
1464 002600 012777 000105 176216      MOV      @105,@PLKS ;STORE PLKS ADDRESS
1465 002606 000137 002666      JMP      STARD      ;START CLOCK
1466
1467      ;START FOR KW11-L.....
1468
1469 002612      KW11L:
(1) 002612 022737 000176 001004      CMP      @176,SWR      ;S/W SWR ?
(1) 002620 001003      BNE      .+10      ;NO- CONTINUE
(1) 002622 052777 000100 176170      BIS      @100,@TKS  ;ENABLE KEYBOARD INTERRUPT
1470 002630 005037 001042      CLR      LINCNT    ;CLEAR LINE COUNT
1471 002634 004437 011506      JSR      %4,TYPINT
1472 002640 012706 001000      MOV      @1000,%6
1473 002644 013737 003212 003214      MOV      MINCNT,CNTR ;RESET STACK
1474 002652 013737 001026 003216      MOV      LKS,DIA    ;SET CLOCK COUNT
1475 002660 012777 000100 176140      MOV      @100,@LKS  ;STORE LKS ADDRESS
1476
1477      ;PRINTING ROUTINE.....
1478
1479 002666 032777 020000 176110      STARD:  BIT      @BIT13,@SWR ;CHECK CHAR SET
1480 002674 001007      BNE      STARDA     ;BRANCH IF 96
1481 002676 012737 000140 001060      MOV      @140,LEGCHR ;LEGAL CHECK
1482 002704 012737 000100 001062      MOV      @100,NUMCHR ;#CHARS
1483 002712 000406      BR      STAROC     ;CONTINUE
1484 002714 012737 000200 001060      STARDA: MOV      @200,LEGCHR ;LEGAL CHECK
1485 002722 012737 000140 001062      MOV      @140,NUMCHR ;#CHARS
1486 002730 013737 001060 001054      STAROC: MOV      LEGCHR,STRCHR ;SET FIRST CHAR IF LP14
    
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1487 002736 032777 002000 176040 STAROB: BIT #BIT10,JSWR ;CHECK FOR NEW DRUM(LP14)/OLD DRUM
1488 002744 001063 BNE TIMTST
1489 002746 012737 000204 001036 MOV #132,CHRCNT ;SET CHAR COUNT
1490 002754 012737 003410 001054 MOV #PATTB,STRCHR ;INITIALIZE TABLE POINTER
1491 002762 012737 000021 001044 STARA: MOV #17,CYCCNT ;SET GROUP COUNT
1492 002770 017737 176060 001040 MOV STRCHR,CHGEN ;GET CHAR FROM TABLE
1493 002776 063737 001042 001040 ADD LINCNT,CHGEN ;ADD LINE COUNT
1494 003004 023737 001060 001040 1S: CMP LEGCHR,CHGEN ;LEGAL CHAR?
1495 003012 003004 BGT STAR1 ;YES, BRANCH
1496 003014 163737 001062 001040 SUB NUMCHR,CHGEN ;NO, MAKE LEGAL
1497 003022 000770 BR 1S ;RECHECK CHAR
1498 003024 013777 001040 175750 STAR1: MOV CHGEN,ALPB ;LOAD BUFFER
1499 003032 005337 001036 DEC CHRCNT ;DECREMENT CHAR COUNT
1500 003036 001410 BEQ STARED ;BRANCH IF DONE LINE
1501 003040 005337 001044 DEC CYCCNT ;DECREMENT CYCCLE COUNT
1502 003044 001367 BNE STAR1 ;CONTINUE IF NOT DONE GROUP
1503 003046 062737 000002 001054 ADD #2,STRCHR ;ADD 2 TO TABLE POINTER
1504 003054 000137 002762 JMP STARA ;CONTINUE
1505 003060 005237 001042 STARED: INC LINCNT ;INCREMENT LINE COUNT
1506 003064 012777 000012 175710 MOV #12,ALPB ;SEND LF
1507 003072 105777 175702 TSTB ALPB ;TEST READY
(1) 003076 100375 BPL -4 ;WAIT FOR READY
1508 003100 032777 000001 175676 BIT #BIT0,JSWR ;STOP PRINT?
1509 003106 001450 BEQ CONVRT ;YES, BRANCH
1510 003110 000137 002736 JMP STAROB ;CONTINUE

;LP14 PRINTING ROUTINE
1514 003114 012737 000204 001036 TIMTST: MOV #132,CHRCNT ;SET CHARACTER COUNT
1515 003122 005337 001054 001036 DEC STRCHR ;GET NEXT STARTING CHARACTER
1516 003126 023727 001054 000040 CMP STRCHR,#40 ;LEGAL CHARACTER ?
1517 003134 100003 BPL 3S ;YES-CONTINUE
1518 003136 063737 001062 001054 ADD NUMCHR,STRCHR ;NO-MAKE LEGAL
1519 003144 013737 001054 001040 3S: MOV STRCHR,CHGEN ;GET CHARACTER
1520 003152 023727 001040 000040 TMTST2: CMP CHGEN,#40 ;LEGAL CHARACTER ?
1521 003160 100003 BPL 1S ;YES-CONTINUE
1522 003162 063737 001062 001040 ADD NUMCHR,CHGEN ;NO-MAKE LEGAL
1523 003170 013777 001040 175604 1S: MOV CHGEN,ALPB ;SEND CHARACTER
1524 003176 005337 001036 DEC CHRCNT ;DECREMENT CHARACTER COUNT
1525 003202 001726 BEQ STARED ;LINE FINISHED
1526 003204 005337 001040 DEC CHGEN ;GET NEXT CHARACTER
1527 003210 000760 TMTST1: BR TMTST2 ;CONTINUE

1530 003212 007020 MINCNT: 7020
1531 003214 000000 CNTR: 0
1532 003216 000002 DIA: 2

;NOTE -- PLACE 5670 (8) IN MINCNT FOR 50 HZ. LINE FREQUENCY !!!
;LINE CLOCK SERVICE ROUTINE FOR KW11-L
1539 003220 005337 003214 LKSRV: DEC CNTR ;DECREMENT COUNTER
1540 003224 001401 BEQ CONVRT ;EXIT IF 1 MINUTE
1541 003226 000002 RTI ;RETURN
    
```

```

1542
1543
1544 ;ROUTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE
1545
1546 003230 042777 000100 177760 CONVRT: BIC #100,201A ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
1547 003236 005037 011636 CLR TYPDAT ;CLEAR DIGIT COUNT
1548 003242 012703 013555 MOV #MES12,%3 ;SET MESSAGE POINTER
1549 003246 022737 000144 001042 1$: CMP #100.,LINCNT ;GREATER THAN 100?
1550 003254 003006 BGT 2$ ;NO, PRINT HUNDRED'S DIGIT
1551 003256 162737 000144 001042 SUB #100.,LINCNT ;YES, SUBTRACT 100
1552 003264 005237 011636 INC TYPDAT ;INCREMENT HUNDRED'S DIGIT
1553 003270 000766 BR 1$ ;CONTINUE CONVERSION
1554 003272 062737 000060 011636 2$: ADD #60,TYPDAT ;MAKE ASCII
1555 003300 113723 011636 MOV# TYPDAT,(%3)+ ;STORE DIGIT
1556 003304 005037 011636 CLR TYPDAT ;CLEAR DIGIT COUNTER
1557 003310 022737 000012 001042 3$: CMP #10.,LINCNT ;GREATER THEN 10?
1558 003316 003006 BGT 4$ ;NO, PRINT DIGIT
1559 003320 162737 000012 001042 SUB #10.,LINCNT ;YES, SUBTRACT 10
1560 003326 005237 011636 INC TYPDAT ;INCREMENT TEN'S DIGIT
1561 003332 000766 BR 3$ ;CONTINUE CONVERSION
1562 003334 062737 000060 011636 4$: ADD #60,TYPDAT ;MAKE ASCII
1563 003342 113723 011636 MOV# TYPDAT,(%3)+ ;STORE DIGIT
1564 003346 013737 001042 011636 MOV LINCNT,TYPDAT ;GET ONE'S DIGIT
1565 003354 062737 000060 011636 ADD #60,TYPDAT ;MAKE ASCII
1566 003362 113723 011636 MOV# TYPDAT,(%3)+ ;STORE DIGIT
1567 003366 104000 EMT +0 ;TYPE MESSAGE
1568 003370 013516 MES11 ;TYPE PRINT SPEED
1569 003372 012737 013514 011470 MOV #MES11A,PRMSG ;SET PRINTER MESSAGE ADDRESS
1570 003400 004437 011452 JSR %4,RINT ;PRINT PRINTER SPEED ON LINE PRINTER
1571 003404 000137 003430 JMP SLEWCK ;NEXT TEST
1572
1573
1574
1575 003410 000040 PATTB: 40
1576 003412 000117 117
1577 003414 000076 76
1578 003416 000055 55
1579 003420 000134 134
1580 003422 000113 113
1581 003424 000072 72
1582 003426 000051 51
1583
1584 ;CHECK TOP OF FORM SWITCH
1585
1586 003430 SLEWCK:
(1) 003430 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 003436 001003 BNE .+10 ;NO- CONTINUE
(1) 003440 052777 000100 175352 BIS #100,%TKS ;ENABLE KEYBOARD INTERRUPT
1587 003446 004437 011506 JSR %4,TYPINT
1588 003452 004537 011332 JSR %5,PRINT ;INITIALIZE PRINTER
1589 003456 000406 BR SLW ;BRANCH IF OK
1590 003460 012737 000024 001052 ERR24: MOV #24, ERCOUNT ;SET UP ERROR COUNT 24
(1) 000025 N=N+1
1591 003466 004537 011722 JSR %5,STAER ;REPORT PRINTER NOT READY
1592 003472 000000 HALT ;HALT ON ERROR
1593 003474 012737 003710 001042 SLW: MOV #FFTAB,LINCNT ;LINE COUNT FOR SWITCH SETTING

```

```

1594 003502 012704 003766      MOV      #OFFSET,%4      ;INIT SWITCH SETTING TABLE POINTER
1595 003506 012703 013270      SLW0:    MOV      #MES8,%3      ;INIT MESSAGE POINTER
1596 003512 012702 013403      MOV      #MES10,%2
1597 003516 111413      SLW1:    MOVVB   (%4),(%3)      ;PUT SWITCH SETTINGS INTO MESSAGES
1598 003520 111412      MOVVB   (%4),(%2)
1599 003522 122423      CMPB   (%4)+,(%3)+      ;INCREMENT POINTERS
1600 003524 105722      TSTB   (%2)+
1601 003526 105714      TSTB   (%4)
1602 003530 001372      BNE    SLW1
1603 003532 005204      INC    %4
1604 003534 104000      EMT    +0
1605 003536 013234      MES7
1606 003540 000000      HALT
1607 003542 005777 175274      SLW11:  TST     @LINCNT
1608 003546 001003      BNE    SLW1A
1609 003550 012737 013604 011470      MOV    #MES13,PRMSG
1610 003556 005777 175216      SLW1A: TST     @LPS
1611 003562 100006      BPL    SLW2
1612 003564 012737 000025 001052      ERR25: MOV    #25,   ERCOUNT
1613 003572 004537 011722      (1)    N=N+1
1614 003576 000000      JSR    %5,STAER
1615 003600 012777 000014 175174      SLW2:  HALT
1616 003606 105777 175166      MOV    #14,@LPB
1617 003612 100375      TSTB   @LPS
1618 003614 004437 011452      BPL    -4
1619 003620 062737 000002 001042      JSR    %4,RINT
1620 003626 022737 003764 001042      ADD    #2,LINCNT
1621 003634 001410      CMP    #FTABE,LINCNT
1622 003636 005777 175200      BEQ    DAVAV
1623 003642 001721      TST    @LINCNT
1624 003644 012737 013306 011470      BEQ    SLW0
1625 003652 000137 003542      MOV    #MES9,PRMSG
1626 003656 013737 014564 013270      DAVAV: JMP    SLW11
1627 003664 104000      MOV    TNO13,MES8
1628 003666 013232      EMT    +0
1629 003670 000000      MES7A
1630 003672 032777 040000 175104      HALT
1631 003700 001060      BIT    #BIT14,@SWR
1632 003702 000000      BNE    INDAT
1633 003704 000137 004534      HALT
1634 003710 000000      JMP    TEST2
1635 003712 000022      FFTAB: 0
1636 003714 000000      18.
1637 003716 000025      0
1638 003720 000000      21.
1639 003722 000030      0
1640 003724 000000      24.
1641 003726 000041      0
1642 003730 000000      33.
1643 003732 000044      0
1644 003734 000000      36.
1645 003736 000052      0
1646 003740 000000      42.
1647 003742 000060      0
1648 003742 000060      48.

```

```

;INIT SWITCH SETTING TABLE POINTER
;INIT MESSAGE POINTER
;PUT SWITCH SETTINGS INTO MESSAGES
;INCREMENT POINTERS
;DONE MOVING SWITCH SETTINGS TO MSG'S?
;BRANCH IF NOT DONE
;TABLE POINTER SET FOR NEXT SWITCH SETTING
;TYPE MESSAGE
;SET TOP OF FORM SWITCH TO ---
;WAIT FOR OPERATOR TO SET SWITCH
;CHECK LINE COUNT
;BRANCH IF NOT ZERO
;CHANGE PRINTER MESSAGE
;TEST FOR ERRORS
;BRANCH IF NO ERROR
;SET UP ERROR COUNT 25
;REPORT ERROR SET
;HALT ON ERROR
;SEND FF
;TEST READY
;WAIT FOR READY
;PRINT MESSAGE ON LINE PRINTER
;NEXT LINE COUNT
;DONE TEST?
;YES, EXIT
;DONE CHECK OF THIS SWITCH SETTING?
;YES, NEXT SWITCH SETTING
;NO, CHECK THIS SETTING
;CONTINUE
;SET MESSAGE
;TYPE MESSAGE
;RESET TOP OF FORM SWITCH
;WAIT FOR OPERATOR
;DAVAV AVAILABLE?
;YES, DO DAVAV TESTS
;DONE OPERATOR TESTS - HALT
;DEPRESS CONTINUE TO START PRINTING TESTS
;LOOP COUNTS FOR SLEW CHECKS

```

```

1648 003744 000000
1649 003746 000063
1650 003750 000000
1651 003752 000102
1652 003754 000000
1653 003756 000110
1654 003760 000000
1655 003762 000124
1656 003764 000000
1657
1658
1659 003766 020063 000040
1660 003772 027063 000065
1661 003776 020064 000040
1662 004002 027065 000065
1663 004006 020066 000040
1664 004012 020067 000040
1665 004016 020070 000040
1666 004022 027070 000065
1667 004026 030461 000040
1668 004032 031061 000040
1669 004036 032061 000040
1670
1671
1672
1673
1674
1675
1676 004042
(1) 004042 022737 000176 001004
(1) 004050 001003
(1) 004052 052777 000100 174740
1677 004060 004437 011506
1678 004064 012737 004214 001040
1679 004072 005777 174702
1680 004076 100010
1681 004100 012737 000026 001052
(1) 000027
1682 004106 004537 011722
1683 004112 000000
1684 004114 000137 004042
1685 004120 017777 174714 174654
1686 004126 062737 000002 001040
1687 004134 005777 174700
1688 004140 001405
1689 004142 105777 174632
(1) 004146 100375
1690 004150 000137 004072
1691 004154 005777 174620
1692 004160 100410
1693 004162 012737 000027 001052
(1) 000030
1694 004170 004537 011722
1695 004174 000000
1696 004176 000137 004042
1697 004202 104000

```

```

0
51.
0
66.
0
72.
0
84.
0
FTABE: 0

FFSET: .ASCIZ /3 / ;SWITCH SETTINGS FOR MESSAGES
        .ASCIZ /3.5/
        .ASCIZ /4 /
        .ASCIZ /5.5/
        .ASCIZ /6 /
        .ASCIZ /7 /
        .ASCIZ /8 /
        .ASCIZ /8.5/
        .ASCIZ /11 /
        .ASCIZ /12 /
        .ASCIZ /14 /

.EVEN

;CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA

INDAT:  CMP #176,SWR ;S/W SWR ?
        BNE .+10 ;NO- CONTINUE
        BIS #100,ATKS ;ENABLE KEYBOARD INTERRUPT
        JSR %4,TYPINT
        MOV #INDATT,CHRGEN ;SET TABLE POINTER
INDO:   TST @LPS ;TEST FOR ERROR
        BPL INDATO ;BRANCH IF NO ERROR
ERR26: MOV #26, ERCCOUNT ;SET UP ERROR COUNT 26
        N=N+1
        JSR %5,STAER ;REPORT ERROR SET
        HALT ;HALT ON ERROR
        JMP INDAT ;RESTART TEST
INDATO: MOV @CHRGEN,@LPB ;LOAD BUFFER
        ADD #2,CHRGEN ;NEXT DATA
        TST @CHRGEN ;TEST CHAR
        BEQ IND1 ;CONTINUE IF DONE
        TSTB @LPS ;TEST READY
        BPL -4 ;WAIT FOR READY
        JMP INDO
IND1:   TST @LPS ;TEST FOR ERROR SET
        BMI INDAT1 ;BRANCH IF ERROR SET
ERR27: MOV #27, ERCCOUNT ;SET UP ERROR COUNT 27
        N=N+1
        JSR %5,STAER ;REPORT ERROR NOT SET
        HALT ;HALT ON ERROR
        JMP INDAT ;RESTART TEST
INDAT1: EMT +0 ;TYPE MESSAGE

```

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1698 004204 012402          MESA          ;ERROR SET OK - CLEAR & TURN ON LINE
1699 004206 000000          HALT          ;WAIT FOR OPERATOR
1700                                ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1701 004210 000137 004230    JMP          NODAT ;NEXT TEST
1702                                ;DATA TABLE FOR ABOVE TEST
1703 004214 000356          INDATT: 356
1704 004216 000001          1
1705 004220 000002          2
1706 004222 000003          3
1707 004224 000357          357
1708 004226 000000          0
1709
1710                                ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
1711
1712 004230          NODAT:
(1) 004230 022737 000176 001004    CMP          #176,SWR          ;S/W SWR ?
(1) 004236 001003          BNE          .+10          ;NO- CONTINUE
(1) 004240 052777 000100 174552    BIS          #100,STKS          ;ENABLE KEYBOARD INTERRUPT
1713 004246 004437 011506          JSR          %4,TYPINT
1714 004252 012737 000200 001054    MOV          #200,STRCHR ;SET PAPER INSTRUCTION
1715 004260 012737 004454 001040    NODDA: MOV      #NODAT3,CHRGEN ;SET TABLE PCINTER FOR LOAD
1716 004266 005777 174506          NODD:  TST      %LPS          ;TEST FOR ERROR
1717 004272 100007          BPL          NODATO        ;BRANCH IF NO ERROR
1718 004274 012737 000030 001052    ERR30: MOV      #30, ERCCOUNT ;SET UP ERROR COUNT 30
(1) 004302 004537 011722          JSR          %5,STAER ;REPORT ERROR SET
1720 004306 000000          HALT          ;HALT ON ERROR
1721 004310 000747          BR          NODAT ;RESTART TEST
1722 004312 017777 174522 174462    NODATO: MOV      %CHRGEN,%LPB ;LOAD BUFFER
1723 004320 062737 000002 001040    ADD          #2,CHRGEN ;NEXT DATA
1724 004326 022737 004534 001040    CMP          #NODAT4+2,CHRGEN ;DONE LOAD?
1725 004334 001405          BEQ          NODATA ;BRANCH IF DONE
1726 004336 105777 174436          TSTB        %LPS          ;TEST READY
(1) 004342 100375          BPL          .-4          ;WAIT FOR READY
1727 004344 000137 004266          JMP          NODD
1728 004350 013777 001054 174424    NODATA: MOV      STRCHR,%LPB ;SEND DATA
1729 004356 005037 001036          CLR          CHRCNT ;DELAY
1730 004362 005237 001036          IS:  INC      CHRCNT
1731 004366 001375          BNE          IS
1732 004370 005777 174404          TST          %LPS ;TEST FOR ERROR SET
1733 004374 100410          BMI          NODAT1 ;BRANCH IF ERROR SET
1734 004376 012737 000031 001052    ERR31: MOV      #31, ERCCOUNT ;SET UP ERROR COUNT 31
(1) 004404 004537 011722          JSR          %5,STAER ;REPORT ERROR NOT SET
1736 004410 000000          HALT          ;HALT ON ERROR
1737 004412 000137 004260          JMP          NODDA ;RETEST
1738 004416 005237 001054          NODAT1: INC      STRCHR ;NEXT PAPER INSTRUCTION
1739 004422 022737 000214 001054    CMP          #214,STRCHR ;DONE TEST?
1740 004430 001404          BEQ          NODAT2 ;CONTINUE IF NOT DONE
1741 004432 104000          EMT          +0 ;TYPE MESSAGE
1742 004434 012447          MESB ;ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1743 004436 000000          HALT          ;WAIT FOR OPERATOR
1744 004440 000707          BR          NODDA ;RELOAD & TEST NEXT CHANNEL
1745 004442 104000          NODAT2: EMT          +0 ;TYPE MESSAGE
1746 004444 012402          MESA ;ERROR SET OK - TURN ON LINE
1747 004446 000000          HALT

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1748 004450 000137 004534          JMP      TEST2          ;JUMP
1749
1750
1751 004454 000356          NODAT3: 356          ;START LOAD
1752 004456 000000          0
1753 004460 000000          0
1754 004462 000000          0
1755 004464 000000          0
1756 004466 000000          0
1757 004470 000000          0
1758 004472 000000          0
1759 004474 000000          0
1760 004476 000000          0
1761 004500 000000          0
1762 004502 000000          0
1763 004504 000000          0
1764 004506 000000          0
1765 004510 000000          0
1766 004512 000000          0
1767 004514 000000          0
1768 004516 000000          0
1769 004520 000000          0
1770 004522 000000          0
1771 004524 000000          0
1772 004526 000000          0
1773 004530 000000          0
1774 004532 000357          NODAT4: 357          ;STOP LOAD
1775
1776          ;TEST 2
1777          ;TESTS INTERFACE AND PRINTER DATA PATHS
1778          ;WITH ALTERNATING ONES AND ZEROS
1779
1780 004534          TEST2:
(1) 004534 022737 000176 001004          CMP      #176,SWR          ;S/W SWR ?
(1) 004542 001003          BNE          +10          ;NO- CONTINUE
(1) 004544 052777 000100 174246          BIS      #100,@TKS          ;ENABLE KEYBOARD INTERRUPT
1781 004552 004437 011506          JSR      %4,TYPINT
1782 004556 004537 011332          JSR      %5,PRINT          ;INITIALIZE PRINTER
1783 004562 000406          BR      TST2AX          ;BRANCH IF OK
1784 004564 012737 000032 001052          ERR32: MOV      #32, ERCOUNT          ;SET UP ERROR COUNT 32
(1) 000033          N=N+1
1785 004572 004537 011722          JSR      %5,STAER          ;REPORT PRINTER NOT READY
1786 004576 000000          HALT          ;HALT ON ERROR
1787 004600          TST2AX:
(1) 004600 013737 014542 014030          MOV      TN02,MES15          ;SET TEST NUMBER FOR MESSAGE
(1) 004606 004437 011406          JSR      %4,PRNT          ;PRINT TEST NUMBER
(1) 000003          M=M+1
1788 004612 012737 177740 001044          MOV      #-32,CYCCNT          ;SET UP LINE COUNT FOR 32 LINES
1789 004620 012737 177574 001036          MOV      #-132,CHRCNT          ;SET CHAR COUNT TO 132
1790 004626 013737 004702 001054          MOV      SCHRSW,STRCHR          ;SET CHAR. SWITCH TO U
1791 004634 005777 174140          T3A: TST      @LPS          ;TEST FOR ERROR
1792 004640 100006          BPL      LP2B          ;NO ERROR CONTINUE
1793 004642 012737 000033 001052          ERR33: MOV      #33, ERCOUNT          ;SET UP ERROR COUNT 33
(1) 000034          N=N+1
1794 004650 004537 011722          JSR      %5,STAER          ;REPORT ERROR SET
1795 004654 000000          HALT          ;HALT ON ERROR

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1796 004656 000177 174172 LP28: JMP 2STRCHR ;LOAD CHAR
1797 004662 013737 004704 001054 T2A: MOV RCHRSM,STRCHR ;RESET CHAR. SWITCH
1798 004670 012737 000125 001050 MOV #125,SAVE ;STORE CHAR
1799 004676 000137 004722 JMP TSA ;LOAD CHAR
1800
1801 004702 004662 SCHRSM: T2A
1802 004704 004706 RCHRSM: T1A
1803
1804 004706 013737 004702 001054 T1A: MOV SCHRSM,STRCHR ;SET CHAR. SWITCH TO U
1805 004714 012737 000052 001050 MOV #52,SAVE ;STORE CHAR
1806 004722 013777 001050 174052 TSA: MOV SAVE,2LPB ;LOAD BUFFER
1807 004730 005237 001036 INC CHRCNT ;INC CHARACTER COUNT
1808 004734 001337 BNE T3A ;CONTINUE
1809 004736 012777 000012 174036 MOV #12,2LPB ;SEND LF
1810 004744 105777 174030 TSTB 2LPS ;TEST READY
(1) 004750 100375 BPL -4 ;WAIT FOR READY
1811 004752 012737 177574 001036 MOV #-132.,CHRCNT ;RESET CHAR COUNT
1812 004760 005237 001044 INC CYCCNT ;INC CYCLE COUNT
1813 004764 001356 BNE TSA ;CONTINUE IF NOT DONE
1814 004766 032777 010000 174010 BIT #BIT12,2SWR ;LOOP ON TEST?
1815 004774 001257 BNE TEST2 ;LOOP
1816
1817 ;TEST 3
1818 ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1819 ;ALL CHARACTERS AND ILLEGAL CHARACTERS
1820
1821 004776 TEST3:
(1) 004776 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 005004 001003 BNE +10 ;NO- CONTINUE
(1) 005006 052777 000100 174004 BIS #100,2TKS ;ENABLE KEYBOARD INTERRUPT
1822 005014 004437 011506 JSR %4,TYPINT
1823 005020 013737 014544 014030 MOV TN03,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 005026 004437 011406 JSR %4,PRNNT ;PRINT TEST NUMBER
(1) 000004 M=M+1
1824 005032 012737 177765 001044 MOV #-13,CYCCNT ;SET 21 LINES
1825 005040 000137 005172 JMP LP2H ;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1826 005044 012737 177574 001036 T280: MOV #-132.,CHRCNT ;SET CHAR COUNT FOR 132
1827 005052 012737 000040 001040 T280A: MOV #40,CHRCNT ;SET FIRST CHAR.
1828 005060 005777 173714 T281: TST 2LPS ;DOES THE PRINTER HAVE AN ERROR
1829 005064 100006 BPL LP2E ;BRANCH IF NO ERROR
1830 005066 012737 000034 001052 ERR34: MOV #34, ERCOUNT ;SET UP ERROR COUNT 34
(1) 000035 N=N+1
1831 005074 004537 011722 JSR %5,STAER ;REPORT ERROR
1832 005100 000000 HALT ;HALT ON ERROR
1833 005102 013777 001040 173672 LP2E: MOV CHRGEN,2LPB ;PRINT CHARACTER
1834 005110 005237 001036 INC CHRCNT ;INC. CHAR. COUNT
1835 005114 001420 BEQ T282 ;BRANCH IF LINE IS FINISHED
1836 005116 005237 001040 INC CHRGEN ;NEXT CHAR
1837 005122 032777 020000 173654 BIT #BIT13,2SWR ;CHECK CHAR SET
1838 005130 001405 BEQ T282B ;BRANCH IF 64 CHARS
1839 005132 022737 000200 001040 CMP #200,CHRCNT ;LEGAL CHAR?
1840 005140 001744 BEQ T280A ;MAKE SPACE IF ILLEGAL
1841 005142 000746 BR T281 ;CONTINUE IF LEGAL CHAR
1842 005144 022737 000140 001040 T282B: CMP #140,CHRCNT ;LEGAL CHAR?
1843 005152 001737 BEQ T280A ;MAKE SPACE IF ILLEGAL
1844 005154 000741 BR T281 ;CONTINUE IF LEGAL CHAR
    
```


1845	005156	012777	000012	173616	T2B2:	MOV	#12,ALPB	:ISSUE LINE FEED
1846	005164	105777	173610			TSTB	ALPS	:TEST READY
(1)	005170	100375				BPL	.-4	:WAIT FOR READY
1847	005172	005037	001040		LP2H:	CLR	CHRGEN	:FIRST ILLEGAL CHAR
1848	005176	005777	173576		T2B3:	TST	ALPS	:TEST FOR ERROR
1849	005202	100006				BPL	LDCH	:BRANCH IF NO ERROR
1850	005204	012737	000035	001052	ERR35:	MOV	#35, ERRCOUNT	:SET UP ERROR COUNT 35
(1)		000036				N=N+1		
1851	005212	004537	011722			JSR	%5,STAER	:REPORT ERROR SET
1852	005216	000000				HALT		:HALT ON ERROR
1853	005220	013777	001040	173554	LDCH:	MOV	CHRGEN,ALPB	:TRANSMIT CHARACTER
1854	005226	005237	001040		T2B4:	INC	CHRGEN	:NEXT CHAR
1855	005232	022737	000012	001040		CMP	#12,CHRGEN	:TEST FOR LINE FEED
1856	005240	001772				BEQ	T2B4	:SKIP IF LF
1857	005242	022737	000014	001040		CMP	#14,CHRGEN	:TEST FOR FORM FEED
1858	005250	001766				BEQ	T2B4	:SKIP IF FF
1859	005252	022737	000015	001040		CMP	#15,CHRGEN	:TEST FOR CARRIAGE RETURN
1860	005250	001762				BEQ	T2B4	:SKIP IF CR
1861	005262	023727	001040	000040		CMP	CHRGEN,#40	:CHECK IF LEGAL CHAR
1862	005270	002753				BLT	LDCH	:CONTINUE IF STILL ILLEGAL CHAR
1863	005272	032777	020000	173504		BIT	#BIT13,ASWR	:CHECK CHAR SET
1864	005300	001007				BNE	T2B5	:BRANCH IF %6 CHAR SET
1865	005302	052737	000100	001040		BIS	#100,CHRGEN	:SET BIT 7 IF NOT SET
1866	005310	032737	000200	001040		BIT	#200,CHRGEN	:DONE ILLEGAL CHARS?
1867	005316	001740				BEQ	LDCH	:BRANCH IF NOT DONE
1868	005320	012777	000012	173454	T2B5:	MOV	#12,ALPB	:ISSUE LINE FEED
1869	005326	105777	173446			TSTB	ALPS	:TEST READY
(1)	005332	100375				BPL	.-4	:WAIT FOR READY
1870	005334	005237	001044			INC	CYCCNT	:INCREMENT LINE COUNT
1871	005340	001241				BNE	T2B0	:CONTINUE IF NOT DONE
1872	005342	032777	010000	173434		BIT	#BIT12,ASWR	:CHECK TO LOOP ON TEST
1873	005350	001212				BNE	TEST3	:LOOP
1874								
1875								
1876								
1877								
1878								
1879	005352							
(1)	005352	022737	000176	001004	CHRCHK:	CMP	#176,SWR	:S/W SWR ?
(1)	005360	001003				BNE	+.10	:NO- CONTINUE
(1)	005362	052777	000100	173430		BIS	#100,ATKS	:ENABLE KEYBOARD INTERRUPT
1880	005370	004437	011506			JSR	%4,TYPINT	

:TEST 4
 :OVER PRINT TEST
 :OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES

B04

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SEQ 0040

1882 005374 013737 014546 014030
(1) 005402 004437 011406
(1) 000005

MOV TNO4,MES15
JSR %4,PRINT
M=M+1

;SET TEST NUMBER FOR MESSAGE
;PRINT TEST NUMBER

C04

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 19
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SEQ 0041

1884	005406	012737	177750	001042	MOV	#-24.,LINCNT	;SET UP LINE COUNT FOR 24 LINES
1885	005414	012737	177776	001044	MOV	#-2,CYCCNT	;SET UP CYCLE COUNT
1886	005422	013737	005564	001054	MOV	CHRÉ,STRCHR	;SET CHAR TAG TO SPACE

1888	005430	012737	177574	001036	CR:	MOV	#-132.,CHRCNT	:SET CHAR COUNT
1889	005436	005777	173336		CR0:	TST	2LPS	:TEST FOR ERROR
1890	005442	100006				BPL	CR1	:CONTINUE IF NO ERROR
1891	005444	012737	000036	001052	ERR36:	MOV	#36, ERCOUNT	:SET UP ERROR COUNT 36
(1)		000037				N=N+1		
1892	005452	004537	011722			JSR	X5,STAEER	:REPORT ERROR SET
1893	005456	000000				HALT		:HALT ON ERROR
1894	005460	000177	173370		CR1:	JMP	2STRCHR	:OPPOSITE CHAR
1895	005464	013737	005564	001054	CR2:	MOV	CHRE,STRCHR	:SET CHAR SWITCH TO SPACE
1896	005472	012737	000105	001050		MOV	#105,SAVE	:SEND E
1897	005500	013777	001050	173274	CR3:	MOV	SAVE,2LPB	:LOAD BUFFER
1898	005506	005237	001036			INC	CHRCNT	:INCREMENT CHAR COUNT
1899	005512	001351				BNE	CR0	:BRANCH IF NOT DONE
1900	005514	005237	001044			INC	CYCNT	:INCREMENT CYCLE COUNT

E04

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SEQ 0043

1902 005520 001422

BEQ CRS

;BRANCH IF FINISHED OVERPRINTS

F04

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 22
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SEQ 0044

1904 005522 012777 000015 173252
1905 005530 105777 173244
(1) 005534 100375

MOV #15 @LPB
TSTB @LPS
BPL .-4

:SEND CR
:TEST READY
:WAIT FOR READY

G04

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 23
DZLPKG.P11 06-APR-77 12:13

SEQ 0045

1907	005536	000137	005430			JMP	CR	:OVERPRINT LINE
1908	005542	013737	005562	001054	CR7:	MOV	CHRS,STRCHR	:RESET CHAR SWITCH
1909	005550	012737	000040	001050		MOV	#40,SAVE	:SEND SPACE

H04

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 24
DZLPKG.P11 06-APR-77 12:13

SEQ 0046

1911	005556	000137	005500		JMP	CR3		;CONTINUE
1912								
1913	005562	005464			CHRS:	CR2		
1914	005564	005542			CHRE:	CR7		
1915	005566	012777	000012	173206	CRS:	MOV	#12,ALPB	;SEND LF
1916	005574	105777	173200			TSTB	ALPS	;TEST READY
(1)	005600	100375				BPL	.-4	;WAIT FOR READY
1917	005602	012737	177776	001044		MOV	#-2,CYCCNT	;RESET CYCLE COUNT
1918	005610	012737	177574	001036		MOV	#-132,CHRCNT	;RESET CHAR COUNT
1919	005616	005237	001042			INC	LINCNT	;INCREMENT LINE COUNT
1920	005622	001326				BNE	CR3	;BRANCH IF NOT DONE
1921	005624	032777	010000	173152		BIT	#BIT12,ASWR	;LOOP ON TEST?
1922	005632	001247				BNE	CHRCHK	;YES, LOOP

1923
1924
1925
1926
1927
1928

;TEST 5
;SHUTTLE POSITIONING TEST
;SENDS PAIRS OF E'S, THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER


```

1933
1934
1935
1936 005634
(1) 005634 022737 000176 001004
(1) 005642 001003
(1) 005644 052777 000100 173146
1937 005652 004437 011506
1938 005656 013737 014550 014030
(1) 005664 004437 011406
(1) 000006
1939 005670 012737 177760 001042
1940 005676 012737 177574 001036
1941 005704 012737 177776 001044
1942 005712 013737 001036 001056
1943 005720 062737 000205 001056
1944 005726 012737 000040 001040
1945 005734 000406
1946 005736 012737 000105 001040

```

:PAIR OF E'S TO THE LINE --- THIS IS REPEATED UNTIL A FULL LINE OF E'S
:HAVE BEEN PRINTED, THEN A FULL LINE OF M'S ARE PRINTED.

OVRPRT:

```

OVRPRT:  CMP      #176,SWR      ;S/W SWR ?
          BNE      .+10      ;NO- CONTINUE
          BIS      #100,ATKS  ;ENABLE KEYBOARD INTERRUPT
          JSR      %4,TYPINT
          MOV      TN05,MES15 ;SET TEST NUMBER FOR MESSAGE
          JSR      %4,PRNT    ;PRINT TEST NUMBER
          M=M+1
          MOV      #-16,LINCNT ;SET LINE COUNT FOR 16 LINES
OVR:     MOV      #-132,CHRCNT ;SET CHAR COUNT
OVR0:    MOV      #-2,CYCCNT  ;SET CYCLE COUNT FOR A PAIR OF E'S
          MOV      CHRCNT,STRCNT ;NO. CHARS LEFT TO PRINT
          ADD      #133,STRCNT ;NO. SPACES +1
          MOV      #40,CHRGEN ;SEND SPACE
          BR      OVR2        ;BRANCH
OVR4:    MOV      #105,CHRGEN ;SEND E

```

J04

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DZLPKG.P11 06-APR-77 12:13

SEQ 0048

1948	005744	013777	001040	173030	OVR1:	MOV	CHRGEN,ALPB	;LOAD BUFFER
1949	005752	005777	173022		OVR2:	TST	ALPS	;TEST FOR ERROR
1950	005756	100006				BPL	OVR3	;BRANCH IF NO ERROR
1951	005760	012737	000037	001052	ERR37:	MOV	#37, ERCOUNT	;SET UP ERROR COUNT 37
(1)		000040				N=N+1		
1952	005766	004537	011722			JSR	%5,STAER	;REPORT ERROR SET
1953	005772	000000				HALT		
1954	005774	005337	001056		OVR3:	DEC	STRCNT	;DECREMENT SPACE COUNTER

K04

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SEQ 0049

1957 006000 003361

BGT OVR1

;BRANCH IF NOT DONE SPACES

L04

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SEQ 0050

1959 006002 001755
1960 006004 005237 001036
1961 006010 001437
1962 006012 005237 001044

OVR5: BEQ OVR4
INC CHRCNT
BEQ OVR8
INC CYCCNT

: BRANCH IF NOT FIRST E
: INCREMENT CHAR COUNT
: BRANCH IF DONE LINE
: INCREMENT CYCLE COUNT

M04

1964	006016	001352			BNE	OVR1		:CONTINUE SENDING E'S IF NOT DONE
1965	006020	012777	000015	172754	MOV	#15,ALPB		:SEND CR
1966	006026						OVR6:	
(1)	006026	105777	172746		TSTB	ALPS		:TEST READY
(1)	006032	100375			BPL	-4		:WAIT FOR READY
1967	006034	005737	001036		TST	CHRCNT		:LINE DONE?
1968	006040	001321			BNE	OVR0		:NO CONTINUE OVER PRINT
1969	006042	005237	001042		INC	LINCNT		:YES INCREMENT LINE COUNT
1970	006046	001425			BEQ	OVRXT		:EXIT IF DONE TEST
1971	006050	032737	000001	001042	BIT	#1 LINCNT		:WHICH LINE NEXT?
1972	006056	001707			BEQ	OVR		:BRANCH TO SEND E'S
1973	006060	012737	000115	001040	MOV	#115,CHRCNT		:SET UP TO SEND M'S
1974	006066	012737	177573	001036	MOV	#-133,CHRCNT		:SET CHAR COUNT
1975	006074	005037	001056		CLR	STRCNT		:CLEAR SPACE COUNT
1976	006100	005037	001044		CLR	CYCCNT		:CLEAR CYCLE COUNT

B05

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SEQ 0053

1982 006116 000137 006026

JMP OVR6

;CONTINUE

```

1984 006122 032777 010000 172654 OVREXT: BIT      @BIT12,@SWR      ;LOOP ON TEST?
1985 006130 001241                BNE      OVRPRT      ;LOOP
1986
1987                ;TEST 6
1988                ;PRINT CONTROL TEST
1989                ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
1990                ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
1991
1992 006132                PRTCTL:
(1) 006132 022737 000176 001004      CMP      @176,@SWR      ;S/W SWR ?
(1) 006140 001003                BNE      .+10          ;NO- CONTINUE
(1) 006142 052777 000100 172650      BIS      @100,@TKS     ;ENABLE KEYBOARD INTERRUPT
1993 006150 004437 011506                JSR      %4,TYPINT

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1995	006154	013737	014552	014030		MOV	TN06,MES15		;SET TEST NUMBER FOR MESSAGE
(1)	006162	004437	011406			JSR	%4,PRINT		;PRINT TEST NUMBER
(1)		000007				M=M+1			
1996	006166	012737	000060	001054		MOV	#60,STRCHR		;FIRST START CHAR
1997	006174	032777	020000	172602	PRT0:	BIT	#BIT13,2SWR		;TEST FOR CHAR SET
1998	006202	001404				BEQ	PRT1		;BRANCH IF 64 CHARS
1999	006204	012737	177641	001034		MOV	#-95.,SEGCNT		;SET OVERFLOW COUNT
2000	006212	000403				BR	PRT2		;BRANCH
2001	006214	012737	177701	001034	PRT1:	MOV	#-63.,SEGCNT		;SET OVERFLOW COUNT
2002	006222	012737	177574	001036	PRT2:	MOV	#-132.,CHRCNT		;SET CHAR COUNT
2003	006230	013737	001054	001040		MOV	STRCHR,CHRCNT		;GET START CHAR
2004	006236	005777	172536		PRT3:	TST	2LPS		;TEST FOR ERROR
2005	006242	100006				BPL	PRT4		;BRANCH IF NO ERROR
2006	006244	012737	000040	001052	ERR40:	MOV	#40, ERCOUNT		;SET UP ERROR COUNT 40
(1)		000041				N=N+1			
2007	006252	004537	011722			JSR	%5,STAER		;REPORT ERROR SET
2008	006256	000000				HALT			;HALT ON ERROR
2009	006260	013777	001040	172514	PRT4:	MOV	CHRCNT,2LPB		;LOAD BUFFER
2010	006266	005237	001036			INC	CHRCNT		;INCREMENT CHAR COUNT
2011	006272	002761				BLT	PRT3		;BRANCH IF NOT 132 CHARS
2012	006274	001433				BEQ	PRTA		;START OVERFLOW
2013	006276	005237	001040			INC	CHRCNT		;NEXT CHAR

2015	006302	005237	001034			INC	SEGCNT	: INCREMENT OVERFLOW COUNT
2016	006306	001353				BNE	PRT3	: CONTINUE IF NOT DONE
2017	006310	012777	000012	172464		MOV	#12,ALPB	: SEND LF
2018	006316	105777	172456			TSTB	ALPS	: TEST READY
(1)	006322	100375				BPL	.-4	: WAIT FOR READY
2019	006324	022737	000040	001054		CMP	#40,STRCHR	: LAST START CHAR SPACE?
2020	006332	001421				BEQ	PRT6	: YES, BRANCH
2021	006334	022737	000065	001054		CMP	#65,STRCHR	: LAST START CHAR 5?
2022	006342	001422				BEQ	PRT7	: YES, BRANCH
2023	006344	022737	000071	001054		CMP	#71,STRCHR	: DONE?
2024	006352	001423				BEQ	PRT8	: YES
2025	006354	005237	001054			INC	STRCHR	: NO, GET NEXT START CHAR
2026	006360	000137	006174			JMP	PRT0	: CONTINUE
2027	006364	012737	000041	001040	PRTA:	MOV	#41,CHRGEN	: GET FIRST CHAR IN SET
2028	006372	000137	006236			JMP	PRT3	: START OVERFLOW
2029	006376	012737	000066	001054	PRT6:	MOV	#66,STRCHR	: SET START CHAR TO 6
2030	006404	000137	006174			JMP	PRT0	: CONTINUE
2031	006410	012737	000040	001054	PRT7:	MOV	#40,STRCHR	: SET START CHAR TO SPACE
2032	006416	000137	006174			JMP	PRT0	: CONTINUE
2033	006422	032777	010000	172354	PRT8:	BIT	#BIT12,SWR	: CHECK LOOP ON TEST
2034	006430	001240				BNE	PRTCTL	: LOOP

: TEST 7
: MULTIPLE LINE ADVANCE TEST
: TESTS MULTIPLE LINE ADVANCES AND TIMINGS
: PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER

2041	006432					MLF:		
(1)	006432	022737	000176	001004		CMP	#176,SWR	: S/W SWR ?
(1)	006440	001003				BNE	.+10	: NO- CONTINUE
(1)	006442	052777	000100	172350		BIS	#100,JKS	: ENABLE KEYBOARD INTERRUPT
2042	006450	004437	011506			JSR	%4,TYPINT	
2043	006454	013737	014554	014030		MOV	TN07,MES15	: SET TEST NUMBER FOR MESSAGE
(1)	006462	004437	011406			JSR	%4,PRNT	: PRINT TEST NUMBER
(1)		000010				M=M+1		
2044	006466	012737	006620	001054		MOV	#TABSTR,STRCHR	: FIRST CHAR
2045	006474	012737	177574	001036	MLFA:	MOV	#-132,CHRCNT	: SET CHAR COUNT
2046	006502	117737	172346	001040		MOV	STRCHR,CHRGEN	: GET CHAR
2047	006510	001452				BEQ	MLF4	: BRANCH IF DONE
2048	006512	005777	172262		MLFO:	TST	ALPS	: TEST FOR ERROR
2049	006516	100006				BPL	MLF1	: CONTINUE IF NO ERROR
2050	006520	012737	000041	001052	ERR41:	MOV	#41, ERCOUNT	: SET UP ERROR COUNT 41
(1)		000042				N=N+1		
2051	006526	004537	011722			JSR	%5,STAER	: REPORT ERROR
2052	006532	000000				HALT		: HALT ON ERROR
2053	006534	013777	001040	172240	MLF1:	MOV	CHRGEN,ALPB	: LOAD BUFFER
2054	006542	005237	001036			INC	CHRCNT	: INCREMENT CHAR COUNT
2055	006546	001361				BNE	MLFO	: CONTINUE
2056	006550	117737	172300	001042		MOV	STRCHR,LINCNT	: GET ASCII LINE COUNT
2057	006556	042737	177770	001042		BIC	#177770,LINCNT	: MAKE OCTAL
2058	006564	005237	001042			INC	LINCNT	: ADD 1
2059	006570	012777	000012	172204	MLF2:	MOV	#12,ALPB	: SEND LF
2060	006576	105777	172176			TSTB	ALPS	: TEST READY
(1)	006602	100375				BPL	.-4	: WAIT FOR READY
2061	006604	005337	001042			DEC	LINCNT	: DECREMENT LINE COUNT
2062	006610	001367				BNE	MLF2	: CONTINUE

F05

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SEQ 0057

2063 006612 005237 001054

INC

STRCHR

;NEXT CHAR

```

2067 006616 000726 BR MLFA ;CONTINUE
2068
2069 006620 033462 033062 033463 TABSTR: .ASCIZ /272637463540/
006626 033064 032463 030064
006634 000

2070
2071 006636 .EVEN
2072
2073 006636 032777 010000 172140 MLF4: BIT #BIT12,JSWR ;CHECK LOOP ON TEST
2074 006644 001272 BNE MLF ;LOOP
2075 .EVEN
2076
2077 ;TEST 8
2078 ;HIGH SPEED PRINT TEST
2079
2080 006646 HSPRT:
(1) 006646 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 006654 001003 BNE .+10 ;NO- CONTINUE
(1) 006656 052777 000100 172134 BIS #100,JKS ;ENABLE KEYBOARD INTERRUPT
2081 006664 004437 011506 JSR %4,TYPINT
2082 006670 013737 014556 014030 MOV TN010,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 006676 004437 011406 JSR %4,PRINT ;PRINT TEST NUMBER
(1) 000011 M=M+1

2083 006702 032777 002000 172074 BIT #BIT10,JSWR ;CHECK FOR NEW DRUM / OLD DRUM
2084 006710 001135 BNE HSPRT ;BRANCH IF NEW DRUM
2085 006712 032777 020000 172064 BIT #BIT13,JSWR ;CHECK CHAR SET
2086 006720 001007 BNE HSD00A ;BRANCH IF %6 CHAR SET
2087 006722 012737 000140 001060 MOV #140,LEGCHR ;LEGAL CHK
2088 006730 012737 000100 001062 MOV #100,NUMCHR ;#CHARS
2089 006736 000406 BR HSD00 ;CONTINUE
2090 006740 012737 000200 001060 HSD00A: MOV #200,LEGCHR ;LEGAL CHECK
2091 006746 012737 000140 001062 MOV #140,NUMCHR ;#CHARS
2092 006754 012737 000040 001054 HSD0: MOV #40,STRCHR ;SET UP FIRST LINE
2093 006762 012737 000177 001042 MOV #127,LINCNT ;SET LINE COUNT FOR 2 PAGES
2094 006770 012737 177574 001036 HSD: MOV #-132,CHRCNT ;SET CHAR COUNT
2095 006776 012737 177757 001044 MOV #-17,CYCCNT ;SET GROUP COUNT
2096 007004 013737 001054 001040 MOV STRCHR,CHGEN ;STORE START CHAR
2097 007012 005777 171762 HS1: TST ALPS ;TEST FOR ERROR
2098 007016 100006 BPL HS2 ;BRANCH IF NO ERROR
2099 007020 012737 000042 001052 ERR42: MOV #42, ERRCOUNT ;SET UP ERROR COUNT 42
(1) 000043 N=N+1

2100 007026 004537 011722 JSR %5,STAER ;REPORT ERROR SET
2101 007032 000000 HALT ;HALT ON ERROR
2102 007034 013777 001040 171740 HS2: MOV CHGEN,ALPB ;LOAD BUFFER
2103 007042 005237 001036 INC CHRCNT ;INCREMENT CHAR COUNT
2104 007046 001424 BEQ HS4 ;BRANCH IF DONE LINE
2105 007050 005237 001040 INC CHGEN ;NEXT CHAR
2106 007054 005237 001044 INC CYCCNT ;INCREMENT GROUP COUNT
2107 007060 001410 BEQ HS3 ;BRANCH IF DONE GROUP
2108 007062 023737 001060 001040 CMP LEGCHR,CHGEN ;LEGAL CHAR?
2109 007070 001350 BNE HS1 ;BRANCH AND CONTINUE IF LEGAL CHAR
2110 007072 163737 001062 001040 SUB NUMCHR,CHGEN ;MAKE LEGAL
2111 007100 000744 BR HS1 ;CONTINUE
2112 007102 013737 001054 001040 HS3: MOV STRCHR,CHGEN ;GET FIRST CHAR IN GROUP
2113 007110 012737 177757 001044 MOV #-17,CYCCNT ;RESET CYCLE COUNT
2114 007116 000735 BR HS1 ;CONTINUE

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2115 007120 012777 000012 171654 HS4:  MOV    #12,ALPB      ;SEND LF
2116 007126 105777 171646      TSTB   ALPS        ;TEST READY
(1) 007132 100375      BPL    .-4         ;WAIT FOR READY
2117 007134 005337 001042      DEC    LINCNT     ;DECREMENT LINE COUNT
2118 007140 002413      BLT    HS6        ;EXIT TEST IF DONE
2119 007142 162737 000004 001054      SUB    #4,STRCHR  ;SKIP 4 LINES ON DRUM, FIND START CHAR
2120 007150 022737 000040 001054      CMP    #40,STRCHR ;START CHAR A LEGAL CHAR?
2121 007156 003704      BLE    HSO        ;CONTINUE IF LEGAL START CHAR
2122 007160 063737 001062 001054      ADD    NUMCHR,STRCHR ;MAKE LEGAL AND CONTINUE
2123 007166 000700      BR     HSO        ;CONTINUE
2124 007170 032777 010000 171606 HS6:  BIT    #BIT12,ASWR ;LOOP ON TEST?
2125 007176 001223      BNE    HSPRT     ;LOOP
2126
2127
2128 007200 000137 007450      JMP    SNGCHR     ;JUMP TO TEST 9 AFTER COMPLETION
2129
2130
2131      ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
2132
2133 007204 032777 020000 171572 NHSVRT: BIT    #BIT13,ASWR ;CHECK CHARACTER SET
2134 007212 001007      BNE    NHS00A    ;BRANCH IF 96 CHARACTER SET
2135
2136 007214 012737 000140 001060      MOV    #140,LEGCHR ;LEGAL CHARACTER CHECK
2137 007222 012737 000100 001062      MOV    #100,NUMCHR ;# CHARACTERS = 64
2138 007230 000406      BR     NHS00     ;CONTINUE
2139 007232 012737 000200 001060 NHS00A: MOV    #200,LEGCHR ;LEGAL CHARACTER CHECK
2140 007240 012737 000140 001062      MOV    #140,NUMCHR ;# CHARACTERS = 96
2141 007246 012737 000003 001064 NHS00:  MOV    #3,OFFSET  ;COLUMN/CHARACTER OFFSET
2142 007254 012737 000040 001054      MOV    #40,STRCHR ;SET UP FIRST CHARACTER OF FIRSTLINE
2143 007262 012737 000177 001042      MOV    #127,LINCNT ;SET LINE COUNT FOR 2 PAGES
2144 007270 012737 177574 001036 NHS0:  MOV    #-132,CHRCNT ;SET CHARACTER COUNT = # COLUMNS
2145 007276 013737 001054 001040      MOV    STRCHR,CHRCNT ;STORE STARTING CHARACTER
2146 007304 005777 171470      NHS1:  TST    ALPS      ;TEST FOR ERROR
2147 007310 100006      BPL    NHS2      ;BRANCH IF NO ERROR
2148 007312 012737 000043 001052 ERR43: MOV    #43, ERRCOUNT ;SET UP ERROR COUNT 43
(1) 000044      N=N+1
2149 007320 004537 011722      JSR    %5,STAER  ;REPORT ERROR SET
2150 007324 000000      HALT           ;HALT ON ERROR
2151 007326 013777 001040 171446 NHS2:  MOV    CHRCNT,ALPB ;LOAD PRINTER BUFFER
2152 007334 005237 001036      INC    CHRCNT    ;INCREMENT CHARACTER COUNT
2153 007340 001413      BEQ    NHS4      ;BRANCH IF LINE DONE
2154 007342 063737 001064 001040      ADD    OFFSET,CHRCNT ;NEXT CHARACTER
2155 007350 023737 001060 001040      CMP    LEGCHR,CHRCNT ;LEGAL CHARACTER
2156 007356 003352      BGT    NHS1      ;BRANCH + CONTINUE IF LEGAL CHARACTER
2157 007360 163737 001062 001040      SUB    NUMCHR,CHRCNT ;MAKE LEGAL
2158 007366 000746      BR     NHS1      ;CONTINUE
2159 007370 012777 000012 171404 NHS4:  MOV    #12,ALPB  ;SEND LINE FEED.
2160 007376 105777 171376      TSTB   ALPS      ;TEST READY
(1) 007402 100375      BPL    .-4         ;WAIT FOR READY
2161 007404 005337 001042      DEC    LINCNT     ;DECREMENT LINE COUNT
2162 007410 002413      BLT    NHS6      ;EXIT IF TEST IS DONE
2163 007412 162737 000004 001054      SUB    #4,STRCHR  ;SKIP 4 LINES DOWN DRUM, FIND STARTING CHARACTER
2164 007420 022737 000040 001054      CMP    #40,STRCHR ;START CHARACTER A LEGAL CHARACTER
2165 007426 003720      BLE    NHS0      ;CONTINUE IF LEGAL START CHARACTER
2166 007430 063737 001062 001054      ADD    NUMCHR,STRCHR ;MAKE LEGAL + CONTINUE
2167 007436 000714      BR     NHS0      ;CONTINUE

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2168 007440 032777 010000 171336 NHS6: BIT #BIT12,JSWR ;LOOP ON TEST
2169 007446 001256 BNE NHSPRT ;LOOP
2170
2171 ;TEST 9
2172 ;WORST CASE NOISE TEST
2173 ;SINGLE CHAR. ACROSS ALL COLS.
2174
2175 007450 SNGCHR:
(1) 007450 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 007456 001003 BNE .+10 ;NO- CONTINUE
(1) 007460 052777 000100 171332 BIS #100,JKS ;ENABLE KEYBOARD INTERRUPT
2176 007466 004437 011506 JSR %4,TYPINT
2177 007472 013737 014560 014030 MOV TN011,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 007500 004437 011406 JSR %4,PRNT ;PRINT TEST NUMBER
(1) 000012 M=M+1
2178 007504 032777 020000 171272 BIT #BIT13,JSWR ;TEST CHAR SET
2179 007512 001404 BEQ S2 ;BRANCH IF 64
2180 007514 012737 177640 001042 MOV #-96.,LINCNT ;96 CHAR.
2181 007522 000403 BR .+10 ;BRANCH
2182 007524 012737 177700 001042 S2: MOV #-64.,LINCNT ;64 CHAR.
2183 007532 012737 000040 001040 MOV #40,CHGEN ;SET UP SPACE
2184 007540 012737 177574 001036 S2A: MOV #-132.,CHCNT ;SET CHAR COUNT FOR 132
2185 007546 005777 171226 S1: TST ALPS ;TEST FOR ERRORS
2186 007552 100006 BPL XS1X ;BRANCH IF NO ERRORS
2187 007554 012737 000044 001052 ERR44: MOV #44, ERCOUNT ;SET UP ERROR COUNT 44
(1) 000045 N=N+1
2188 007562 004537 011722 JSR %5,STAER ;REPORT ERROR
2189 007566 000000 HALT ;HALT ON ERROR
2190 007570 013777 001040 171204 XS1X: MOV CHGEN,ALPB ;LOAD PRINTER BUFFER
2191 007576 005237 001036 INC CHCNT ;INCREMENT CHAR COUNT
2192 007602 001361 BNE S1 ;CONTINUE IF NOT DONE LINE
2193 007604 012777 000012 171170 S4X2: MOV #12,ALPB ;ISSUE LINE FEED
2194 007612 105777 171162 TSTB ALPS ;TEST READY
(1) 007616 100375 BPL .-4 ;WAIT FOR READY
2195 007620 005237 001040 INC CHGEN ;+1 CHAR.
2196 007624 005237 001042 INC LINCNT ;+1 LINE COUNT
2197 007630 002743 BLT S2A ;CONTINUE IF NOT DONE
2198 007632 001764 BEQ S4X2 ;SEND BLANK LINE AT END OF TEST
2199 007634 032777 010000 171142 LPS7: BIT #BIT12,JSWR ;CHECK TO LOOP ON TEST
2200 007642 001302 BNE SNGCHR ;LOOP ON TEST

```

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2201
2202
2203
2204 ;TEST 10
2205 ;DRUM PATTERN CHARACTER TEST
2206
2207 ROTATE:
(1) 007644 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 007652 001003 BNE .+10 ;NO- CONTINUE
(1) 007654 052777 000100 171136 BIS #100,JKS ;ENABLE KEYBOARD INTERRUPT
2208 007662 004437 011506 JSR %4,TYPINT
2209 007666 013737 014562 014030 MOV TN012,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 007674 004437 011406 JSR %4,PRNT ;PRINT TEST NUMBER
(1) 000013 M=M+1
2210
2211 007700 032777 002000 171076 BIT #BIT10,JSWR ;CHECK FOR NEW DRUM/OLD DRUM

```

```

2212 007706 001122      BNE      NROTAT      ; BRANCH IF NEW DRUM
2213 007710 032777 020000 171066  BIT      #BIT13,2SWR ; TEST CHAR SET
2214 007716 001012      BNE      ROTO        ; SKIP IF 96 CHAR
2215 007720 012737 000137 001042  MOV      #137,LINCNT ; LAST CHAR
2216 007726 012737 000140 001060  MOV      #140,LEGCHR ; LEGAL CHK
2217 007734 012737 000100 001062  MOV      #100,NUMCHR ; #CHARS
2218 007742 000411      BR       ROT1        ; CONTINUE
2219 007744 012737 000177 001042  ROT0:   MOV      #177,LINCNT ; LAST CHAR
2220 007752 012737 000200 001060  MOV      #200,LEGCHR ; LEGAL CHK
2221 007760 012737 000140 001062  MOV      #140,NUMCHR ; #CHARS
2222 007766 005037 001044      ROT1:   CLR      CYCCNT   ; CLEAR CYCLE COUNT
2223 007772 005237 001044      ROT2:   INC      CYCCNT   ; INC CYCLE COUNT
2224 007776 005037 001040      CLR      CHRGEN     ; CLEAR POINTER
2225 010002 005237 001040      ROT3:   INC      CHRGEN     ; INC POINTER
2226 010006 013737 001040 001054  MOV      CHRGEN,STRCHR ; STORE POINTER
2227 010014 063737 001042 001054  ADD      LINCNT,STRCHR ; FIND CHAR
2228 010022 023737 001054 001060  CMP      STRCHR,LEGCHR ; LEGAL?
2229 010030 002403      BLT     ROT4        ; BRANCH IF LEGAL
2230 010032 163737 001062 001054  SUB      NUMCHR,STRCHR ; MAKE LEGAL
2231 010040 005777 170734      ROT4:   TST     2ALPS     ; TEST FOR ERRORS
2232 010044 100006      BPL     ROT5        ; BRANCH IF NO ERRORS
2233 010046 012737 000045 001052  ERR45:  MOV      #45,   ERCOUNT ; SET UP ERROR COUNT 45
(1)
2234 010054 000046      N=N+1
2235 010060 000000      JSR     %5,STAER    ; REPORT ERROR
2236 010062 013777 001054 170712  ROT5:   HALT     ; HALT ON ERROR
2237 010070 023727 001040 000021  MOV      STRCHR,2ALPB ; LOAD BUFFER
2238 010076 001341      CMP     CHRGEN,#17. ; DONE GROUP?
2239 010100 023727 001044 000010  BNE     ROT3        ; NO GET NEXT CHAR
2240 010106 001331      CMP     CYCCNT,#8. ; DONE LINE?
2241 010110 012777 000012 170664  BNE     ROT2        ; NO, NEXT GROUP
2242 010116 105777 170656      MOV     #12,2ALPB  ; YES, SEND LF
(1)
2243 010122 100375      TSTB   2ALPS       ; TEST READY
2244 010124 005337 001042      BPL     -4         ; WAIT FOR READY
2245 010130 023727 001042 000037  DEC     LINCNT     ; DECREMENT LINE COUNT
2246 010136 003313      CMP     LINCNT,#37 ; DONE?
2247 010140 032777 010000 170636  BGT     ROT1        ; NO, NEXT LINE
2248 010146 001236      BIT     #BIT12,2SWR ; LOOP ON TEST?
2249 010150 000137 010406      BNE     ROTATE     ; LOOP
2250
2251
2252
2253
2254 010154 032777 020000 170622  JMP     LFTTR      ; JUMP TO TEST 11 AFTER COMPLETION

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;NEW DRUM (LP14) PATTERN CHARACTER TEST

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2254 010154 032777 020000 170622  NROTAT: BIT      #BIT13,2SWR ; TEST CHARACTER SET
2255 010162 001012      BNE     NROTO      ; SKIP IF 96 CHARACTERS
2256 010164 012737 000137 001042  MOV      #137,LINCNT ; LAST CHARACTER
2257 010172 012737 000140 001060  MOV      #140,LEGCHR ; LEGAL CHECK
2258 010200 012737 000100 001062  MOV      #100,NUMCHR ; # OF CHARACTERS
2259 010206 000411      BR     NROT1      ; CONTINUE
2260 010210 012737 000177 001042  NROTO:  MOV      #177,LINCNT ; LAST CHARACTER
2261 010216 012737 000200 001060  MOV      #200,LEGCHR ; LEGAL CHECK
2262 010224 012737 000140 001062  MOV      #140,NUMCHR ; # OF CHARACTERS
2263 010232 012737 000040 001040  NROT1:  MOV      #40,CHRGEN ; GET POINTER
2264 010240 005237 001040      NROT6:  INC      CHRGEN     ; SET POINTER
2265 010244 013737 001040 001054  MOV      CHRGEN,STRCHR ; STORE POINTER

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2266 010252 005037 001036          CLR      CHRCNT      ;# CHARACTERS PRINTED
2267 010252 005237 001036          INC      CHRCNT      ;INCREMENT CHARACTERS PRINTED
2268 010262 063737 001064 001054          ADD      OFFSET,STRCHR ;INCREMENT POINTER
2269 010270 023737 001054 001060          CMP      STRCHR,LEGCHR ;LEGAL CHARACTER?
2270 010276 002403          BLT      NROT4       ;BRANCH IF LEGAL
2271 010300 163737 001062 001054          SUB      NUMCHR,STRCHR ;MAKE LEGAL
2272 010306 005777 170466          NROT4:  TST      @LPS     ;TEST FOR ERRORS
2273 010312 100006          BPL      NROT5       ;BRANCH IF NO ERRORS
2274 010314 012737 000046 001052          ERR46:  MOV      #46,    ERCOUNT ;SET UP ERROR COUNT 46
(1)          000047          N=N+1
2275 010322 004537 011722          JSR      %5,STAER    ;REPORT ERROR
2276 010326 000000          HALT
2277 010330 013777 001054 170444          NROT5:  MOV      STRCHR,@LPB  ;LOAD BUFFER
2278 010336 023727 001036 000204          CMP      CHRCNT,#132. ;LINE FINISHED?
2279 010344 001344          BNE      NROT2       ;NO GET NEXT CHARACTER
2280 010346 012777 000012 170426          MOV      #12,@LPB    ;YES SEND LINE FEED
2281 010354 105777 170420          TSTB    @LPS        ;TEST READY
(1)          010360 100375          BPL      -4          ;WAIT FOR READY
2282 010362 005337 001042          DEC      LINCNT      ;DECREMENT LINE COUNT
2283 010366 023727 001042 000037          CMP      LINCNT,#37  ;PATTERN FINISHED
2284 010374 003321          BGT      NROT6       ;NO, DO NEXT LINE
2285 010376 032777 010000 170400          BIT      @BIT12,JSWR ;LOOP ON TEST
2286 010404 001263          BNE      NROTAT      ;LOOP
2287
2288          ;TEST 11 ----- SPURIOUS HAMMER FIRING TEST
2289          ;LEFT AND RIGHT TRIANGLES
2290
2291          ; STARTING WITH A LEFT TRIANGLE
2292
2293 010406          LFTTR:  CMP      #176,SWR    ;S/W SWR ?
(1)          010406 022737 000176 001004          BNE      .+10        ;NO- CONTINUE
(1)          010414 001003          BIS      #100,@TKS   ;ENABLE KEYBOARD INTERRUPT
2294 010424 004437 011506          JSR      %4,TYPINT
2295 010430 013737 014564 014030          MOV      TN013,MES15 ;SET TEST NUMBER FOR MESSAGE
(1)          010436 004437 011406          JSR      %4,PRNT     ;PRINT TEST NUMBER
(1)          000014          M=M+1
2296 010442 012737 000204 001042          LFT:    MOV      #132, LINCNT ;SET LINE COUNT
2297 010450 013737 001042 001036          LFT0:  MOV      LINCNT,CHRCNT ;STORE CHAR COUNT
2298 010456 012737 177757 001044          MOV      #-17,CYCNT  ;SET GROUP COUNT
2299 010464 013737 001036 001040          MOV      CHRCNT,CHGEN ;FIND FIRST CHAR ON LINE...
2300 010472 022737 000022 001040          LFT1:  CMP      #18,CHGEN  ;MORE THAN 17 CHARS?
2301 010500 003004          BGT      LFT2        ;BRANCH IF LESS THAN 17
2302 010502 162737 000021 001040          SUB      #17,CHGEN   ;SUBTRACT 17, IF > 17
2303 010510 000770          BR      LFT1        ;CONTINUE
2304 010512 005437 001040          LFT2:  NEG      CHGEN     ;NEGATE CHGEN
2305 010516 062737 000100 001040          ADD      #100,CHGEN  ;START CHAR IN CHGEN
2306 010524 013737 001040 001054          MOV      CHGEN,STRCHR ;STORE STARTING CHAR
2307 010532 005777 170242          LFT3:  TST      @LPS     ;TEST FOR ERROR
2308 010536 100006          BPL      LFT4        ;CONTINUE IF NO ERROR
2309 010540 012737 000047 001052          ERR47:  MOV      #47,    ERCOUNT ;SET UP ERROR COUNT 47
(1)          000050          N=N+1
2310 010546 004537 011722          JSR      %5,STAER    ;REPORT ERROR SET
2311 010552 000000          HALT      ;HALT ON ERROR
2312 010554 013777 001040 170220          LFT4:  MOV      CHGEN,@LPB  ;LOAD BUFFER
2313 010562 005337 001036          DEC      CHRCNT     ;DECREMENT CHAR COUNT

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2314 010566 001415          BEQ    LFT6      ;BRANCH IF DONE LINE
2315 010570 005237 001044    INC    CYCCNT   ;INCREMENT GROUP COUNT
2316 010574 001403          BEQ    LFT5      ;BRANCH IF DONE GROUP
2317 010576 005237 001040    INC    CHRGEN  ;NEXT CHAR IN GROUP
2318 010602 000753          BR     LFT3      ;CONTINUE
2319 010604 013737 001054 001040 LFT5:  MOV    STRCHR,CHRGEN ;GET START CHAR AGAIN
2320 010612 012737 177757 001044    MOV    #17.,CYCCNT ;RESET GROUP COUNT
2321 010620 000744          BR     LFT3      ;CONTINUE
2322 010622 012777 000012 170152 LFT6:  MOV    #12,ALPB   ;SEND LF
2323 010630 105777 170144    TSTB  ALPS     ;TEST READY
(1) 010634 100375          BPL    .-4      ;WAIT FOR READY
2324 010636 005337 001042    DEC    LINCNT  ;DECREMENT LINE COUNT
2325 010642 003302          BGT    LFT0     ;BRANCH IF NOT DONE
2326 010644 001766          BEQ    LFT6     ;SEND BLANK LINE AT END OF TEST
2327 010646 032777 010000 170130    BIT    #BIT12,ASWR ;LOOP ON TEST?
2328 010654 001254          BNE    LFTTR   ;LOOP
2329
2330          ;TEST 11 ----- CONTINUED
2331          ;RIGHT TRIANGLE
2332
2333 010656 012737 000001 001042 RTTR:  MOV    #1,LINCNT  ;INITIALIZE LINE
2334 010664 012737 000077 001040 RT1:   MOV    #77,CHRGEN ;FIRST CHAR IS A ?
2335 010672 013737 001042 001044    MOV    LINCNT,CYCCNT ;SAVE NO. CHARS ON LINE
2336 010700 012737 177757 001056    MOV    #17.,STRCNT ;SET GROUP COUNT
2337 010706 012737 000204 001036    MOV    #132,CHRCNT ;NO. CHARS PER LINE
2338 010714 163737 001042 001036    SUB    LINCNT,CHRCNT ;SUBTRACT NO. OF CHARS ON LINE
2339 010722 001425          BEQ    RT3      ;BRANCH IF NO SPACES ON THIS LINE
2340 010724 005777 170050          TST    ALPS     ;TEST FOR ERROR
2341 010730 100006          BPL    RT2A     ;CONTINUE IF NO ERROR
2342 010732 012737 000050 001052 ERR50: MOV    #50, ERRCOUNT ;SET UP ERROR COUNT 50
(1) 010740 004537 011722          JSR    %5,STAER ;REPORT ERROR SET
2344 010744 000000          HALT          ;HALT ON ERROR
2345 010746 012777 000040 170026 RT2A:  MOV    #40,ALPB  ;LOAD BUFFER
2346 010754 005237 001056    INC    STRCNT  ;INCREMENT GROUP COUNT
2347 010760 001003          BNE    RT2AA   ;BRANCH IF NOT DONE GROUP
2348 010762 012737 177757 001056    MOV    #17,STRCNT ;RESET GROUP COUNT
2349 010770 005337 001036    RT2AA: DEC    CHRCNT ;DECREMENT SPACE COUNT
2350 010774 001353          BNE    RT2     ;BRANCH IF NOT DONE SPACES
2351 010776 005777 167776          TST    ALPS     ;TEST FOR ERROR
2352 011002 100006          BPL    RT3A     ;CONTINUE IF NO ERROR
2353 011004 012737 000051 001052 ERR51: MOV    #51, ERRCOUNT ;SET UP ERROR COUNT 51
(1) 011012 004537 011722          JSR    %5,STAER ;REPORT ERROR SET
2355 011016 000000          HALT          ;HALT ON ERROR
2356 011020 013777 001040 167754 RT3A:  MOV    CHRGEN,ALPB ;LOAD BUFFER
2357 011026 005237 001040    INC    CHRGEN  ;NEXT CHAR
2358 011032 005237 001056    INC    STRCNT  ;INCREMENT GROUP COUNT
2359 011036 001006          BNE    RT3B   ;BRANCH IF NOT DONE GROUP
2360 011040 012737 177757 001056    MOV    #17.,STRCNT ;RESET GROUP COUNT
2361 011046 162737 000021 001040    SUB    #17.,CHRGEN ;GET FIRST GROUP CHAR
2362 011054 005337 001044    RT3B:  DEC    CYCCNT  ;DECREMENT CHAR COUNT
2363 011060 001346          BNE    RT3     ;CONTINUE
2364 011062 012777 000012 167712    MOV    #12,ALPB  ;SEND LF
2365 011070 105777 167704    TSTB  ALPS     ;TEST READY
(1) 011074 100375          BPL    .-4      ;WAIT FOR READY

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2366 011076 005237 001042          INC      LINCNT      ; INCREMENT LINE COUNT
2367 011102 022737 000205 001042      CMP      #133.,LINCNT ; DONE?
2368 011110 003265          BGT      RT1         ; BRANCH IF NOT DONE
2369 011112 032777 010000 167664      BIT      #BIT12,2SWR ; LOOP ON TEST?
2370 011120 001256          BNE      RTTR        ; LOOP
2371
2372          ; TEST 12
2373          ; HAMMER ALIGNMENT
2374
2375 011122          HAMALN:
(1) 011122 022737 000176 001004      CMP      #176,SWR    ; S/W SWR ?
(1) 011130 001003          BNE      .+10        ; NO- CONTINUE
(1) 011132 052777 000100 167660      BIS      #100,2TKS   ; ENABLE KEYBOARD INTERRUPT
2376 011140 004437 011506          JSR      %4,TYPINT
2377 011144 013737 014566 014030      MOV      TNO14,MES15 ; SET TEST NUMBER FOR MESSAGE
(1) 011152 004437 011406          JSR      %4,PRINT    ; PRINT TEST NUMBER
(1)          000015      M=M+1
2378 011156 012737 177701 001042      MOV      #-63.,LINCNT ; SET UP FOR 63 LINES
2379 011164 012737 177574 001036      HAM1X: MOV      #-132.,CHRCNT ; SET CHAR COUNT
2380 011172 005777 167602          HAM2: TST      2LPS    ; CHECK FOR ERROR
2381 011176 100006          BPL      XHAM1       ; BRANCH IF NO ERROR
2382 011200 012737 000052 001052      ERR52: MOV      #52, ERRCOUNT ; SET UP ERROR COUNT 52
(1)          000053      N=N+1
2383 011206 004537 011722          JSR      %5,STAER    ; REPORT ERROR OCCURRED
2384 011212 000000          HALT                ; HALT ON ERROR
2385 011214          XHAM1:
(1) 011214 105777 167560          TSTB     2LPS        ; TEST READY
(1) 011220 100375          BPL      .-4         ; WAIT FOR READY
2386 011222 100375          BPL      .-4         ; WAIT FOR READY
2387 011224 012777 000105 167550      XHAM1X: MOV      #105,2LPB ; TRANSMIT E TO PRINTER
2388 011232 005237 001036          INC      CHRCNT      ; +1 CHAR COUNT
2389 011236 001355          BNE      HAM2        ; TRANSMIT ANOTHER CHAR.
2390 011240 012777 000012 167534      MOV      #12,2LPB    ; TRANSMIT LINE FEED
2391 011246 105777 167526          TSTB     2LPS        ; TEST READY
(1) 011252 100375          BPL      .-4         ; WAIT FOR READY
2392 011254 005237 001042          INC      LINCNT      ; +1 TO COUNT
2393 011260 001341          BNE      HAM1X       ; GO DO NEXT LINE
2394 011262 032777 010000 167514      BIT      #BIT12,2SWR ; CHECK TO LOOP ON TEST
2395 011270 001314          BNE      HAMALN      ; LOOP ON TEST
2396
2397 011272 032777 040000 167504      BIT      #BIT14,2SWR ; DAVFU AVAILABLE?
2398 011300 001402          BEQ      HAMX        ; NO, RECYCLE PRINTING TESTS
2399 011302 000137 014576          JMP      DAVFU       ; YES, DO DAVFU PRINTING TESTS
2400 011306
2401 011306 013700 000042          HAMX:  MOV      2#42,RO
2402 011312 001405          BEQ      DOAGN
2403 011314 000005          RESET
2404 011316          LOGICAL:
2405 011316 004710          JSR      PC,(RO)
2406 011320 000240          NOP
2407 011322 000240          NOP
2408 011324 000240          NOP
2409 011326
2410 011326 000137 004534          DOAGN: JMP      TEST2      ; RESTART
2411
2412          ; MISC. ROUTINES

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;ROUTINE TO INITIALIZE PRINTER
 ;ENTER FROM JSR %S, PRTINT

```

PRTINT: TST      2LPS          ;TEST FOR ERROR
        BMI      PRTINO      ;BRANCH IF ERROR
        TSTB     2LPS          ;TEST FOR READY
        BMI      RDYOK        ;READY SET OK
PRTINO: ADD      #2,%S        ;SET UP FOR ERROR REPORT
        RTS      %S           ;REPORT READY NOT SET
RDYOK:  MOV      #14,2LPB     ;ISSUE FORM FEED
        TSTB     2LPS          ;TEST FOR READY NOT SET
        BPL      NTRDY        ;READY NOT SET OK
        ADD      #2,%S        ;SET UP FOR REPORT
        RTS      %S           ;EXIT AND REPORT

NTRDY:  TSTB     2LPS          ;TEST READY
        BPL      -4           ;WAIT FOR READY
        RTS      %S           ;READY SET EXIT
    
```

;ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER

```

PRNNT:  MOV      #MES14,PRMSG ;PRINT TEST NUMBER
        MOV      #340,-(SP)    ;LOCK OUT KEYBOARD INTERRUPTS
        MOV      PC,-(SP)      ;MOVE PRESENT LOCATION TO STACK
        ADD      #6,(SP)       ;SET UP FOR NEXT INSTRUCTION
        RTI                    ;LOAD PSW
        TST      2LPS          ;TEST FOR ERROR
        BPL      RINT          ;BRANCH IF OK
ERR53:  MOV      #53, ERRCOUNT ;SET UP ERROR COUNT 53
        N=N+1
        JSR      %S,STAER      ;REPORT ERROR SET
        HALT                    ;HALT ON ERROR
RINT:   MOV      LPS,TPS ;SET VECTORS -
        MOV      LPB,TPB ;TO PRINT ON LINE PRINTER
        EMT      +0           ;PRINT MESSAGE
PRTMSG: MES14
        MOV      #140,-(SP)    ;ALLOW KEYBOARD INTERRUPTS
        MOV      PC,-(SP)      ;MOVE PRESENT LOCATION TO STACK
        ADD      #6,(SP)       ;SET UP FOR NEXT INSTRUCTION
        RTI                    ;LOAD PSW
TYPINT: MOV      #177564,TPS   ;RESET VECTORS
        MOV      #177566,TPB   ;FOR TTY
        RTS      %4           ;RETURN
    
```

;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER

```

TYP:   MOV      2%6,%0        ;GET ADDR. THAT CONTAINS MESS.
        ADD      #2,2%6       ;SET UP EXIT
        MOV      2%0,%0       ;ADDRESS OF MESSAGE IN RO
    
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2462 011534 112037 011636      TYPA:  MOVB   (0)+, TYPDAT      ; GET CHARACTER
2463 011540 001001              BNE     TYPC'                ; BRANCH IF NOT DONE
2464 011542 000002              RTI                                  ; EXIT
2465 011544 122737 000045 011636  TYPC:  CMPB   #45, TYPDAT      ; CHECK FOR "%"
2466 011552 001416              BEQ     TYPF'                ; BRANCH IF "%"
2467 011554 122737 000043 011636  TYPC:  CMPB   #43, TYPDAT      ; CHECK FOR "8"
2468 011562 001417              BEQ     TYPG'                ; BRANCH IF "8"
2469 011564 004737 011572              JSR    %7, TYPD              ; TYPE CHARACTER IN TYPDAT
2470 011570 000761              BR     TYPA'                ; NEXT CHAR IN MESSAGE
2471 011572 113777 011636 167212  TYPD:  MOVB   TYPDAT, @TPB     ; OUTPUT CHARACTER TO PRINTER
2472 011600 105777 167212  TYPD:  TSTB   @TPS
2473 011604 100375              BPL    -.4
2474 011606 000207              RTS    %7                    ; CHAR. TYPED EXIT
2475 011610 112737 000012 011636  TYPF:  MOVB   #12, TYPDAT     ; OUTPUT LF
2476 011616 004737 011572              JSR    %7, TYPD              ; GO TYPE CHAR.
2477 011622 112737 000015 011636  TYPG:  MOVB   #15, TYPDAT     ; OUTPUT CR
2478 011630 004737 011572              JSR    %7, TYPD              ; GO TYPE CHAR.
2479 011634 000737              BR     TYPA'
2480 011636 000000      TYPDAT: 0
2481
2482
2483      ; ROUTINE TO CONVERT OCTAL TO ASCII
2484
2485      ; ENTER ROUTINE AS FOLLOWS
2486      ; JSR    %5, CONV
2487      ; XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
2488      ; XXXXXX=ADDRESS OF ASCII MESSAGE
2489      ; XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
2490
2491 011640 013537 011720  CONV:  MOV     @5+, ACNVX      ; ADDRESS OF NO. TO BE CONVERTED
2492 011644 012501              MOV     (5)+, %1            ; ADDRESS OF MESSAGE
2493 011646 012502              MOV     (5)+, %2            ; NUMBER OF ASCII CHARACTERS
2494 011650 060201              ADD     %2, %1              ; FIRST CHAR ADDRESS
2495 011652 013703 011720  ACVN:  MOV     ACNVX, %3        ; STORE NUMBER
2496 011656 042703 177770              BIC     #177770, %3         ; ISOLATE LEAST SIGNIFICANT BIT
2497 011662 062703 000060              ADD     #60, %3             ; SET UP ASCII CHARACTER
2498 011666 110341              MOVB   %3, -(1)            ; STORE CHARACTER
2499 011670 000241              CLC                                  ; GET NEXT SIGNIFICANT BIT ...
2500 011672 006037 011720              ROR     ACNVX
2501 011676 000241              CLC
2502 011700 006037 011720              ROR     ACNVX
2503 011704 000241              CLC
2504 011706 006037 011720              ROR     ACNVX
2505 011712 005302              DEC     %2                    ; -1 FROM ASCII CHAR. CNT
2506 011714 001356              BNE     ACVN'                ; CONVERT NEXT CHARACTER
2507 011716 000205              RTS    %5                    ; EXIT! CONVERSION DONE
2508
2509 011720 000000      ACNVX:  0                    ; WORK REGISTER
2510
2511      ; ROUTINE TO REPORT ERROR COUNT
2512
2513 011722 032777 001000 167054  STAER: BIT     #BIT9, @SWR     ; INHIBIT ERROR REPORTS ?
2514 011730 001007              BNE     STAER1'              ; YES
2515 011732 004537 011640              JSR    %5, CONV              ; CONVERT OCTAL TO ASCII
2516 011736 001052              ERCOUNT
2517 011740 012361              HEDI

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2518	011742	000003			3				
2519	011744	104000			EMT	+0			;TYPE ERROR MESSAGE
2520	011746	012360			HED0				
2521	011750	005777	167030		STAER1: TST	2SWR			;TEST FOR HALT ON ERROR
2522	011754	100401			BMI	.+4			;BRANCH IF NO HALT WANTED
2523	011756	000000			HALT				;HALT ON ERROR
2524	011760	000205			RTS	%S			;RETURN
;KEYBOARD INTERRUPT ROUTINE									
;FOR ACCESS TO THE S/W SWITCH REGISTER									
2527	011762	010046			TKINT: MOV	%0,-(SP)			;SAVE REGISTERS
2528	011764	010146			MOV	%1,-(SP)			
2529	011766	010246			MOV	%2,-(SP)			
2530	011770	010346			MOV	%3,-(SP)			
2531	011772	010446			MOV	%4,-(SP)			
2532	011774	010546			MOV	%5,-(SP)			
2533	011776	005737	001072		TST	SET			;INITIAL SWR ENTRY ?
2534	012002	001130			BNE	TYP5WR			;YES-PRINT HEADER
2535	012004	005737	001070		TST	SIGNAL			;PREVIOUS CONTROL-G INPUT ?
2536	012010	001477			BEQ	CNTRLG			;YES-CONTINUE
2537	012012	017737	166776	001074	MOV	2TKB,CHAR			;GET INPUT CHARACTER
2538	012020	042737	177600	001074	BIC	#177600,CHAR			;STRIP OFF PARITY BIT
2539	012026	022737	000015	001074	CMF	#15,CHAR			;CARRIAGE RETURN ?
2540	012034	001456			BEQ	DGTS			;YES-CONTINUE
2541	012036	022737	000025	001074	CMF	#25,CHAR			;CONTROL-U INPUT ?
2542	012044	001530			BEQ	TK4			;YES-CONTINUE
2543	012046	023727	001074	000060	CMF	CHAR,#60			;LEGAL CHECK: LESS THAN 60 ?
2544	012054	100001			BPL	TK1			;NO-CONTINUE
2545	012056	000466			BR	WT3			;YES-PRINT "?"
2546	012060	022737	000067	001074	TK1: CMF	#67,CHAR			;LEGAL CHECK: GREATER THAN 67 ?
2547	012066	100001			BPL	TK2			;NO-CONTINUE
2548	012070	000461			BR	WT3			;YES-PRINT "?"
2549	012072	005237	001066		TK2: INC	DIGITS			;NEXT DIGIT OF SWR INPUT
2550	012076	022737	000006	001066	CMF	#6,DIGITS			;MORE THAN SIX DIGITS ?
2551	012104	100453			BMI	WT3			;YES-PRINT "?"
2552	012106	105777	166704		WT2: TSTB	2TPS			;TTY PRINTER READY ?
2553	012112	100375			BPL	WT2			;NO-WAIT
2554	012114	013777	001074	166670	MOV	CHAR,2TPB			;PRINT CHARACTER
2555	012122	162737	000060	001074	SUB	#60,CHAR			;CONVERT TO OCTAL
2556	012130	022737	000001	001066	CMF	#1,DIGITS			;FIRST DIGIT ?
2557	012136	001411			BEQ	TK5			;YES-CONTINUE
2558	012140	000241			CLC				;ROTATE LEFT THREE
2559	012142	006137	001076		ROL	OCT			;TIMES
2560	012146	000241			CLC				;THIS WILL SHIFT
2561	012150	006137	001076		ROL	OCT			;SWR VALUE ONE
2562	012154	000241			CLC				;PLACE LEFT
2563	012156	006137	001076		ROL	OCT			;OCTAL
2564	012162	063737	001074	001076	TK5: ADD	CHAR,OCT			;NEW VALUE OF SWR
2565	012170	000464			BR	TK6			;RETURN FROM INTERRUPT
2566	012172	005737	001066		DGTS: TST	DIGITS			;SWR VALUE CHANGED ?
2567	012176	001451			BEQ	TK3			;NO-RETURN, NO CHANGE TO SWR
2568	012200	013777	001076	166576	MOV	OCT,2SWR			;YES-ENTER NEW SWR VALUE
2569	012206	000445			BR	TK3			;RETURN FROM INTERRUPT

2574	012210	017737	166600	001074	CNTRLG:	MOV	@TKB,CHAR	;GET CHARACTER
2575	012216	042737	177600	001074		BIC	@177600,CHAR	;STRIP OFF PARITY BIT
2576	012224	022737	000007	001074		CMP	@7,CHAR	;CONTROL-G INPUT ?
2577	012232	001414				BEQ	TYP5WR	;YES-PRINT HEADER
2578	012234	105777	166556		WT3:	TSTB	@TPS	;TTY PRINTER READY ?
2579	012240	100375				BPL	WT3	;NO-WAIT
2580	012242	013777	001074	166542		MOV	CHAR,@TPB	;PRINT CHARACTER
2581	012250	104000				EMT	+0	;PRINT "?"
2582	012252	014466				MES22		
2583	012254	005737	001070			TST	SIGNAL	;BAD VALUE ?
2584	012260	001001				BNE	TYP5WR	;YES-PRINT HEADER
2585	012262	000427				BR	TK6	;RETURN FROM INTERRUPT
2586	012264	012737	000001	001070	TYP5WR:	MOV	@1,SIGNAL	;SET FLAG: CONTROL-G ENTERED
2587	012272	104000				EMT	+0	;PRINT HEADER
2588	012274	014472				MES23		
2589	012276	004537	011640			JSR	%5,CONV	;CONVERT SWR VALUE TO ASCII
2590	012302	000176				176		
2591	012304	014522				MES25		
2592	012306	000006				6		
2593	012310	104000				EMT	+0	;PRINT SWR VALUE
2594	012312	014522				MES25		
2595	012314	104000				EMT	+0	;PRINT HEADER
2596	012316	014503				MES24		
2597	012320	000404				BR	TK7	;RETURN FROM INTERRUPT
2598	012322	005037	001070		TK3:	CLR	SIGNAL	;CLEAR CONTROL-G FLAG
2599	012326	104000			TK4:	EMT	+0	;PRINT LINE FEED AND CARRIAGE RETURN
2600	012330	014464				MES21		
2601	012332	005037	001066		TK7:	CLR	DIGITS	;CLEAR DIGIT COUNT
2602	012336	005037	001076			CLR	OCT	;CLEAR SWR INPUT
2603	012342	012605			TK6:	MOV	(SP)+,%5	;RESTORE REGISTERS
2604	012344	012604				MOV	(SP)+,%4	
2605	012346	012603				MOV	(SP)+,%3	
2606	012350	012602				MOV	(SP)+,%2	
2607	012352	012601				MOV	(SP)+,%1	
2608	012354	012600				MOV	(SP)+,%0	
2609	012356	000002				RTI		;RETURN FROM INTERRUPT
2610								
2611								
2615								
2616	012360	045			HEDO:	.ASCII	/%/	
2617	012361	040	020040	042440	HED1:	.ASCII	/ ERROR COUNT%/	
2618	012402	051105	047522	020122	MESA:	.ASCII	/ERROR SET OK - CLEAR & TURN ON LINE%/	
2619	012447	105	051122	051117	MESB:	.ASCII	/ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/	
2620	012522	050045	044522	052116	MESC:	.ASCII	/%PRINT SPEED CHECK USING MANUAL TIMING%/	
2621	012571	045	052520	020124		.ASCII	/%PUT SWITCH 0 UP TO START TIMING%/	
2622	012632	050045	052125	051440		.ASCII	/%PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/	
2623	012701	045	052123	051101	MES00:	.ASCII	/%STARTING DAYFU PRINTING TESTS%/	
2624	012741	045	050114	032460	MES1:	.ASCII	/%LPOS-LP11-LP14 LINE PRINTER TEST%/	
2625	013004	042522	052123	051101	MES2:	.ASCII	/RESTART ADDRESS 600%/	
2626	013031	045	047520	042527	MES3:	.ASCII	/%POWER ON - TURN ON LINE%/	
2627	013063	117	020116	044514	MES4:	.ASCII	/ON LINE OK - TRY TORN PAPER SWITCH%/	
2628	013127	122	040505	054504	MES5:	.ASCII	/READY SET OK - TRY DRUM GATE SWITCH%/	
2629	013174	051105	047522	020122	MES6:	.ASCII	/ERROR SET OK - TURN ON LINE%/	
2630		013232			.EVEN			
2631	013232	042522			MES7A:	.ASCII	/RE/	
2632	013234	042523	020124	047524	MES7:	.ASCII	/SET TOP OF FORM SWITCH TO /	

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2633 013270 020040 020040 044440 MES8: .ASCIZ / INCHES%/
2634 .EVEN
2635 013306 026455 026455 026455 MES9: .ASCIZ /----- THIS LINE SHOULD BE /
2636 013403 040 020040 020040 MES10: .ASCIZ / INCHES FROM THE LAST LINE -----
2637 013514 005012 MES11A: .ASCIZ <12><12>
2638 013516 050045 044522 052116 MES11: .ASCIZ /%PRINT SPEED IS APPROXIMATELY /
2639 013555 040 020040 020040 MES12: .ASCIZ / LINES PER MINUTE%/
2640 013604 026455 026455 026455 MES13: .ASCIZ /-----/
2641 013666 026455 026455 026455 .ASCIZ /-----/
2642 013750 026455 026455 026455 .ASCIZ /-----#/
2643 .EVEN
2644 014012 005012 042524 052123 MES14: .ASCIZ <12><12>/TEST NUMBER /
2645 014030 020040 005012 000012 MES15: .ASCIZ / /<12><12><12>
2646 .EVEN
2647 014036 044124 051511 046040 MES16: .ASCIZ /THIS LINE SHOULD BE PRINTED#/
2648 014073 040 020040 020040 MES17: .ASCIZ / ALL ON ONE LINE --- IF SLEWED 0 LINES%/
2649 .EVEN
2650 014176 026455 026455 026455 MES18: .ASCIZ /----- THERE SHOULD BE /
2651 014270 020040 020040 020040 MES19: .ASCIZ / BLANK LINES BEFORE THIS LINE -----
2652 .EVEN
2653 014404 052040 051505 044524 MES20: .ASCIZ / TESTING CHANNEL SLEWING USING CHANNEL NO. /
2654 014460 020040 000 .ASCIZ / /
2655 014464 .EVEN
2656 014464 000045 MES21: .ASCIZ /%/
2657 014466 037440 000045 MES22: .ASCIZ / ?%/
2658 014472 051445 051127 036440 MES23: .ASCIZ /%SWR = /
2659 014503 040 020040 042516 MES24: .ASCIZ / NEW SWR = /
2660 014522 020040 020040 020040 MES25: .ASCIZ / /
2661 014532 030504 TNDV1: .ASCIZ /D1/ ;TEST NUMBERS FOR DAVFU TESTS
2662 014534 031104 TNDV2: .ASCIZ /D2/
2663 014536 031504 TNDV3: .ASCIZ /D3/
2664 014540 020061 TN01: .ASCIZ /1 /
2665 014542 020062 TN02: .ASCIZ /2 /
2666 014544 020063 TN03: .ASCIZ /3 /
2667 014546 020064 TN04: .ASCIZ /4 /
2668 014550 020065 TN05: .ASCIZ /5 /
2669 014552 020066 TN06: .ASCIZ /6 /
2670 014554 020067 TN07: .ASCIZ /7 /
2671 014556 020070 TN010: .ASCIZ /8 /
2672 014560 020071 TN011: .ASCIZ /9 /
2673 014562 030061 TN012: .ASCIZ /10/
2674 014564 030461 TN013: .ASCIZ /11/
2675 014566 031061 TN014: .ASCIZ /12/
2676 014570 031461 TN015: .ASCIZ /13/
2677 014572 032061 TN016: .ASCIZ /14/
2678 014574 032461 TN017: .ASCIZ /15/
2679 .EVEN
2680
2681
2685 ;DAVFU PRINTING TESTS IF DAVFU IS AVAILABLE -- SET SWITCH 14
2686
2687
2688 ;TESTS D1 AND D2
2689 ;CHECK DAVFU LINE COUNT SLEWING
2690
2691

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2692	014576				DAVFU:	CMP	#176, SWR		;S/W SWR ?
(1)	014576	022737	000176	001004		BNE	.+10		;NO- CONTINUE
(1)	014604	001003				BIS	#100, JTKS		;ENABLE KEYBOARD INTERRUPT
(1)	014606	052777	000100	164204		JSR	%4, TYPINT		;INITIALIZE
2693	014614	004437	011506			MOV	SPSP, MES19+2		
2694	014620	013737	016662	014272		EMT	+0		;TYPE MESSAGE
2695	014626	104000				MES00			;STARTING DAVFU TESTS
2696	014630	012701				MOV	#220, DAVI1		;SET DAVFU INSTRUCTIONS
2697	014632	012737	000220	015326		MOV	#221, DAVI2		
2698	014640	012737	000221	015330		MOV	TNDVI, MES15		;SET TEST NUMBER FOR MESSAGE
2699	014646	013737	014532	014030		JSR	%4, PRINT		;PRINT TEST NUMBER
2700	014654	004437	011406			MOV	#DAVTAB, CHRGEN		;SET TABLE POINTER
2701	014660	012737	015260	001040	DAVD:	TST	ALPS		;TEST FOR ERROR
2702	014666	005777	164106		DAVD:	BPL	DAVI		;BRANCH IF NO ERROR
2703	014672	100010			ERR54:	MOV	#54, ERCOUNT		;SET UP ERROR COUNT 54
2704	014674	012737	000054	001052		N=N+1			
(1)		000055				JSR	%5, STAER		;REPORT ERROR SET
2705	014702	004537	011722			HALT			;HALT ON ERROR
2706	014706	000000				JMP	DAVD		;RESTART TEST
2707	014710	000137	014660		DAVI:	MOV	CHRGEN, ALPB		;LOAD DAVFU
2708	014714	017777	164120	164060		ADD	#2, CHRGEN		;INCREMENT TABLE POINTER
2709	014722	062737	000002	001040		TST	CHRGEN		;TEST IF DONE LOAD
2710	014730	005777	164104			BEQ	D5		;CONTINUE IF DONE
2711	014734	001405				TSTB	ALPS		;TEST READY
2712	014736	105777	164036			BPL	.-4		;WAIT FOR READY
(1)	014742	100375				JMP	DAVD		
2713	014744	000137	014666		D5:	MOV	#2, CYCNT		;SET CYCLE COUNT
2714	014750	012737	000002	001044	DO:	MOV	#MES16, PRMSG		;SET MESSAGE ADDRESS
2715	014756	012737	014036	011470		JSR	%4, RINT		;PRINT MESSAGE
2716	014764	004437	011452			TST	ALPS		;TEST FOR ERROR
2717	014770	005777	164004			BPL	D1		;CONTINUE IF NO ERROR
2718	014774	100006			ERR55:	MOV	#55, ERCOUNT		;SET UP ERROR COUNT 55
2719	014776	012737	000055	001052		N=N+1			
(1)		000056				JSR	%5, STAER		;REPORT ERROR SET
2720	015004	004537	011722			HALT			;HALT ON ERROR
2721	015010	000000			D1:	MOV	DAVI1, ALPB		;SEND DAVFU INSTRUCTION, SKIP 0 LINES
2722	015012	013777	015326	163762		TSTB	ALPS		;TEST READY
2723	015020	105777	163754			BPL	.-4		;WAIT FOR READY
(1)	015024	100375				MOV	#MES17, PRMSG		;SET PRINTER MESSAGE ADDRESS
2724	015026	012737	014073	011470		JSR	%4, RINT		;PRINT MESSAGE
2725	015034	004437	011452			MOV	#MES18, PRMSG		;SET MESSAGE ADDRESS
2726	015040	012737	014176	011470		MOV	DAVI2, CHRGEN		;FIRST DAVFU INSTRUCTION
2727	015046	013737	015330	001040		MOV	#TNO1, STRCHR		;SET TABLE POINTER
2728	015054	012737	014540	001054		MOV	#15, CHRCNT		;SET TABLE COUNT
2729	015062	012737	000017	001036	D2:	TST	ALPS		;TEST FOR ERROR
2730	015070	005777	163704			BPL	D3		;CONTINUE IF NO ERRORS
2731	015074	100006			ERR56:	MOV	#56, ERCOUNT		;SET UP ERROR COUNT 56
2732	015076	012737	000056	001052		N=N+1			
(1)		000057				JSR	%4, STAER		;REPORT ERROR SET
2733	015104	004437	011722			HALT			;HALT ON ERROR
2734	015110	000000			D3:	MOV	CHRGEN, ALPB		;SEND DAVFU INSTR.
2735	015112	013777	001040	163662		TSTB	ALPS		;TEST READY
2736	015120	105777	163654			BPL	.-4		;WAIT FOR READY
(1)	015124	100375				MOV	STRCHR, MES19		;SET PRINTER MESSAGE
2737	015126	017737	163722	014270		JSR	%4, RINT		;PRINT MESSAGE
2738	015134	004437	011452						


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2739 015140 005337 001036          DEC      CHRCNT      ;DEC TABLE COUNT
2740 015144 001407          BEQ      D4         ;EXIT TEST IF DONE
2741 015146 005237 001040          INC      CHRCNT    ;NEXT DAVFU INSTR.
2742 015152 062737 000002 001054    ADD      #2,STRCHR ;INC TABLE POINTER
2743 015160 000137 015070          JMP      D2         ;CONTINUE
2744 015164 005337 001044          D4:      DEC      CYCCNT ;DEC CYCLE COUNT
2745 015170 001415          BEQ      DEXD      ;EXIT IF DONE
2746 015172 062737 000140 015326    ADD      #140,DAVI1 ;CHANGE DAVFU INSTR.
2747 015200 062737 000140 015330    ADD      #140,DAVI2 ;CHANGE DAVFU INSTR.
2748 015206 013737 014534 014030    MOV      TNDV2,MES15 ;SET TEST NUMBER FOR MESSAGE
2749 015214 004437 011406          JSR      %4,PRNNT  ;PRINT TEST NUMBER
2750 015220 000137 014756          JMP      D0         ;RETEST LINE COUNT SLEWING
2751 015224 012737 000220 015326    DEXD:   MOV      #220,DAVI1 ;RESET DAVFU INSTR.
2752 015232 012737 000221 015330    MOV      #221,DAVI2 ;RESET DAVFU INSTR.
2753 015240 032777 010000 163536    BIT      #BIT12,SWR ;LOOP ON TEST?
2754 015246 001002          BNE      IS        ;LOOP
2755 015250 000137 015332          JMP      DAV2      ;NEXT TEST
2756 015254 000137 014576          IS:     JMP      DAVFU     ;LOOP
2757
2758
2759 015260 000356          DAVTAB: 356      ;DAVFU LOAD TABLE
2760 015262 000001          1
2761 015264 000002          2
2762 015266 000003          3
2763 015270 000004          4
2764 015272 000005          5
2765 015274 000006          6
2766 015276 000007          7
2767 015300 000010          10
2768 015302 000011          11
2769 015304 000012          12
2770 015306 000013          13
2771 015310 000014          14
2772 015312 000015          15
2773 015314 000016          16
2774 015316 000017          17
2775 015320 000020          20
2776 015322 000357          357
2777 015324 000000          0
2778
2779
2780 015326 000220          DAVI1: 220
2781 015330 000221          DAVI2: 221
2782
2783          ;TEST D3
2784          ;CHECK DAVFU CHANNEL SLEW COMMANDS
2785
2786 015332          DAV2:
(1) 015332 022737 000176 001004    CMP      #176,SWR   ;S/W SWR ?
(1) 015340 001003          BNE      .+10      ;NO- CONTINUE
(1) 015342 052777 000100 163450    BIS      #100,JKS  ;ENABLE KEYBOARD INTERRUPT
2787 015350 004437 011506          JSR      %4,TYPINT ;INITIALIZE
2788 015354 013737 016662 014272    MOV      SPSP,MES19+2 ;SAT TEST NUMBER FOR MESSAGE
2789 015362 013737 014536 014030    MOV      TNDV3,MES15 ;PRINT TEST NUMBER D3
2790 015370 004437 011406          JSR      %4,PRNNT  ;SET MESSAGE TABLE POINTER
2791 015374 012737 016644 016126    MOV      #MTAB,MTABP

```

```

2792 015402 012737 016612 016122      MOV      #ITAB,ITABP      ;SET INSTRUCTION TABLE POINTER
2793 015410 017737 000506 001054      MOV      @ITABP,STCHR    ;SAT FIRST INSTRUCTION
2794 015416 012737 014540 016130      MOV      #TNO1,ATABP    ;SET HEADER MESSAGE TABLE POINTER
2795 015424 012737 016574 016124      MOV      #ICTAB,ICTABP  ;SET INSTR COUNT TABLE POINTER
2796 015432 017737 000466 001056      MOV      @ICTABP,STCNT  ;GET FIRST INSTR COUNT
2797 015440 012737 016132 016120      LOAD:   MOV      @DTAB,DTABP ;SET DATA TABLE POINTER
2798 015446 017737 000446 001040      MOV      @DTABP,CHGEN   ;SET FIRST DATA PAIR
2799 015454 005777 163320      TST     @LPS           ;TEST FOR ERROR
2800 015460 100007      BPL     DL1           ;BRANCH IF NO ERROR
2801 015462 012737 000057 001052      ERR57:  MOV      #57, ERRCOUNT ;SET UP ERROR COUNT 57
      (1) 000060      N=N+1
2802 015470 004537 011722      JSR     %5,STAER      ;REPORT ERROR SET
2803 015474 000000      HALT                    ;HALT ON ERROR
2804 015476 000760      BR     LOAD           ;RESTART LOAD
2805 015500 012737 000002 001036      DL1:   MOV      #2,CHRCNT ;SET PAIR COUNT
2806 015506 013777 001040 163266      DL2:   MOV      CHGEN,@LPB ;LOAD DAVFU
2807 015514 105777 163260      TSTB   @LPS          ;TEST READY
      (1) 015520 100375      BPL     -4            ;WAIT FOR READY
2808 015522 005777 163252      TST     @LPS          ;TEST FOR ERROR
2809 015526 100010      BPL     DL6           ;BRANCH IF NO ERROR
2810 015530 012737 000060 001052      ERR60:  MOV      #60, ERRCOUNT ;SET UP ERROR COUNT 60
      (1) 000061      N=N+1
2811 015536 004537 011722      JSR     %5,STAER      ;REPORT ERROR SET
2812 015542 000000      HALT                    ;HALT ON ERROR
2813 015544 000137 015440      JMP     LOAD           ;RESTART LOAD
2814 015550 022737 000356 001040      DL6:   CMP      #356,CHGEN  ;LOAD COMMAND?
2815 015556 001407      BEQ     DL6A          ;YES, SEND ONLY ONCE
2816 015560 022737 000357 001040      CMP      #357,CHGEN  ;LOAD COMMAND?
2817 015566 001403      BEQ     DL6A          ;YES, SEND ONLY ONCE
2818 015570 005337 001036      DEC     CHRCNT        ;DEC PAIR COUNT
2819 015574 001344      BNE     DL2           ;FINISH PAIR IF NOT DONE
2820 015576 062737 000002 016120      DL6A:  ADD      #2,DTABP    ;INC DATA TABLE POINTER
2821 015604 017737 000310 001040      MOV      @DTABP,CHGEN ;SET NEXT DATA PAIR
2822 015612 022737 077777 001040      CMP      #77777,CHGEN ;DONE LOAD?
2823 015620 001327      BNE     DL1
2824
2825 ;START OF CHANNEL SLEW TESTS
2826
2827
2828 015622      DL8:   MOV      STCHR,@LPB   ;SEND DAVFU INSTRUCTION
2829 015630 013777 001054 163152      TSTB   @LPS          ;TEST READY
      (1) 015634 100375      BPL     -4            ;WAIT FOR READY
2830 015636 105777 163136      TSTB   @LPS          ;TEST READY
2831 015642 100375      BPL     -4            ;WAIT FOR READY
2832 015644
2833 015644 017737 000260 014460      DL8A:  MOV      @HTABP,MES20A ;SET HEADER MSSG ADDRESS
2834 015652 012737 014404 011470      MOV      #MES20,PRMSG  ;SET HEADER MSG ADDRESS
2835 015660 004437 011452      JSR     %4,RINT       ;PRINT HEADER MESSAGE
2836 015664 013777 001054 163110      DL9:   MOV      STCHR,@LPB ;SEND DAVFU INSTRUCTION
2837 015672 105777 163102      TSTB   @LPS          ;TEST READY
      (1) 015676 100375      BPL     -4            ;WAIT FOR READY
2838 015700 005777 163074      TST     @LPS          ;TEST FOR ERROR
2839 015704 100010      BPL     DL10          ;BRANCH IF OK
2840 015706 012737 000061 001052      ERR61:  MOV      #61, ERRCOUNT ;SET UP ERROR COUNT 61
      (1) 000062      N=N+1
2841 015714 004537 011722      JSR     %5,STAER      ;REPORT ERROR SET

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2842 015720 000000          HALT
2843 015722 000137 015440    JMP      LOAD
2844 015726 017737 000174 014270 DL10:  MOV     @MTABP,MES19 ;RELOAD DAVFU
2845 015734 027727 000164 000001    CMP     @ICTABP,#1 ;SET MESSAGE
2846 015742 001004          BNE     DL10A      ;CHECK IF MAX LINE SLEW
2847 015744 013737 016660 014272    MOV     FS,MES19+2 ;NOT, CONTINUE
2848 015752 000403          BR      DL10B      ;SET MESSAGE
2849 015754 013737 016662 014272 DL10A: MOV     SPSP,MES19+2 ;CONTINUE
2850 015762 012737 014176 011470 DL10B: MOV     @MES18,PRMSG ;SET MESSAGE
2851 015770 004437 011452          JSR     %4,RINT    ;SET MSG ADDRESS
2852 015774 005337 001056          DEC     STRCNT    ;PRINT MESSAGE
2853 016000 001331          BNE     DL9       ;DEC INSTR COUNT
2854 016002 062737 000002 016126    ADD     #2,MTABP  ;FINISH TESTING THIS CHANNEL
2855 016010 062737 000002 016130    ADD     #2,HTABP  ;INC MSG TABLE POINTER
2856 016016 062737 000002 016124    ADD     #2,ICTABP ;INC HEADER MSG TABLE POINTER
2857 016024 005777 000074          TST     @ICTABP  ;INC INSTR COUNT TABLE POINTER
2858 016030 001006          BNE     DL12     ;CHECK INSTR COUNT
2859 016032 012737 016574 016124    MOV     @ICTAB,ICTABP ;RESET TABLE POINTER
2860 016040 012737 016644 016126    MOV     @MTAB,MTABP ;RESET MSG TABLE POINTER
2861 016046 017737 000052 001056 DL12:  MOV     @ICTABP,STRCNT ;GET INSTR COUNT
2862 016054 062737 000002 016122    ADD     #2,ITABP  ;INC INSTR TABLE POINTER
2863 016062 017737 000034 001054    MOV     @ITABP,STRCHR ;GET INSTRUCTION
2864 016070 001254          BNE     DL8       ;CONTINUE IF NOT DONE TEST
2865 016072 013737 016662 014272    MOV     SPSP,MES19+2 ;RESET MESSAGE
2866 016100 032777 010000 162676    BIT     @BIT12,@SWR ;LOOP ON TEST?
2867 016106 001402          BEQ     DLEX     ;LOOP ON TEST
2868 016110 000137 015332          JMP     DAV2     ;RECYCLE PRINTING TESTS
2869 016114 000137 004534    DLEX:  JMP     TEST2
2870
2871 016120 000000          DTABP: 0 ;DATA TABLE POINTER
2872 016122 000000          ITABP: 0 ;INSTRUCTION TABLE POINTER
2873 016124 000000          ICTABP: 0 ;INSTR COUNT TABLE POINTER
2874 016126 000000          MTABP: 0 ;MESSAGE TABLE POINTER
2875 016130 000000          HTABP: 0 ;HEADER MESSAGE TABLE POINTER
2876
2877 ;DATA TABLE FOR DAVFU LOAD
2878
2879 016132 000356    DTAB: 356 ;START LOAD
2880 016134 000077          77 ;HEADER MESSAGES
2881 016136 000000          0
2882 016140 000001          1
2883 016142 000002          2
2884 016144 000005          5
2885 016146 000000          0
2886 016150 000003          3
2887 016152 000010          10
2888 016154 000005          5
2889 016156 000002          2
2890 016160 000001          1
2891 016162 000000          0
2892 016164 000007          7
2893 016166 000000          0
2894 016170 000011          11
2895 016172 000002          2
2896 016174 000005          5
2897 016176 000000          0

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3010 016540 000001
 3011 016542 000000
 3012 016544 000007
 3013 016546 000010
 3014 016550 000001
 3015 016552 000002
 3016 016554 000005
 3017 016556 000000
 3018 016560 000003
 3019 016562 000000
 3020 016564 000001
 3021 016566 000000
 3022 016570 000357
 3023 016572 077777
 3024
 3025
 3026
 3027 016574 000105
 3028 016576 000056
 3029 016600 000042
 3030 016602 000023
 3031 016604 000005
 3032 016606 000001
 3033 016610 000000
 3034
 3035
 3036
 3037 016612 000200
 3038 016614 000201
 3039 016616 000202
 3040 016620 000203
 3041 016622 000204
 3042 016624 000205
 3043 016626 000206
 3044 016630 000207
 3045 016632 000210
 3046 016634 000211
 3047 016636 000212
 3048 016640 000213
 3049 016642 000000
 3050
 3051
 3052
 3053 016644 030440
 3054 016646 031040
 3055 016650 031440
 3056 016652 033040
 3057 016654 032062
 3058 016656 032061
 3059 016660 020063
 3060 016662 020040
 3061
 3062
 3063
 3064
 3065

1
 0
 7
 10
 1
 2
 5
 0
 3
 0
 1
 0
 357
 77777

;STOP LOAD
 ;STOP !!!!!

;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

ICTAB: 105
 56
 42
 23
 5
 1
 0

;END OF TABLE

;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

ITAB: 200	: CHANNEL 1
201	: CHANNEL 2
202	: CHANNEL 3
203	: CHANNEL 4
204	: CHANNEL 5
205	: CHANNEL 6
206	: CHANNEL 7
207	: CHANNEL 8
210	: CHANNEL 9
211	: CHANNEL 10
212	: CHANNEL 11
213	: CHANNEL 12
0	: END OF TABLE

;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE

MTAB: .ASCII / 1/
 .ASCII / 2/
 .ASCII / 3/
 .ASCII / 6/
 .ASCII / 24/
 .ASCII / 14/
 FS: .ASCII / 3 /
 SPSP: .ASCII / /

;SCOPE LOOP ROUTINE

;SET CHARACTER IN SWITCH REGISTER -0.

M06

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 43
DZLPKG.P11 06-APR-77 12:13

SEQ 0077

3067 016664
(1) 016664 022737 000176 001004
(1) 016672 001003
(1) 016674 052777 000100 162116

SCOPE: CMP #176,SWR
BNE +10
BIS #100,ATKS

;S/W SWR ?
;NO- CONTINUE
;ENABLE KEYBOARD INTERRUPT

N06

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 44
DZLPKG.P11 06-APR-77 12:13

SEQ 0078

3069 016702 004437 011506 JSR %4, TYPINT
3070 016706 017737 162072 MOV JSR, SAVE ;FETCH SWITCHES

B07

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 45
DZLPKG.P11 06-APR-77 12:13

SEQ 0079

3072	016714	012737	177574	001036		MOV	#-132, CHRCNT	:SET CHAR COUNT
3073	016722	042737	177400	001050		BIC	#177400,SAVE	:MASK CHARACTER
3074	016730				LDLPX:			
(1)	016730	105777	162044			TSTB	@LPS	:TEST READY
(1)	016734	100375				BPL	-4	:WAIT FOR READY
3075	016736	005777	162036			TST	@LPS	:TEST FOR ERROR

C07

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 46
DZLPKG.P11 06-APR-77 12:13

SEQ 0080

3077	016742	100006				BPL	LPSCOPE		;BRANCH IF NO ERROR
3078	016744	012737	000062	001052	ERR62:	MOV	#62, ERCOUNT		;SET UP ERROR COUNT 62
(1)		000063				N=N+1			
3079									
3080	016752	004537	011722			JSR	%S,STAER		;REPORT ERROR SET
3081	016756	000000				HALT			;HALT ON ERROR
3082	016760	013777	001050	162014	LPSCOPE:MOV		SAVE,ALPB		;LOAD PRINTER BUFFER

3084	016766	032777	004000	162010		BIT	@BIT11,@SWR	: SEND ONLY ONE CHAR?
3085	016774	001402				BEG	LSCO	: NO, BRANCH
3086	016776	000000				HALT		: HALT - WAIT FOR OPERATOR
3087	017000	000731				BR	SCOPE	: NEXT CHAR
3088	017002	000177	000024		LSCO:	JMP	@LOSCOP	: SEND LF?
3089	017006	005237	001036		LSCA:	INC	CHRCNT	: INCREMENT CHAR COUNT
3090	017012	001346				BNE	LDLPX	: CONTINUE IF NOT DONE LINE
3091	017014	012777	000012	161760		MOV	@12,@LPB	: SEND LF
3092	017022	105777	161752			TSTB	@LPS	: TEST READY
(1)	017026	100375				BPL	-4	: WAIT FOR READY
3093	017030	000715				BR	SCOPE	: CONTINUE
3094								
3095								
3096	017032	017006						
3097								
3098								
3099								
3100		000001						

.END

ERR31	004376	1734#							
ERR32	004564	1784#							
ERR33	004642	1793#							
ERR34	005066	1830#							
ERR35	005204	1850#							
ERR36	005444	1891#							
ERR37	005760	1951#							
ERR4	001470	1269#							
ERR40	006244	2006#							
ERR41	006520	2050#							
ERR42	007020	2099#							
ERR43	007312	2148#							
ERR44	007554	2187#							
ERR45	010046	2233#							
ERR46	010314	2274#							
ERR47	010540	2309#							
ERR5	001520	1278#							
ERR50	010732	2342#							
ERR51	011004	2353#							
ERR52	011200	2382#							
ERR53	011436	2444#							
ERR54	014674	2704#							
ERR55	014776	2719#							
ERR56	015076	2732#							
ERR57	015462	2801#							
ERR6	001552	1293#							
ERR60	015530	2810#							
ERR61	015706	2840#							
ERR62	016744	3078#							
ERR7	001576	1302#							
FFSET	003766	1594	1659#						
FFTAB	003710	1593	1634#						
FS	016660	2847	3059#						
FTABE	003764	1619	1656#						
HAMALN	011122	1041	2375#	2395					
HAMX	011306	2398	2400#						
HAMIX	011164	2379#	2393						
HAM2	011172	2380#	2389						
HEDO	012360	2520	2616#						
HED1	012361	2517	2617#						
HSPRT	006646	1037	2080#	2125					
HSO	006770	2094#	2121	2123					
HS00	006754	2089	2092#						
HS00A	006740	2086	2090#						
HS1	007012	2097#	2109	2111	2114				
HS2	007034	2098	2102#						
HS3	007102	2107	2112#						
HS4	007120	2104	2115#						
HS6	007170	2118	2124#						
HTABP	016130	2794#	2833	2855*	2875#				
ICTAB	016574	2795	2859	3027#					
ICTABP	016124	2795#	2796	2845	2856*	2857	2859*	2861	2873#
INDAT	004042	1012	1630	1676#	1684	1696			
INDATT	004214	1678	1703#						
INDATO	004120	1680	1685#						
INDAT1	004202	1692	1697#						

M07

MAINDEC-11-DZLPK-G-D MACY11 27(1006) 06-APR-77 12:14 PAGE 48-B
 DZLPKG.P11 06-APR-77 12:13 CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0090

TYP	011524	972	2459#															
TYPA	011534	2462#	2470	2479														
TYPB	011544	2463	2465#															
TYPD	011572	2469	2471#	2476	2478													
TYPDAT	011636	1547#	1552#	1554#	1555	1556#	1560#	1562#	1563	1564#	1565#	1566	2462#	2465				
		2467	2471	2475#	2477#	2480#												
TYPDO	011600	2472#																
TYPF	011610	2466	2475#															
TYPG	011622	2468	2477#															
TYPINT	011506	1174	1446	1460	1471	1587	1677	1713	1781	1822	1880	1937	1993	2042				
		2081	2176	2208	2294	2376	2453#	2693	2787	3069								
TYPSMR	012264	2538	2577	2584	2586#													
T1A	004706	1802	1804#															
T2A	004662	1797#	1801															
T2B0	005044	1826#	1871															
T2B0A	005052	1827#	1840	1843														
T2B1	005060	1828#	1841	1844														
T2B2	005156	1835	1845#															
T2B2B	005144	1838	1842#															
T2B3	005176	1848#																
T2B4	005226	1854#	1856	1858	1860													
T2B5	005320	1864	1868#															
T3A	004634	1791#	1808															
T5A	004722	1799	1806#	1813														
WORK	001046	1157#	1308#	1322#														
WT	001274	1217#	1220															
WT2	012106	2556#	2557															
WT3	012234	2549	2552	2555	2578#	2579												
XHAM1	011214	2381	2385#															
XHAM1X	011224	2387#																
XSIX	007570	2186	2190#															
.	= 017034	962#	967	970#	976#	980#	982#	986#	991#	999#	1003#	1009#	1018#	1028#				
		1044#	1049#	1055#	1444	1458	1469	1507	1586	1616	1676	1689	1712	1726				
		1780	1810	1821	1846	1869	1879	1905	1916	1936	1966	1992	2018	2041				
		2060	2071#	2080	2116	2160	2175	2181	2194	2207	2242	2281	2293	2323				
		2365	2375	2385	2386	2391	2432	2473	2522	2630#	2634#	2655#	2661#	2692				
		2712	2723	2736	2786	2807	2829	2831	2837	3067	3074	3092						

SENABL	11248	1444	1458	1469	1586	1676	1712	1780	1821	1879	1936	1992	2041	2080	2175
	2207	2293	2375	2692	2786	3067									
SERROR	10898	1239	1244	1255	1264	1269	1278	1293	1302	1312	1317	1324	1337	1342	1345
	1354	1364	1374	1396	1401	1408	1590	1612	1681	1693	1718	1734	1784	1793	1830
	1850	1891	1951	2006	2050	2099	2148	2187	2233	2274	2309	2342	2353	2382	2444
	2704	2719	2732	2801	2810	2840	3078								
SPRINT	10998	1787	1823	1882	1938	1995	2043	2082	2177	2209	2295	2377			
SSETFS	11398	1347	1356	1366	1376	1405	1417	2441	2452						
SWAIT	11108	1507	1616	1689	1726	1810	1846	1869	1905	1916	1966	2018	2060	2116	2160
	2194	2242	2281	2323	2365	2385	2391	2432	2712	2723	2736	2807	2829	2837	3074
	3092														

. ABS. 017034 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

DZLPKG.BIN,DZLPKG.LST/CRF/NL:TOC=DZLPKG.P11
RUN-TIME: 36.9 SECONDS
RUN-TIME RATIO: 51/10=4.8
CORE USED: 9K (17 PAGES)

B08