

**LP11/LP05**

LINE PRINTER TEST  
MD-11-DZLPK-E

EP-DZLPK-E-DL-B  
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**digital**  
MADE IN USA



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CONTENTS

- 1.0 ABSTRACT
- 2.0 REQUIREMENTS
  - 2.1 EQUIPMENT
  - 2.2 STORAGE
  - 2.3 PRELIMINARY PROGRAMS
- 3.0 LOADING PROCEDURE
  - 3.1 METHOD
- 4.0 STARTING PROCEDURE
  - 4.1 CONTROL SWITCH SETTINGS
  - 4.2 STARTING ADDRESS OR ADDRESSES
  - 4.3 PROGRAM AND/OR OPERATOR OPERATION
- 5.0 OPERATING PROCEDURE
  - 5.1 OPERATIONAL SWITCH SETTINGS
  - 5.2 IOT CHANGES
- 6.0 ERRORS
  - 6.1 COMPUTER DETECTED ERRORS
  - 6.2 VISUALLY DETECTED ERRORS



## 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

LPOS DATA PRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER

TELETYPE MODEL 33 OR EQUIVALENT CONSOLE UNIT

### 2.2 STORAGE

MEMORY LOCATIONS 0 - 10 - 14600 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/LP05 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 C IS DOWN BEFORE STARTING THE TEST.

4.2 STARTING ADDRESS OR ADDRESSES

THE INITIAL STARTING ADDRESS TO RUN THE ENTIRE LP11/LP05 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 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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 PAGE 42

- 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 "LPOS 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 DAVFU IS AVAILABLE  
 AND SWITCH 14 IS SET, THE DAVFU 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.

NOTE: IN TEST 1 - SECTION 2 - PRINT SPEED TIMING  
 TEST, SWITCH 0 IS NOT READILY ACCESSIBLE WITH  
 PROCESSORS HAVING A SOFTWARE SWR, SO THIS TEST SHOULD NOT BE  
 RUN IN THE MANUAL MODE.

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 JP LOCATION 174 WITH THE SOFTWARE DISPLAY VALUES AND LOCATION 175 WITH THE SOFTWARE SWITCH VALUES.

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
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 - 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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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. DAYFU 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. DAVFL 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 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 COMPLEMENTARY 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.

## 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 (DIS) 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.

## 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.

710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730

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 FULL LINES OF THE DRUM PATTERN AND THEN SKIPPING FOUR (4) LINES AND PRINTING THAT DRUM LINE. 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:

????-----????  
0000-----0000  
AAAA-----AAAA  
BBBB-----BBBB  
-----  
-----  
ZZZZ-----ZZZZ

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 USING THE DRUM PATTERN 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.



760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776

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.



.TITLE MAINDEC-11-DZLPK-E-D  
:COPYRIGHT (C) 1975,1974 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

:\*\*\*\*\* LP11 LPOS LINE PRINTER TEST \*\*\*\*\*

:AUTHOR: ROBERT BAKER

:LIST OF SWITCH SETTINGS USED IN THIS TEST

SWITCH NO.	DESCRIPTION
15	LOOP ON ERROR IN TEST 1 ONLY !!!
14	OPTIONAL DAVFU 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
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  
000001  
000002  
000003  
000004  
000005  
000006  
000007  
000008  
000009  
000010  
000011  
000012  
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000097  
000098  
000099

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

000000  
000002  
000004

000002  
000000  
000006

.+2  
HALT  
.+2

000000  
000001  
000002  
000003  
000004  
000005  
000006  
000007  
000008  
000009  
000010  
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859	000006	000000	HALT
860	000010	000012	.+2
861	000012	000000	HALT
862	000014	000016	.+2
863	000016	000000	HALT
864	000020	000022	.+2
865	000022	000000	HALT
866	000024	000026	.+2
867	000026	000000	HALT
868	000030	000032	.+2
869	000032	000000	HALT
870	000034	000036	.+2
871	000036	000000	HALT
872	000040	000042	.+2
873	000042	000000	HALT
874	000044	000046	.+2
875	000046	000000	HALT
876	000050	000052	.+2
877	000052	000000	HALT
878	000054	000056	.+2
879	000056	000000	HALT
880	000060	000062	.+2
881	000062	000000	HALT
882	000064	000066	.+2
883	000066	000000	HALT
884	000070	000072	.+2
885	000072	000000	HALT
886	000074	000076	.+2
887	000076	000000	HALT
888	000100	000102	.+2
889	000102	000000	HALT
890	000104	000106	.+2
891	000106	000000	HALT
892	000110	000112	.+2
893	000112	000000	HALT
894	000114	000116	.+2
895	000116	000000	HALT
896	000120	000122	.+2
897	000122	000000	HALT
898	000124	000126	.+2
899	000126	000000	HALT
900	000130	000132	.+2
901	000132	000000	HALT
902	000134	000136	.+2
903	000136	000000	HALT
904	000140	000142	.+2
905	000142	000000	HALT
906	000144	000146	.+2
907	000146	000000	HALT
908	000150	000152	.+2
909	000152	000000	HALT
910	000154	000156	.+2
911	000156	000000	HALT
912	000160	000162	.+2
913	000162	000000	HALT
914	000164	000166	.+2



```

971 000346 000000 HALT
972 000350 000352 .+2
973 000352 000000 HALT
974 000354 000356 .+2
975 000356 000000 HALT
976 000360 000362 .+2
977 000362 000000 HALT
978 000364 000366 .+2
979 000366 000000 HALT
980 000370 000372 .+2
981 000372 000000 HALT
982 000374 000376 .+2
983 000376 000000 HALT

          000030 . =30
988 000030 010046 TYP
989 000032 000340 340

          000042 . =42
994 000042 000000 0

          000046 . =46
997 000046 007670 LOGICAL
998 000052 . =52
999 000052 040000 BIT 14

1000
1001
1002 000100 . =100
1003
1004 000100 002624 LKSRV ;LINE CLOCK SERVICE ROUTINE
1005 000102 000340 340
1006
1007 000104 002634 CONVRT
1008 000106 000340 340
1009
1010 000174 . =174
1011 000174 000000 DISPREG: 0
1012 000176 000000 SWREG: 0
1013
1014 000200 . =200
1015
1016 000200 012706 001000 MOV #1000,%6
1017 000204 000137 001064 JMP SETUP
1018
1019
1020 000300 . =300
1021
1022 000300 000137 003430 JMP INDAT ;START FOR DAVFU TESTS
1023 000304 000137 003600 JMP NCDAT ;ILLEGAL LOAD TEST
1024 000310 000137 012424 JMP DAVFU ;NO STOP BIT - CHANNEL SLEW TEST
1025 000314 000137 013142 JMP DAV2 ;LINE COUNT SLEW TEST
          ;CHANNEL SLEW TEST

```

1027  
1028  
1029  
1030  
1031  
1032  
1033  
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1035  
1036  
1037  
1038  
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1078  
1079  
1080  
1081  
1082

000400 . =400

000400 000137 000204 JMP SWTIME  
000404 000137 000204 JMP KW11L  
000410 000137 000204 JMP KW11P  
000414 000137 000204 JMP SLEWCK

:: MINUTE PRINT SPEED CHECK  
:START FOR USING SWITCH REG FOR TIMING  
:START FOR KW11-L LINE CLOCK  
:START FOR KW11-P LINE CLOCK  
:CHECK TOP OF FORM SWITCH

000600 . =600

000600 012706 001000 MOV #1000,%6  
000604 000137 004066 JMP TEST2  
000610 000137 004312 JMP TEST3  
000614 000137 004650 JMP CHRCHK  
000620 000137 005114 JMP OVRPRT  
000624 000137 005374 JMP PRTCTL  
000630 000137 005656 JMP MLF  
000634 000137 006054 JMP HSPRT  
000640 000137 006360 JMP SNGCHR  
000644 000137 006536 JMP ROTATE  
000650 000137 007014 JMP LFTTR  
000654 000137 007512 JMP HAMALN

:START OF PRINTING TESTS SEQUENCE  
:TEST 2  
:TEST 3  
:TEST 4  
:TEST 5  
:TEST 6  
:TEST 7  
:TEST 8  
:TEST 9  
:TEST 10  
:TEST 11  
:TEST 12

000700 . =700

000700 012737 014552 014606 MOV #LSCA,LOSCOP  
000706 000137 014456 JMP SCOPE

:SEND LF AFTER 132 CHARS

000720 . =720

000720 012737 014456 014606 MOV #SCOPE,LOSCOP  
000726 000137 014456 JMP SCOPE

:NO LF'S SENT IN SCOPE ROUTINE  
:DO SCOPE ROUTINE

001000 . =1000

:LINE PRINTER HARDWARE REGISTERS

001000 177514 LPS: 177514

:STATUS REGISTER  
:BIT 15=ERROR  
:BIT 7=READY  
:BIT 6=INTERRUPT ENABLE

001002 177516 LPB: 177516

:DATA BUFFER REGISTER  
:BITS 0-6=7 BIT ASCII CHARACTER BUFFER  
:BITS 7-15=NOT USED

001004 177570 SWR: 177570

001006 177570 DISPLAY: 177570

001010 177776 PSW: 177776

1083 001012 177566  
 1084 001014 177562  
 1085 001016 177564  
 1086 001020 177560  
 1087 001022 172542  
 1088 001024 172540  
 1089 001026 177546  
 1090 001030 000200  
 1091 001032 000202  
 1092 000240  
 1093 000000  
 1094 000002  
 1095  
 1096  
 1097  
 1098  
 1099  
 1100  
 1101  
 1102  
 1103  
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 1107  
 1108  
 1109  
 1110  
 1111  
 1112  
 1113  
 1114  
 1115  
 1116  
 1117  
 1118  
 1119  
 1120 001034 000000  
 1121 001036 000000  
 1122 001040 000000  
 1123 001042 000000  
 1124 001044 000000  
 1125 001046 000000  
 1126 001050 000000  
 1127 001052 000000  
 1128 001054 000000  
 1129 001056 000000  
 1130 001060 000000  
 1131 001062 000000  
 1132  
 1133  
 1134  
 1135 001064 004437 010030  
 1136 001070 000005  
 1137 001072 013746 000004  
 1138 001076 013746 000006

TPB: 177566  
 TKB: 177562  
 TPS: 177564  
 TKS: 177560  
 CSBR: 172542  
 PLKS: 172540  
 LKS: 177546  
 PTRVEC: .WORD 200  
 PTRPSW: .WORD 202  
 NOP =240  
 N =0  
 M =2

;MACRO FOR SETTING UP ERROR COUNT

.LIST ME

;MACRO FOR PRINTING TEST NUMBER AT START OF TEST

.LIST ME

;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW

.LIST ME

;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

SEGCNT: 0  
 CHRCNT: 0  
 CHRCNT: 0  
 LINCNT: 0  
 CYCCNT: 0  
 WORK: 0  
 SAVE: 0  
 ERCOUNT: 0  
 STRCHR: 0  
 STRCNT: 0  
 LEGCHR: 0  
 NUMCHR: 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)  
 ;



```

1139 001102 012737 001116 000004      MOV      #15,4      ;SET UP TIMEOUT VECTOR
1140 001110 005777 177670      TST      $SWR      ;TRY TO ACCESS HARDWARE SWP
1141 001114 000407      BR       25        ;IF THERE, GO TO 25
1142 001116      ;
1143 001116 012737 000176 001004 15:      MOV      #SWREG,SWR ;POINT TO SOFTWARE SWR
1144 001124 012737 000174 001006      MOV      #DISPREG,DISPLAY ;POINT TO SOFTWARE DISPLAY
1145 001132 022626      CMP      (SP)+,(SP)+ ;RESTORE STACK
1146 001134 012637 000004 25:      MOV      (SP)+,4    ;RESTORE TIMEOUT VECTORS
1147 001140 012637 000006      MOV      (SP)+,6    ;
1148 001144 104000      EMT      +0        ;
1149 001146 010650      MES1     ;TYPE DIAGNOSTIC TITLE
1150 001150 104000      EMT      +0        ;
1151 001152 010701      MES2     ;TYPE RESTART ADDRESS INFO
1152 001154 104000      EMT      +0        ;TYPE MESSAGE
1153 001156 010726      MES3     ;POWER UP
1154 001160 000000      HALT     ;DEPRESS CONTINUE WHEN READY TO START TEST
1155
1156 001162 005777 177612      STP1:    TST      $LPS      ;TEST FOR ERROR
1157 001166 100006      BPL      STP2      ;NO ERROR TEST FOR READY
1158 001170 012737 000000 001052  ERR0:    MOV      #0,      ERCOUNT ;SET UP ERROR COUNT 0
1159 001170 000001      N=N+1
1160 001176 004537 010244      JSR      %5,STAER  ;REPORT ERROR BIT SET
1161 001202 000767      BR       STP1      ;GO TEST FOR ERROR
1162 001204 105777 177570      STP2:    TSTB     $LPS      ;TEST FOR READY
1163 001210 100406      BMI      STP3      ;READY SET OK
1164 001212 012737 000001 001052  ERR1:    MOV      #1,      ERCOUNT ;SET UP ERROR COUNT 1
1165 001212 000002      N=N+1
1166 001220 004537 010244      JSR      %5,STAER  ;REPORT READY NOT SET
1167 001224 000767      BR       STP2      ;GO TEST FOR READY
1168 001226 104000      STP3:    EMT      +0        ;TYPE MESSAGE
1169 001230 010757      MES4     ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1170 001232 000000      HALT     ;DEPRESS CONTINUE WHEN READY
1171 001234      ;
1172 001234 012777 000014 177540  STP4:    MOV      #14,$LPB    ;SEND A "FF" TO THE PRINTER
1173 001242 012777 000015 177532      MOV      #15,$LPB  ;ATTEMPT "FF" BY SENDING A "CR"
1174 001250 005777 177524      TST      $LPS      ;TEST FOR ERROR
1175 001254 100406      BMI      STP5      ;BRANCH IF ERROR SET
1176 001256 012737 000002 001052  ERR2:    MOV      #2,      ERCOUNT ;SET UP ERROR COUNT 2
1177 001256 000003      N=N+1
1178 001264 004537 010244      JSR      %5,STAER  ;REPORT ERROR NOT SET
1179 001270 000761      BR       STP4      ;LOOP ON ERROR
1180 001272 104000      STP5:    EMT      +0        ;TYPE MESSAGE
1181 001274 011070      MES6     ;ERROR SET OK - TURN ON LINE
1182 001276 000000      HALT     ;WAIT FOR OPERATOR
1183
1184 001300 005777 177474      STP5A:   TST      $LPS      ;TEST FOR ERROR
1185 001304 100006      BPL      STP5B     ;NO ERROR CONTINUE
1186 001306 012737 000003 001052  ERR3:    MOV      #3,      ERCOUNT ;SET UP ERROR COUNT 3
1187 001306 000004      N=N+1
1188 001314 004537 010244      JSR      %5,STAER  ;REPORT ERROR SET
1189 001320 000767      BR       STP5A     ;LOOP ON ERROR
1190 001322 105777 177452      STP5B:   TSTB     $LPS      ;TEST READY
1191 001326 100406      BMI      STP5C     ;READY SET OK
1192 001330 012737 000004 001052  ERR4:    MOV      #4,      ERCOUNT ;SET UP ERROR COUNT 4
1193 001330 000005      N=N+1
1194 001336 004537 010244      JSR      %5,STAER  ;REPORT ERROR NOT SET

```

```

1195 001342 000767          BR      STP5B      ;LOOP ON ERROR
1196 001344 104000          STP5C: EMT      +0      ;TYPE MESSAGE
1197 001346 011023          MESS    ;READY SET OK - TRY DRUM GATE SWITCH
1198 001350 000000          HALT    ;DEPRESS CONTINUE WHEN READY
1199
1200 001352 005777 177422          STP6:  TST      @LPS    ;TEST FOR ERROR
1201 001356 100406          BMI      STP7      ;BRANCH IF ERROR SET
1202 001360 012737 000005 001052  ERR5:  MOV      #5,    ERCOUNT ;SET UP ERROR COUNT 5
1203 000006          N=N+1
1204 001366 004537 010244          JSR      %5, STAER  ;REPORT ERROR NOT SET
1205 001372 000767          BR      STP6      ;LOOP ON ERROR
1206 001374 104000          STP7:  EMT      +0      ;TYPE MESSAGE
1207 001376 011070          MESS    ;ERROR SET OK - TURN ON LINE
1208 001400 000000          HALT    ;DEPRESS CONTINUE WHEN READY
1209
1210          ;TEST 1
1211          ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING.
1212
1213          ;IS THE PRINTER FREE OF ERRORS
1214
1215 001402 000005          TEST1: RESET     ;CLEAR THE WORLD
1216 001404 005777 177370          TST      @LPS    ;IS ERROR FLAG CLEAR
1217 001410 100006          BPL     TEST1A   ;ERROR IS CLEAR OK
1218 001412 012737 000006 001052  ERR6:  MOV      #6,    ERCOUNT ;SET UP ERROR COUNT 6
1219 000007          N=N+1
1220 001420 004537 010244          JSR      %5, STAER  ;REPORT ERROR SET
1221 001424 000766          BR      TEST1    ;LOOP ON ERROR
1222
1223          ;IS READY SET (NO ERRORS EXIST)
1224
1225 001426 000005          TEST1A: RESET    ;CLEAR THE WORLD
1226 001430 105777 177344          TSTB    @LPS    ;IS READY SET
1227 001434 100406          BMI     TEST1B   ;READY SET! PRINTER OK
1228 001436 012737 000007 001052  ERR7:  MOV      #7,    ERCOUNT ;SET UP ERROR COUNT 7
1229 000010          N=N+1
1230 001444 004537 010244          JSR      %5, STAER  ;REPORT READY NOT SET
1231 001450 000766          BR      TEST1A   ;LOOP ON ERROR
1232
1233          ;DOES LOADING THE BUFFER RESET READY
1234
1235 001452 005037 001046          TEST1B: CLR      WORK  ;CLEAR COUNTER
1236 001456 012777 000015 177316          MOV     #15, @LPB  ;LOAD CARRIAGE RETURN INTO BUFFER
1237 001464 105777 177310          TSTB    @LPS    ;IS READY CLEAR
1238 001470 100006          BPL     LP1      ;READY IO CLEAR OK!
1239 001472 012737 000010 001052  ERR10: MOV     #10,   ERCOUNT ;SET UP ERROR COUNT 10
1240 000011          N=N+1
1241 001500 004537 010244          JSR      %5, STAER  ;REPORT READY STILL SET
1242 001504 000762          BR      TEST1B   ;LOOP ON ERROR
1243 001506 005777 177266          LP1:   TST      @LPS  ;IS THERE AN ERROR
1244 001512 100006          BPL     LP2      ;NO ERROR CONTINUE
1245 001514 012737 000011 001052  ERR11: MOV     #11,   ERCOUNT ;SET UP ERROR COUNT 11
1246 000012          N=N+1
1247 001522 004537 010244          JSR      %5, STAER  ;REPORT ERROR OCCURRED
1248 001526 000751          BR      TEST1B   ;LOOP ON ERROR
1249 001530 105777 177244          LP2:   TSTB    @LPS  ;IS THE PRINTER STILL BUSY
1250 001534 100411          BMI     TEST1C   ;NO! GO TO NEXT TEST

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1251 001536 005237 001046      INC      WORK      ;YES! GO CHECK FLAGS
1252 001542 001361      BNE     LPI        ;PRINTER STILL BUSY WAIT
1253 001544 012737 000012 001052 ERR12:  MOV     #12,   ERCOUNT ;SET UP ERROR COUNT 12
1254      000013      N=N+1
1255 001552 004537 010244      JSR     %S STAER   ;ERROR REPORT TIME OUT
1256 001556 000735      BR      TEST1B    ;LOOP ON ERROR
1257
1258      ;CHECK INTERRUPT LEVEL OF PRINTER
1259      ;THE PRINTER SHOULD BE AT LEVEL 4
1260
1261      ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
1262
1263 001560 012777 002014 177242 TEST1C: MOV     #INTIC, @PTRVEC ;SET UP INT VECTOR
1264 001566 012777 000340 177236      MOV     #340, @PTRPSW ;SET PRIORITY
1265 001574 005777 177200      TST     @LPS        ;TEST FOR ERROR
1266 001600 100006      BPL     LP3         ;NO ERROR CONTINUE
1267 001602 012737 000013 001052 ERR13:  MOV     #13,   ERCOUNT ;SET UP ERROR COUNT 13
1268      000014      N=N+1
1269 001610 004537 010244      JSR     %S STAER   ;REPORT ERROR SET
1270 001614 000761      BR      TEST1C    ;LOOP ON ERROR
1271 001616 105777 177156      LP3:   TSTB    @LPS ;TST FOR READY
1272 001622 100406      BMI     LP3X       ;READY SET OK
1273 001624 012737 000014 001052 ERR14:  MOV     #14,   ERCOUNT ;SET UP ERROR COUNT 14
1274      000015      N=N+1
1275 001632 004537 010244      JSR     %S STAER   ;REPORT READY NOT SET
1276 001636 000750      BR      TEST1C    ;LOOP ON ERROR
1277 001640
1278 001640 012737 000015 001052 LP3X:  ERR15:  MOV     #15,   ERCOUNT ;SET UP ERROR COUNT 15
1279      000016      N=N+1
1280 001646 012777 000340 177134      MOV     #340, @PSW  ;LOCKUP PROCESSOR
1281 001654 052777 000100 177116      BIS     #100, @LPS  ;SET PRINTER INTO ENABLE
1282 001662 000240      NOP
1283 001664 042777 000100 177106      BIC     #100, @LPS  ;CLEAR PRINTER INT. ENABLE
1284
1285      ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
1286
1287 001672 012737 000016 001052 ERR16:  MOV     #16,   ERCOUNT ;SET UP ERROR COUNT 16
1288      000017      N=N+1
1289 001700 012777 000300 177102      MOV     #300, @PSW  ;SET PROCESSOR PRIORITY LEVEL 6
1290 001706 052777 000100 177064      BIS     #100, @LPS  ;SET PRINTER INT ENABLE
1291 001714 000240      NOP
1292 001716 042777 000100 177054      BIC     #100, @LPS  ;CLEAR PRINTER INT. ENABLE
1293
1294      ;TEST THAT THE PRINTER WILL NOT INT. AT
1295      ;PROCESSOR LEVEL 5
1296
1297 001724 012737 000017 001052 ERR17:  MOV     #17,   ERCOUNT ;SET UP ERROR COUNT 17
1298      000020      N=N+1
1299 001732 012777 000240 177050      MOV     #240, @PSW  ;SET UP PROCESSOR TO LEVEL 5
1300 001740 052777 000100 177032      BIS     #100, @LPS  ;SET PRINTER INT ENABLE
1301 001746 000240      NOP
1302 001750 042777 000100 177022      BIC     #100, @LPS  ;CLEAR INT ENABLE PRINTER OK
1303
1304      ;TEST THAT THE PRINTER WILL NOT INT
1305      ;WHEN THE PROCESSOR IS AT LEVEL 4
1306

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001756 012737 000020 001052 ERR20: MOV      #20,   ERCOUNT      ;SET UP ERROR COUNT 20
001757 000021      N=N+1
001758 012737 000200 177016      MOV      #200, 2PSW      ;SET PROCESSOR TO LEVEL 4
001759 052777 000100 177000      BIS      #100, 2LPS      ;SET PRINTER INT. ENABLE
002000 000240      NOP
002001 042777 000100 176770      BIC      #100, 2LPS      ;CLEAR PRINTER INT ENABLE
002002 000137 002026      JMP      TESTID          ;PRINTER OK CONTINUE

; INTERRUPT HANDLER FOR TESTID
; RESTORE STACK AND REPORT ERROR

002004 002626 010244      INTID:  CMP      (6)+, (6)+      ;RESTORE STACK
002005 004537      JSR      %5, STAER        ;REPORT ERROR
002006 000733      JMP      TESTID          ;RE-ENTER TESTID

; TEST THE ABILITY OF THE PRINTER TO INTERRUPT
; AT PRIORITY LEVEL 4

002026 012777 002140 176774 TESTID: MOV      #INTID, 2PTRVEC  ;SET UP INTERRUPT VECTOR
002027 012777 000340 176770      MOV      #340, 2PTRPSW    ;LOCK UP PRIORITIES
002028 005777 176732      TST      2LPS             ;IS THERE A PRINTER ERROR
002029 100306      BPL      LP4              ;NO! CONTINUE
002030 012737 000021 001052 ERR21: MOV      #21,   ERCOUNT      ;SET UP ERROR COUNT 21
002031 000022      N=N+1
002032 004537 010244      JSR      %5, STAER        ;REPORT PRINTER ERROR
002033 000733      BR      TESTID           ;LOOP ON ERROR
002034 105777 176710 LP4:   TSTB      2LPS             ;IS READY SET
002035 100406      BMI      LPS             ;YES - PRINTER READY
002036 012737 000022 001052 ERR22: MOV      #22,   ERCOUNT      ;SET UP ERROR COUNT 22
002037 000023      N=N+1
002038 004537 010244      JSR      %5, STAER        ;REPORT READY NOT SET
002039 000733      BR      TESTID           ;LOOP ON ERROR
002040 012777 000140 176674 LPS:   MOV      #140, 2PSW      ;SET PRIORITY TO LEVEL 3
002041 002777 000100 176656      BIS      #100, 2LPS      ;SET PRINTER INTERRUPT ENABLE
002042 000240      NOP
002043 012737 000023 001052 ERR23: MOV      #23,   ERCOUNT      ;SET UP ERROR COUNT 23
002044 000024      N=N+1
002045 004537 010244      JSR      %5, STAER        ;REPORT ERROR
002046 000733      BR      TESTID           ;LOOP ON ERROR

; INTERRUPT HANDLER FOR TESTID

002140 022626 000100 176630 INTID:  CMP      (6)+, (6)+      ;RESET STACK
002141 042777 000100 176630      BIC      #100, 2LPS      ;CLEAR INT. ENABLE FOR PRINTER
002142 005077 176634      CLR      2PSW            ;CLEAR PROCESSOR STATUS
002143 012777 012706 176646      MOV      #12706, 2PTRVEC  ;RESET INSTRUCTION AT 200
002144 012777 001000 176642      MOV      #1000, 2PTRPSW   ;RESET INSTRUCTION AT 202

; 1 MINUTE PRINT SPEED CHECK
; IF A KW11-L OR KW11-P ARE NOT AVAILABLE, THE SR BIT0 IS USED
; FOR MANUAL TIMING OF THE PRINTER.

002170 012737 000002 000006 CLCKAV: MOV      #RTI, 206      ;SET TRAP TO RETURN
002171 012737 000006 000004      MOV      #6, 204
002204 000261      SEC
002206 105777 176614      TSTB      2LPS          ;KW11-L AVAILABLE?

```

```

000004 000004 BCS 18 :NO BRANCH
002350 002350 CLR 284 :RESET TRAP VECTOR TO HALT
:SWTIB: SEC 284 :USE KWII FOR TIMING
176572 176572 :KWII-P AVAILABLE?
000004 000004 BCS 2PLKS :NO USE SWITCH REG FOR TIMING
002306 002306 CLR 284 :RESET TRAP VECTOR TO HALT
:SWTIB: SWTIME: CLR 284 :USE KWII-P FOR TIMING
010030 010030 JSR LINCNT :CLEAR LINE COUNT
000004 000004 CLR 284 :RESET TRAP VECTOR TO HALT
134000 134000 FMT +C :TYPE MESSAGE
010435 010435 MESC :PRINT SPEED CHECK USING MANUAL TIMING
000002 002622 MOV 284,DIA :SET DUMMY ADDRESS
000001 176504 18: BIT 284,25WR :START?
002406 002406 BFC 18 :WAIT FOR START
JMP STARD :START PRINTING

:START FOR KWII-P.....
KWII-P: CLR LINCNT :CLEAR LINE COUNT
JSR 24,TYPINT
MOV #1000,%6 :RESET STACK
MOV MINCNT,2CSBR :SET CLOCK COUNT
MOV PLKS,DIA :STORE PLKS ADDRESS
MOV #105,2PLKS :START CLOCK
JMP STARD :START PRINTING

:START FOR KWII-L.....
KWII-L: CLR LINCNT :CLEAR LINE COUNT
JSR 24,TYPINT
MOV #1000,%6 :RESET STACK
MOV MINCNT,CNTR :SET CLOCK COUNT
MOV LKS,DIA :STORE LKS ADDRESS
MOV #100,2LKS :ENABLE CLOCK INTERRUPT

:PRINTING ROUTINE.....
STARD: BIT #BIT13,25WR :CHECK CHAR SET
BNE STARDA :BRANCH IF 96
MOV #140,LEGCHR :LEGAL CHECK
MOV #100,NUMCHR :#CHARS
BR STAROB :CONTINUE
STARDA: MOV #200,LEGCHR :LEGAL CHECK
MOV #140,NUMCHR :#CHARS
STAROB: MOV #132,CHRCNT :SET CHAR COUNT
MOV #PATTB,STRCHR :INITIALIZE TABLE POINTER
STARA: MOV #17,CYC CNT :SET GROUP COUNT
MOV 2STRCHR,CHGEN :GET CHAR FROM TABLE
ADD LINCNT,CHGEN :ADD LINE COUNT
18: CMP LEGCHR,CHGEN :LEGAL CHAR?
BGT STARI :YES, BRANCH
SUB NUMCHR,CHGEN :NO, MAKE LEGAL

```

```

000700 BR 15 :RECHECK CHAR
013777 MOV CHRGEN,ALPB :LOAD BUFFER
001040 176246 STAR1: DEC CHRCNT :DECREMENT CHAR COUNT
001036 BEQ STARED :BRANCH IF DONE LINE
001410 DEC CYCCNT :DECREMENT CYCCLE COUNT
005337 001044 BNE STAR1 :CONTINUE IF NOT DONE GROUP
001367 ADD #2,STRCHR :ADD 2 TO TABLE POINTER
000002 001054 JMP STARA :CONTINUE
002464 STAR1: INC LINCNT :INCREMENT LINE COUNT
001042 STARED: MOV #12,ALPB :SEND LF
000012 176206 TSTB ALPS :TEST READY
135777 BIT #-4 :WAIT FOR READY
130375 BPL -4 :STOP PRINT?
000001 176174 BEQ CONVRT :YES BRANCH
001411 JMP STARD :CONTINUE
002406

```

```

MINCNT: 7020
CNTR: 0
CIA: 2

```

:NOTE -- PLACE 5670 (8) IN MINCNT FOR 50 HZ. LINE FREQUENCY !!!

:LINE CLOCK SERVICE ROUTINE FOR KW11-L

```

005337 002620 LKSRV: DEC CNTR :DECREMENT COUNTER
001410 BEQ CONVRT :EXIT IF 1 MINUTE
000002 RTI :RETURN

```

:ROUTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE

```

042777 000100 177760 CONVRT: BIC #100,CIA :DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
005037 010160 CLR TYPDAT :CLEAR DIGIT COUNT
012703 011450 MOV #MES12,%3 :SET MESSAGE POINTER
002737 000144 001042 15: CMP #100,LINCNT :GREATER THAN 100?
003006 BGT 25 :NO PRINT HUNDRED'S DIGIT
002737 000144 001042 SLB #100,LINCNT :YES SUBTRACT 100
005237 010160 INC TYPDAT :INCREMENT HUNDRED'S DIGIT
000766 BR 15 :CONTINUE CONVERSION
002737 000060 010160 25: ADD #60,TYPDAT :MAKE ASCII
003733 010160 MCVB TYPDAT,(%3)+ :STORE DIGIT
005037 010160 CLR TYPDAT :CLEAR DIGIT COUNTER
002737 000012 001042 35: CMP #10,LINCNT :GREATER THEN 10?
003006 BGT 45 :NO PRINT DIGIT
002737 000012 001042 SJB #10,LINCNT :YES SUBTRACT 10
005237 010160 INC TYPDAT :INCREMENT TEN'S DIGIT
000766 BR 35 :CONTINUE CONVERSION
002737 000060 010160 45: ADD #60,TYPDAT :MAKE ASCII
0113723 010160 MOVB TYPDAT,(%3)+ :STORE DIGIT
013737 001042 010160 MOV LINCNT,TYPDAT :GET ONE'S DIGIT
002737 000060 010160 ADD #60,TYPDAT :MAKE ASCII
0113723 010160 MOVB TYPDAT,(%3)+ :STORE DIGIT
104000 EMT +0 :TYPE MESSAGE
011412 MES11 :TYPE PRINT SPEED
012737 011410 010026 MCV #MES11A,PRTMSG :SET PRINTER MESSAGE ADDRESS

```

```

003004 004437 010010 JSR %4,RINT ;PRINT PRINTER SPEED ON LINE PRINTER
003010 000137 003034 JMP SLEWCK ;NEXT TEST

003014 000040 PAT'B: 40
003016 000117 117
003020 000076 76
003022 000055 55
003024 000134 134
003026 000113 113
003028 000072 72
003032 000051 51

;CHECK TOP OF FORM SWITCH

003034 004437 010030 SLEWCK: JSR %4,TYPINT
003040 004537 007734 JSR %5,PRINT ;INITIALIZE PRINTER
003044 000406 BR SLW ;BRANCH IF OK
003046 012737 000024 001052 ERR24: MOV #24, ERRCOUNT ;SET UP ERROR COUNT 24
;N=N+1

003054 004537 010244 JSR %5,STAER ;REPORT PRINTER NOT READY
003060 000000 HALT ;HALT ON ERROR
003062 012737 003276 001042 SLW: MOV #FFTAB,LINCNT ;LINE COUNT FOR SWITCH SETTING
003070 012704 003354 MOV #FFSET,%4 ;INIT SWITCH SETTING TABLE POINTER
003074 012703 011164 SLWD: MOV #MES9,%3 ;INIT MESSAGE POINTER
003100 012702 011277 MOV #MES10,%2
003104 111413 SLW1: MOVB (%4),(%3) ;PUT SWITCH SETTINGS INTO MESSAGES
003106 111412 MOVB (%4),(%2)
003110 122423 CMPB (%4)+,(%3)+ ;INCREMENT POINTERS
003112 105722 TSTB (%2)+
003114 105714 TSTB (%4)
003116 001372 BNE SLW1 ;DONE MOVING SWITCH SETTINGS TO MSG'S
003120 005224 ;BRANCH IF NOT DONE
003122 104000 INC %4 ;TABLE POINTER SET FOR NEXT SWITCH SETTING
003124 011130 EMT ;TYPE MESSAGE
003126 000000 MES7 ;SET TOP OF FORM SWITCH TO ---
003130 005777 175706 SLW11: TST @LINCNT ;WAIT FOR OPERATOR TO SET SWITCH
003134 001003 BNE SLW1A ;CHECK LINE COUNT
003136 012737 011477 010026 SLW1A: MOV #MES13,PRMSG ;BRANCH IF NOT ZERO
003144 005777 175630 TST @LPS ;CHANGE PRINTER MESSAGE
003150 100006 BPL SLW2 ;TEST FOR ERRORS
003152 012737 000025 001052 ERR25: MOV #25, ERRCOUNT ;BRANCH IF NO ERROR
;SET UP ERROR COUNT 25
;N=N+1

003160 004537 010244 JSR %5,STAER ;REPORT ERROR SET
003164 000000 HALT ;HALT ON ERROR
003166 012777 000014 175606 SLW2: MOV #14,@LPB ;SEND FF
003174 105777 175600 TSTB @LPS ;TEST READY
003200 100375 BPL -4 ;WAIT FOR READY
003202 004437 010010 JSR %4,RINT ;PRINT MESSAGE ON LINE PRINTER
003206 062737 000002 001042 ADD #2,LINCNT ;NEXT LINE COUNT
003214 022737 003352 001042 CMP #FTABE,LINCNT ;DONE TEST?
003222 001410 BEQ DAVAV ;YES, EXIT
003224 005777 175612 TST @LINCNT ;DONE CHECK OF THIS SWITCH SETTING
003230 001721 BEQ SLWD ;YES, NEXT SWITCH SETTING
003232 012737 011202 010026 MOV #MES9,PRMSG ;NO, CHECK THIS SETTING

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1531 003240 000137 003130      JMP      SLW11      :CONTINUE
1532 003244 013737 012412 011164 DAVAV: MOV      TNC13,MESB   :SET MESSAGE
1533 003252 10400C      ENT      +0        :TYPE MESSAGE
1534 003254 011126      MES7A           :RESET TOP OF FORM SWITCH
1535 003256 000000      HALT           :WAIT FOR OPERATOR
1536 003260 032777 040000 175516      BIT      #B:T14,DSWR :DAVFU AVAILABLE?
1537 003266 001060      BNE           :YES, DO DAVFU TESTS
1538 003270 00000C      HALT           :DONE OPERATOR TESTS - HALT
1539 003272 000137 004066      JMP      TEST2    :DEPRESS CONTINUE TO START PRINTING TESTS

003276 000000      FF*AB: 0        :LOOP COUNTS FOR SLEW CHECKS
003300 000022      18.
003302 000000      19.
003304 000025      20.
003306 000000      21.
003310 000030      22.
003312 000000      23.
003314 000041      24.
003316 000000      25.
003320 000044      26.
003322 000000      27.
003324 000052      28.
003326 000000      29.
003328 000060      30.
003330 000000      31.
003332 000063      32.
003334 000000      33.
003336 000000      34.
003338 000102      35.
003340 000000      36.
003342 000000      37.
003344 000110      38.
003346 000000      39.
003348 000124      40.
003350 000000      FTABE: 0

003354 020063 000004      FFSET: .ASCIZ 13 :SWITCH SETTINGS FOR MESSAGES
003356 020064 000006      .ASCIZ 14 .5
003358 020064 000004      .ASCIZ 15 .5
003360 020065 000006      .ASCIZ 16 .5
003362 020066 000004      .ASCIZ 17 .5
003364 020067 000004      .ASCIZ 18 .5
003366 020070 000006      .ASCIZ 19 .5
003368 020070 000006      .ASCIZ 20 .5
003370 020070 000006      .ASCIZ 21 .5
003372 020070 000006      .ASCIZ 22 .5
003374 020070 000006      .ASCIZ 23 .5
003376 020070 000006      .ASCIZ 24 .5
003378 020070 000006      .ASCIZ 25 .5
003380 020070 000006      .ASCIZ 26 .5
003382 020070 000006      .ASCIZ 27 .5
003384 020070 000006      .ASCIZ 28 .5
003386 020070 000006      .ASCIZ 29 .5
003388 020070 000006      .ASCIZ 30 .5
003390 020070 000006      .ASCIZ 31 .5
003392 020070 000006      .ASCIZ 32 .5
003394 020070 000006      .ASCIZ 33 .5
003396 020070 000006      .ASCIZ 34 .5
003398 020070 000006      .ASCIZ 35 .5
003400 020070 000006      .ASCIZ 36 .5
003402 020070 000006      .ASCIZ 37 .5
003404 020070 000006      .ASCIZ 38 .5
003406 020070 000006      .ASCIZ 39 .5
003408 020070 000006      .ASCIZ 40 .5

.EVEN
:CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
003430 004437 010030      INDAT: JSR      %4,TYPINT
003434 012737 003564 001040      MOV      #INDATT,CHRGEN :SET TABLE POINTER
003442 005777 175332      INDC:  TST     JPLS      :TEST FOR ERROR
003446 100010      BPL      INDATO     :BRANCH IF NO ERROR

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1628 003450 012737 000026 001052 ERR26: MOV #26, ERCOUNT ;SET UP ERROR COUNT 26
1629 000027 N=N+1
1630 003456 004537 010244 JSR %5, STAER ;REPORT ERROR SET
1631 000000 HALT ;HALT ON ERROR
1632 003462 000000 JMP INDAT ;RESTART TEST
1633 003464 000137 003430 INDAT: MOV @CHRGEN, @LPB ;LOAD BUFFER
1634 003470 017777 175344 175304 INDATA: ADD #2, CHRGEN ;NEXT DATA
1635 003476 062737 000002 001040 TST @CHRGEN ;TEST CHAR
1636 003504 005777 175330 BEQ INDI ;CONTINUE IF DONE
1637 003510 001405 TSTB @LPS ;TEST READY
1638 003512 105777 175262 BPL -4 ;WAIT FOR READY
1639 003516 100375 JMP INDD
1640 003520 000137 003442 INDD: TST @LPS ;TEST FOR ERROR SET.
1641 003524 005777 175252 INC1: BMI INDATA1 ;BRANCH IF ERROR SET
1642 003530 100410 ERR27: MOV #27, ERCOUNT ;SET UP ERROR COUNT 27
1643 003532 012737 000027 001052 N=N+1
1644 000030 JSR %5, STAER ;REPORT ERROR NOT SET
1645 003540 004537 010244 HALT ;HALT ON ERROR
1646 003544 000000 JMP INDAT ;RESTART TEST
1647 003546 000137 003430 INDATA1: EMT +0 ;TYPE MESSAGE
1648 003552 104000 MESA ;ERROR SET OK - CLEAR & TURN ON LINE
1649 003554 010315 HALT ;WAIT FOR OPERATOR
1650 003556 000000 ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1651 003560 000137 003600 JMP NODAT ;NEXT TEST
1652 003564 000356 INDATA: 356 ;DATA TABLE FOR ABOVE TEST
1653 000001 1
1654 003566 000001 2
1655 003570 000002 3
1656 003572 000003 357
1657 003574 000357 0
1658 003576 000000
;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
1659 003600 004437 010030 NODAT: JSR %4, TYPINT
1660 003604 012737 000200 001054 MOV #200, STCHR ;SET PAPER INSTRUCTION
1661 003612 012737 004066 001040 NODDA: MOV @NODAT3, CHRGEN ;SET TABLE POINTER FOR LOAD
1662 003620 005777 175154 NODO: TST @LPS ;TEST FOR ERROR
1663 003624 100007 BPL NODATO ;BRANCH IF NO ERROR
1664 003626 012737 000030 001052 ERR30: MOV #30, ERCOUNT ;SET UP ERROR COUNT 30
1665 000031 N=N+1
1666 003634 004537 010244 JSR %5, STAER ;REPORT ERROR SET
1667 003640 000000 HALT ;HALT ON ERROR
1668 003642 000756 BR NODAT ;RESTART TEST
1669 003644 017777 175170 175130 NODATO: MOV @CHRGEN, @LPB ;LOAD BUFFER
1670 003652 062737 000002 001040 ADD #2, CHRGEN ;NEXT DATA
1671 003660 022737 004066 001040 CMP @NODAT4+2, CHRGEN ;DONE LOAD?
1672 003666 001405 BEQ NODATA ;BRANCH IF DONE
1673 003670 105777 175104 TSTB @LPS ;TEST READY
1674 003674 100375 BPL -4 ;WAIT FOR READY
1675 003676 000137 003620 JMP NODD
1676 003702 013777 001054 175072 NODATA: MOV STCHR, @LPB ;SEND DATA
1677 003710 005037 001036 CLR CHRCNT ;DELAY
1678 003714 005237 001036 IS: INC CHRCNT
1679 003720 001375 BNE IS
1680 003722 005777 175052 TST @LPS ;TEST FOR ERROR SET

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1643 003726 100410          BMI      NODAT1      :BRANCH IF ERROR SET
1644 003730 012737 000031 001052 ERR31: MOV      #31,   ERCOUNT  ;SET UP ERROR COUNT 31
1645          000032          N=N+1
1646 003736 004537 010244          JSR      %5,STAER  :REPORT ERROR NOT SET
1647 003742 000000          HALT      :HALT ON ERROR
1648 003744 000137 003612          JMP      NODDA     :RETEST
1649 003750 005237 001054          NODAT1: INC      STCHR   :NEXT PAPER INSTRUCTION
1650 003754 022737 000214 001054          CMP      #214,STCHR :DONE TEST?
1651 003762 001404          BEQ     NODAT2    :CONTINUE IF NOT DONE
1652 003764 104000          MVA     +0        :TYPE MESSAGE
1653 003766 010362          MESSB   :ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1654 003770 000000          HALT      :WAIT FOR OPERATOR
1655 003772 000707          BR      NODDA     :RELOAD & TEST NEXT CHANNEL
1656 003774 104000          NODAT2: EMT      +C    :TYPE MESSAGE
1657 003776 010315          MESA    :ERROR SET OK - TURN ON LINE
1658 004000 000000          HALT      :
1659 004002 000137 004066          JMP     TEST2     ;JUMP
1660
1661          NODAT3: 356          :START LOAD
1662 004006 000356
1663 004010 000000
1664 004012 000000
1665 004014 000000
1666 004016 000000
1667 004018 000000
1668 004020 000000
1669 004022 000000
1670 004024 000000
1671 004026 000000
1672 004030 000000
1673 004032 000000
1674 004034 000000
1675 004036 000000
1676 004040 000000
1677 004042 000000
1678 004044 000000
1679 004046 000000
1680 004050 000000
1681 004052 000000
1682 004054 000000
1683 004056 000000
1684 004060 000000
1685 004062 000000
1686 004064 000357          NODAT4: 357          ;STOP LOAD
1687
1688          :TEST 2
1689          :TESTS INTERFACE AND PRINTER DATA PATHS
1690          :WITH ALTERNATING ONES AND ZEROS
1691 004066 004437 010030          TEST2: JSR      %4,TYPINT
1692 004072 004537 007704          JSR      %5,PRINT  :INITIALIZE PRINTER
1693 004076 000406          BR      TST2AX    :BRANCH IF OK
1694 004100 012737 000032 001052 ERR32: MOV      #32,   ERCOUNT  ;SET UP ERROR COUNT 32
1695          000033          N=N+1
1696 004106 004537 010244          JSR      %5,STAER  :REPORT PRINTER NOT READY
1697 004112 000000          HALT      :HALT ON ERROR
1698 004114          TST2AX:

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1699 004114 013737 012370 011724 MOV TNO2,MES15 ;SET TEST NUMBER FOR MESSAGE
1700 004122 004437 007760 JSR %4,PRNNT ;PRINT TEST NUMBER
1701 000003 M=M+1
1702 004126 012737 177740 001044 MOV #32,CYCCNT ;SET UP LINE COUNT FOR 32 LINES
1703 004134 012737 177574 001036 MOV #132,CHRCNT ;SET CHAR COUNT TO 132
1704 004142 013737 004216 001054 MOV SCHRSW,STRCHR ;SET CHAR. SWITCH TO J
1705 004150 005777 174624 T3A: TST ALPS ;TEST FOR ERROR
1706 004154 000006 BPL LP2B ;NO ERROR CONTINUE
1707 004156 012737 000033 001052 ERR33: MOV #33, ERCOUNT ;SET UP ERROR COUNT 33
1708 000034 N=N+1
1709 004164 004537 010244 JSR %5,STAER ;REPORT ERROR SET
1710 004170 000000 HALT ;HALT ON ERROR
1711 004172 000177 174656 LP2B: JMP @STRCHR ;LOAD CHAR
1712 004176 013737 004220 001054 T2A: MOV RCHRSW,STRCHR ;RESET CHAR. SWITCH
1713 004182 012737 000125 001050 MOV #125,SAVE ;STORE CHAR
1714 000137 004236 JMP SA ;LOAD CHAR
1715 004216 004176 SCHRSW: T2A
1716 004220 004222 RCHRSW: T1A
1717 004222 013737 004216 001054 T1A: MOV SCHRSW,STRCHR ;SET CHAR. SWITCH TO U
1718 004224 012737 000052 001050 MOV #52,SAVE ;STORE CHAR
1719 004226 013777 001050 174536 T5A: MOV SAVE,ALPB ;LOAD BUFFER
1720 004234 005237 001036 INC CHRCNT ;INC CHARACTER COUNT
1721 004250 001237 BNE T3A ;CONTINUE
1722 004252 012777 000012 174522 MOV #12,ALPB ;SEND LF
1723 004260 105777 174514 TSTB ALPS ;TEST READY
1724 004264 100375 BPL -4 ;WAIT FOR READY
1725 004266 012737 177574 001036 MOV #132,CHRCNT ;RESET CHAR COUNT
1726 004274 005237 001044 INC CYCCNT ;INC CYCLE COUNT
1727 004300 001356 BNE T5A ;CONTINUE IF NOT DONE
1728 004302 032777 010000 174474 BIT @BIT12,ASMR ;LOOP ON TEST?
1729 004310 001266 BNE TEST2 ;LOOP
1730 :TEST 3
1731 :TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1732 :ALL CHARACTERS AND ILLEGAL CHARACTERS
1733
1734
1735
1736
1737 004312 004437 010030 TEST3: JSR %4,TYPINT
1738 004316 013737 012372 011724 MOV TNO3,MES15 ;SET TEST NUMBER FOR MESSAGE
1739 004324 004437 007760 JSR %4,PRNNT ;PRINT TEST NUMBER
1740 000004 M=M+1
1741 004330 012737 177765 001044 MOV #13,CYCCNT ;SET 21 LINES
1742 004336 000137 004470 JMP LP2H ;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1743 004342 012737 177574 001036 T2B0: MOV #132,CHRCNT ;SET CHAR COUNT FOR 132
1744 004350 012737 000040 001040 T2B0A: MOV #40,CHRGEN ;SET FIRST CHAR.
1745 004356 005777 174416 T2B1: TST ALPS ;DOES THE PRINTER HAVE AN ERROR
1746 004362 100006 BPL LP2E ;BRANCH IF NO ERROR
1747 004364 012737 000034 001052 ERR34: MOV #34, ERCOUNT ;SET UP ERROR COUNT 34
1748 000035 N=N+1
1749 004372 004537 010244 JSR %5,STAER ;REPORT ERROR
1750 004376 000000 HALT ;HALT ON ERROR
1751 004400 013777 001040 174374 LP2E: MOV CHRGEN,ALPB ;PRINT CHARACTER
1752 004406 005237 001036 INC CHRCNT ;INC. CHAR. COUNT
1753 004412 001420 BEQ T2B2 ;BRANCH IF LINE IS FINISHED
1754 004414 005237 001040 INC CHRGEN ;NEXT CHAR

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1755 004420 032777 020000 174356 BIT #BIT13,DSWR ;CHECK CHAR SET
1756 004426 001405 BEQ T2B2B ;BRANCH IF 64 CHARS
1757 004430 022737 000200 001040 CMP #200,CHRGEN ;LEGAL CHAR?
1758 004436 001744 BEQ T2B0A ;MAKE SPACE IF ILLEGAL
1759 004440 000746 BR T2B1 ;CONTINUE IF LEGAL CHAR
1760 004442 022737 000140 001040 T2B2B: CMP #140,CHRGEN ;LEGAL CHAR?
1761 004450 001737 BEQ T2B0A ;MAKE SPACE IF ILLEGAL
1762 004452 000746 BR T2B1 ;CONTINUE IF LEGAL CHAR
1763 004454 012777 000012 174320 T2B2: MOV #12,ALPB ;ISSUE LINE FEED
1764 004462 105777 174312 TSTB ALPS ;TEST READY
1765 004466 100375 BPL .-4 ;WAIT FOR READY
1766 004470 005037 001040 LP24: CLR CHRGEN ;FIRST ILLEGAL CHAR
1767 004474 005777 174300 T2B3: TST ALPS ;TEST FOR ERROR
1768 004500 100006 BPL LDCH ;BRANCH IF NO ERROR
1769 004502 012737 000035 001052 ERR35: MOV #35, ERRCOUNT ;SET UP ERROR COUNT 35
1770 004510 004537 010244 JSR %5,STAER ;REPORT ERROR SET
1771 004514 000000 HALT ;HALT ON ERROR
1772 004516 013777 001040 174256 LDCH: MOV CHRGEN,ALPB ;TRANSMIT CHARACTER
1773 004524 005237 001040 T2B4: INC CHRGEN ;NEXT CHAR
1774 004530 022737 000012 001040 CMP #12,CHRGEN ;TEST FOR LINE FEED
1775 004536 001772 BEQ T2B4 ;SKIP IF LF
1776 004540 022737 000014 001040 CMP #14,CHRGEN ;TEST FOR FORM FEED
1777 004546 001766 BEQ T2B4 ;SKIP IF FF
1778 004550 022737 000015 001040 CMP #15,CHRGEN ;TEST FOR CARRIAGE RETURN
1779 004556 001762 BEQ T2B4 ;SKIP IF CR
1780 004560 023727 001040 000040 CMP CHRGEN,#40 ;CHECK IF LEGAL CHAR
1781 004566 002753 BLT LDCH ;CONTINUE IF STILL ILLEGAL CHAR
1782 004570 032777 020000 174206 BIT #BIT13,DSWR ;CHECK CHAR SET
1783 004576 001007 BNE T2B5 ;BRANCH IF 96 CHAR SET
1784 004600 052737 000100 001040 BIS #100,CHRGEN ;SET BIT 7 IF NOT SET
1785 004606 032737 000200 001040 BIT #200,CHRGEN ;DONE ILLEGAL CHARS?
1786 004614 001740 BEQ LDCH ;BRANCH IF NOT DONE
1787 004616 012777 000012 174156 T2B5: MOV #12,ALPB ;ISSUE LINE FEED
1788 004624 105777 174150 TSTB ALPS ;TEST READY
1789 004630 100375 BPL .-4 ;WAIT FOR READY
1790 004632 005237 001044 INC CYCCNT ;INCREMENT LINE COUNT
1791 004636 001241 BNE T2B0 ;CONTINUE IF NOT DONE
1792 004640 032777 010000 174136 BIT #BIT12,DSWR ;CHECK TO LOOP ON TEST
1793 004646 001221 BNE TEST3 ;LOOP
1794
1795
1796 ;TEST 4
1797 ;OVER PRINT TEST
1798 ;OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES
1799
1800 004650 004437 010030 CHRCHK: JSR %4,TYPINT
1801 004654 013737 012374 011724 MOV TN04,MES15 ;SET TEST NUMBER FOR MESSAGE
1802 004662 004437 007760 JSR %4,PRNNT ;PRINT TEST NUMBER
1803 004666 000005 M=M+1
1804 004674 012737 177750 001042 MOV #-24,.LINCNT ;SET UP LINE COUNT FOR 24 LINES
1805 004674 012737 177776 001044 MOV #-2,CYCCNT ;SET UP CYCLE COUNT
1806 004702 013737 005044 001054 MOV CHR,STRCHR ;SET CHAR TAG TO SPACE
1807 004710 012737 177574 001036 CR: MOV #-132.,CHRCNT ;SET CHAR COUNT
1808 004716 005777 174056 CR0: TST ALPS ;TEST FOR ERROR
1809 004722 100006 BPL CR1 ;CONTINUE IF NO ERROR
1810 004724 012737 000036 001052 ERR36: MOV #36, ERRCOUNT ;SET UP ERROR COUNT 36

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1811      000037      N=N+1
1812 004732 004537 010244      JSR      %5,STAER      ;REPORT ERROR SET
1813 004736 000000      HALT      ;HALT ON ERROR
1814 004740 000177 174110      CR1: JMP      @STRCHR      ;OPPOSITE CHAR
1815 004744 013737 005044 001054 CR2: MOV      CHRE,STRCHR ;SET CHAR SWITCH TO SPACE
1816 004752 012737 000195 001053      MOV      #105,SAVE     ;SEND E
1817 004760 013777 001050 174014 CR3: MOV      SAVE,@LPB  ;LOAD BUFFER
1818 004766 005237 001036      INC      CHRCNT        ;INCREMENT CHAR COUNT
1819 004772 001351      BNE      CR0           ;BRANCH IF NOT DONE
1820 004774 005237 001044      INC      CYCCNT        ;INCREMENT CYCLE COUNT
1821 005000 001422      BEQ      CR5           ;BRANCH IF FINISHED OVERPRINTS
1822 005002 012777 000015 173772      MOV      #15,@LPB     ;SEND CR
1823 005010 105777 173764      TSTB    @LPS          ;TEST READY
1824 005014 100375      BPL      -4           ;WAIT FOR READY
1825 005016 000137 004710      JMP      CR            ;OVERPRINT LINE
1826 005022 013737 005042 001054 CR7: MOV      CHRS,STRCHR ;RESET CHAR SWITCH
1827 005030 012737 000040 001050      MOV      #40,SAVE     ;SEND SPACE
1828 005036 000137 004760      JMP      CR3          ;CONTINUE
1829 005042 004744      CHRS: CR2
1830 005044 005022      CHRE: CR7
1831 005046 012777 000012 173726 CR5: MOV      #12,@LPB  ;SEND LF
1832 005054 105777 173720      TSTB    @LPS          ;TEST READY
1833 005060 100375      BPL      -4           ;WAIT FOR READY
1834 005062 012737 177776 001044      MOV      #-2,CYCCNT   ;RESET CYCLE COUNT
1835 005070 012737 177574 001036      MOV      #-132,CHRCNT ;RESET CHAR COUNT
1836 005076 005237 001042      INC      LINCNT        ;INCREMENT LINE COUNT
1837 005102 001326      BNE      CR3          ;BRANCH IF NOT DONE
1838 005104 032777 010000 173672      BIT      @BIT12,@SWR  ;LOOP ON TEST?
1839 005112 001256      BNE      CHRCHK       ;YES. LOOP

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```

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

```

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1850 005114 004437 010030      OVRPRT: JSR      %4,TYPINT
1851 005120 013737 012376 011724      MOV      TN05,MESIS   ;SET TEST NUMBER FOR MESSAGE
1852 005126 004437 007760      JSR      %4,PRNNT     ;PRINT TEST NUMBER
1853 005132 000006      M=M+1
1854 005132 012737 177760 001042      MOV      #-16,LINCNT  ;SET LINE COUNT FOR 16 LINES
1855 005140 012737 177574 001036 OVR: MOV      #-132,CHRCNT ;SET CHAR COUNT
1856 005146 012737 177776 001044 OVR0: MOV      #-2,CYCCNT  ;SET CYCLE COUNT FOR A PAIR OF E'S
1857 005154 013737 001036 001056      MOV      CHRCNT,STRCNT ;NO. CHARS LEFT TO PRINT
1858 005162 062737 000205 001056      ADD      #133,STRCNT  ;NO. SPACES +1
1859 005170 012737 000040 001040      MOV      #40,CHRCNT  ;SEND SPACE
1860 005176 000406      BR      OVR2          ;BRANCH
1861 005200 012737 000105 001040 OVR4: MOV      #105,CHRCNT ;SEND E
1862 005206 013777 001040 173566 OVR1: MOV      CHRCNT,@LPB ;LOAD BUFFER
1863 005214 005777 173560 OVR2: TST      @LPS      ;TEST FOR ERROR
1864 005220 100006      BPL      OVR3         ;BRANCH IF NO ERROR
1865 005222 012737 000037 001052 ERR37: MOV      #37,ERCOUNT ;SET UP ERROR COUNT 37
1866 000040      N=N+1

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1867	005230	004537	010244		JSR	%5, STAER		:REPORT ERROR SET
1868	005234	000000			HALT			
1869	005236	005337	001056	OVR3:	DEC	STRCNT		:DECREMENT SPACE COUNTER
1870	005242	003361			BGT	OVR1		:BRANCH IF NOT DONE SPACES
1871	005244	001755			BEQ	OVR4		:BRANCH IF NOT FIRST E
1872	005246	005237	001036		INC	CHRCNT		:INCREMENT CHAR COUNT
1873	005252	001437			BEQ	OVR8		:BRANCH IF DONE LINE
1874	005254	005237	001044	OVR5:	INC	CYCCNT		:INCREMENT CYCLE COUNT
1875	005260	001352			BNE	OVR1		:CONTINUE SENDING E'S IF NOT DONE
1876	005262	012777	000015	173512	MOV	#15,ALPB		:SEND CR
1877	005270			OVR6:				
1878	005270	105777	173504		TSTB	ALPS		:TEST READY
1879	005274	100375			BPL	-4		:WAIT FOR READY
1880	005276	005737	001036		TST	CHRCNT		:LINE DONE?
1881	005302	001321			BNE	OVR0		:NO, CONTINUE OVER PRINT
1882	005304	005237	001042		INC	LINCNT		:YES, INCREMENT LINE COUNT
1883	005310	001425			BEQ	OVR2		:EXIT IF DONE TEST
1884	005312	032737	000001	001042	BIT	#1,LINCNT		:WHICH LINE NEXT?
1885	005320	001707			BEQ	OVR		:BRANCH TO SEND E'S
1886	005322	012737	000115	001040	MOV	#115,CHRCNT		:SET UP TO SEND M'S
1887	005330	012737	177573	001036	MOV	#-133,CHRCNT		:SET CHAR COUNT
1888	005336	005037	001056		CLR	STRCNT		:CLEAR SPACE COUNT
1889	005342	005037	001044		CLR	CYCCNT		:CLEAR CYCLE COUNT
1890	005346	000137	005214		JMP	OVR2		:PRINT LINE OF M'S
1891	005352	012777	000012	173422	OVR8:	MOV	#12,ALPB	:SEND LF
1892	005360	000137	005270		JMP	OVR6		:CONTINUE
1893	005364	032777	010000	173412	OVR2:	BIT	#BIT12,ALPB	:LCOP ON TEST?
1894	005372	001250			BNE	OVRPRT		:LOOP
1895								
1896								
1897								
1898								
1899								
1900								
1901	005374	004437	010030		PRTCTL:	JSR	%4,TYPINT	
1902	005400	013737	012400	011724	MOV	TN06,MES15		:SET TEST NUMBER FOR MESSAGE
1903	005406	004437	007760		JSR	%4,PRNNT		:PRINT TEST NUMBER
1904		000007				M=M+1		
1905	005412	012737	000060	001054	MOV	#60,STRCHR		:FIRST START CHAR
1906	005420	032777	020000	173356	PRT0:	BIT	#BIT13,ALPB	:TEST FOR CHAR SET
1907	005426	001404			BEQ	PRT1		:BRANCH IF 64 CHARS
1908	005430	012737	177641	001034	MOV	#-95,SEGCNT		:SET OVERFLOW COUNT
1909	005436	000403			BR	PRT2		:BRANCH
1910	005440	012737	177701	001034	PRT1:	MOV	#-63,SEGCNT	:SET OVERFLOW COUNT
1911	005446	012737	177574	001036	PRT2:	MOV	#-132,CHRCNT	:SET CHAR COUNT
1912	005454	013737	001054	001040	MOV	STRCHR,CHRCNT		:GET START CHAR
1913	005462	005777	173312		PRT3:	TST	ALPS	:TEST FOR ERROR
1914	005466	100006			BPL	PRT4		:BRANCH IF NO ERROR
1915	005470	012737	000040	001052	ERR40:	MOV	#40, ERCOUNT	:SET UP ERROR COUNT 40
1916		000041				N=N+1		
1917	005476	004537	010244		JSR	%5, STAER		:REPORT ERROR SET
1918	005502	000000			HALT			:HALT ON ERROR
1919	005504	013777	001040	173270	PRT4:	MOV	CHRCNT,ALPB	:LOAD BUFFER
1920	005512	005237	001036		INC	CHRCNT		:INCREMENT CHAR COUNT
1921	005516	002761			BLT	PRT3		:BRANCH IF NOT 132 CHARS
1922	005520	001433			BEQ	PRTA		:START OVERFLOW

:TEST 6  
 :PRINT CONTROL TEST  
 :SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET  
 :SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED

M03

MAINDEC-11-DZLPK-E-D MACY11 27(732) 27-SEP-76 10:57 PAGE 74  
DZLPKE.F11

1923 035522 035237 001040

INC CHRGEN

:NEXT CHAR

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1924 005526 005237 001034      INC      SEGCNT      ; INCREMENT OVERFLOW COUNT
1925 005522 001353      BNE      PRT3      ; CONTINUE IF NOT DONE
1926 005534 012777 000012 173240      MOV      #12, QLPB ; SEND LF
1927 005542 105777 173232      TSTB     QLP5      ; TEST READY
1928 005546 100375      BPL      .-4       ; WAIT FOR READY
1929 005550 022737 000040 001054      CMP      #40, STRCHR ; LAST START CHAR SPACE?
1930 005556 001421      BEQ      PRT6      ; YES BRANCH
1931 005550 022737 000065 001054      CMP      #65, STRCHR ; LAST START CHAR 5?
1932 005566 001422      BEQ      PRT7      ; YES BRANCH
1933 005570 022737 000071 001054      CMP      #71, STRCHR ; DONE?
1934 005576 001423      BEQ      PRT8      ; YES
1935 005600 005237 001054      INC      STRCHR     ; NO, GET NEXT START CHAR
1936 005604 000137 005420      JMP      PRT0      ; CONTINUE
1937 005610 012737 000041 001040 PRTA:     MOV      #41, CHGEN ; GET FIRST CHAR IN SET
1938 005616 000137 005462      JMP      PRT3      ; START OVERFLOW
1939 005622 012737 000066 001054 PRT6:     MOV      #66, STRCHR ; SET START CHAR TO 6
1940 005630 000137 005420      JMP      PRT0      ; CONTINUE
1941 005634 012737 000040 001054 PRT7:     MOV      #40, STRCHR ; SET START CHAR TO SPACE
1942 005642 000137 005420      JMP      PRT0      ; CONTINUE
1943 005646 032777 010000 173130 PRT8:     BIT      #BIT12, QSWR ; CHECK LOOP ON TEST
1944 005654 001247      BNE      PRTCTL    ; LOOP
1945
1946
1947
1948      ; TEST 7
1949      ; MULTIPLE LINE ADVANCE TEST
1950      ; TESTS MULTIPLE LINE ADVANCES AND TIMINGS
1951      ; PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER
1952
1953 005656 004437 010030      M_LF:    JSR      %4, TYPINT
1954 005662 012737 012402 011724      MOV      TNC7, MES15 ; SET TEST NUMBER FOR MESSAGE
1955 005670 004437 007760      JSR      %4, PRNNT ; PRINT TEST NUMBER
1956      M=M+1
1957 005674 012737 006026 001054      MOV      #TABSTR, STRCHR ; FIRST CHAR
1958 005702 012737 177574 001036 MLFA:     MOVB    #-132, CHRCNT ; SET CHAR COUNT
1959 005710 117737 173140 001040      MOVB    #STRCHR, CHGEN ; GET CHAR
1960 005716 001452      BEQ      M_LF4     ; BRANCH IF DONE
1961 005720 005777 173054      MLFO:    TST      QLP5 ; TEST FOR ERROR
1962 005724 100006      BPL      MLF1      ; CONTINUE IF NO ERROR
1963 005726 012737 000041 001052 ERR41:   MOV      #41, ERRCOUNT ; SET UP ERROR COUNT 41
1964      N=N+1
1965 005734 004537 010244      JSR      %5, STAER ; REPORT ERROR
1966 005740 000000      HALT     ; HALT ON ERROR
1967 005742 013777 001040 173032 MLF1:    MOV      CHGEN, QLPB ; LOAD BUFFER
1968 005750 005237 001036      INC      CHRCNT    ; INCREMENT CHAR COUNT
1969 005754 001361      BNE      MLFO      ; CONTINUE
1970 005756 117737 173072 001042      MOVB    #STRCHR, LINCNT ; GET ASCII LINE COUNT
1971 005764 042737 177770 001042      BIC     #177770, LINCNT ; MAKE OCTAL
1972 005772 005237 001042      INC      LINCNT    ; ADD 1
1973 005776 012777 000012 172776 MLF2:    MOV      #12, QLPB ; SEND LF
1974 006004 105777 172770      TSTB     QLP5      ; TEST READY
1975 006010 100375      BPL      .-4       ; WAIT FOR READY
1976 006012 005337 001042      DEC      LINCNT    ; DECREMENT LINE COUNT
1977 006016 001367      BNE      MLF2      ; CONTINUE
1978 006020 005237 001054      INC      STRCHR     ; NEXT CHAR

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006024 000726 BR MLFA ;CONTINUE
006026 033462 033062 033463 TABSTR: .ASCIZ '272637463540'
006034 033064 032463 033064
006042 000
006044 .EVEN
006044 032777 010000 172732 MLF4: BIT #BIT12, QSWR ;CHECK LOOP ON TEST
006052 001301 BNE MLF ;LOOP
.EVEN
;TEST 8
;HIGH SPEED PRINT TEST
006054 004437 010030 HSFRT: JSR %4, TYPINT
006060 013737 012404 011724 MOV TNO10, MES15 ;SET TEST NUMBER FOR MESSAGE
006066 004437 007760 JSR %4, PRNT ;PRINT TEST NUMBER
006074 000011 M=M+1
006074 032777 020000 172704 BIT #BIT13, QSWR ;CHECK CHAR SET
006082 001301 BNE HS00A ;BRANCH IF '96' CHAR SET
006090 012737 000140 001060 MOV #140, LEGCHR ;LEGAL CHK
006098 012737 000100 001062 MOV #100, NUMCHR ;#CHARS
006106 004437 BR HS00 ;CONTINUE
006114 012737 000200 001060 HS00A: MOV #200, LEGCHR ;LEGAL CHECK
006122 012737 000140 001062 MOV #140, NUMCHR ;#CHARS
006130 012737 000040 001054 HS00: MOV #40, STRCHR ;SET JP FIRST LINE
006138 012737 000177 001042 HS0: MOV #127, LINCNT ;SET LINE COUNT FOR 2 PAGES
006146 012737 177574 001036 HS0: MOV #-132, CHRCNT ;SET CHAR COUNT
006154 012737 177757 001044 HS0: MOV #-17, CYCCNT ;SET GROUP COUNT
006162 013737 001054 001040 HS1: MOV STRCHR, CHRGEN ;STORE START CHAR
006170 000006 TST QLPB ;TEST FOR ERROR
006178 012737 000042 001052 ERR42: MOV #42, ERRCOUNT ;BRANCH IF NO ERROR
006186 000042 M=M+1 ;SET UP ERROR COUNT 42
006194 004437 010244 JSR %5, STAER ;REPORT ERROR SET
006202 000000 HALT ;HALT ON ERROR
006210 013777 001040 172560 HS2: MOV CHRGEN, QLPB ;LOAD BUFFER
006218 005237 001036 INC CHRCNT ;INCREMENT CHAR COUNT
006226 001424 BEQ HS4 ;BRANCH IF DONE LINE
006234 005237 001040 INC CHRGEN ;NEXT CHAR
006242 005237 001044 INC CYCCNT ;INCREMENT GROUP COUNT
006250 001410 BEQ HS3 ;BRANCH IF DONE GROUP
006258 023737 001060 001040 HS3: CMP LEGCHR, CHRGEN ;LEGAL CHAR?
006266 001350 BNE HS1 ;BRANCH AND CONTINUE IF LEGAL CHAR
006274 163737 001062 001040 HS3: SUB NUMCHR, CHRGEN ;MAKE LEGAL
006282 000744 BR HS1 ;CONTINUE
006290 013737 001054 001040 HS3: MOV STRCHR, CHRGEN ;GET FIRST CHAR IN GROUP
006298 012737 177757 001044 HS3: MOV #-17, CYCCNT ;RESET CYCLE COUNT
006306 000735 BR HS1 ;CONTINUE
006314 012777 000012 172474 HS4: MOV #12, QLPB ;SEND LF
006322 105777 172466 TSTB QLPB ;TEST READY
006330 100375 BPL ;WAIT FOR READY
006338 005337 001042 DEC LINCNT ;DECREMENT LINE COUNT
006346 002413 BLT HS6 ;EXIT TEST IF DONE
006354 162737 000004 001054 SUB #4, STRCHR ;SKIP 4 LINES ON DRUM. FIND START CHAR

```

```

000040 001054      CMP      #40,STRCHR      ; START CHAR A LEGAL CHAR?
000100 001054      BLE      HS0              ; CONTINUE IF LEGAL START CHAR
000100 001054      MOO      #100,STRCHR    ; MAKE LEGAL AND CONTINUE
000300 172426      BR       HS0              ; CONTINUE
000300 172426      HS6:   BIT      #BIT12,BSWR    ; LOOP ON TEST?
000300 172426      BNE      HSPRT          ; LOOP

:TEST 9
:WORST CASE NOISE TEST
:SINGLE CHAR. ACROSS ALL COLS.

000330 004437      SNGCHR: JSR      %4,TYPINT
000330 012406      MOV      TN011,MES15    ; SET TEST NUMBER FOR MESSAGE
000330 007760      JSR      %4,PRNT       ; PRINT TEST NUMBER
000330 000012      M=M+1
000330 032777      BIT      #BIT13,BSWR    ; TEST CHAR SET
000330 001404      BEQ      S2            ; BRANCH IF 64
000330 177640      MOV      #96,,LINCNT   ; 96 CHAR.
000330 001042      BR       .+10          ; BRANCH
000330 001042      S2:   MOV      #64,,LINCNT ; 64 CHAR.
000330 001040      MOV      #40,CHRCNT   ; SET UP SPACE
000330 001036      S2A:  MOV      #132,,CHRCNT ; SET CHAR COUNT FOR 132
000330 172334      S1:   TST      #LPS      ; TEST FOR ERRORS
000330 100006      BPL      XSIX          ; BRANCH IF NO ERRORS
000330 000043      ERR43: MOV      #43, ERCCOUNT ; SET UP ERROR COUNT 43
000330 000044      N=N+1
000330 004537      JSR      %5,STAER      ; REPORT ERROR
000330 000000      HALT
000330 013777      XSIX:  MOV      CHRCNT,#LPS ; LOAD PRINTER BUFFER
000330 001040      INC      CHRCNT        ; INCREMENT CHAR COUNT
000330 001036      BNE      S1            ; CONTINUE IF NOT DONE LINE
000330 000012      S4X2:  MOV      #12,#LPS   ; ISSUE LINE FEED
000330 172276      TSTB   #LPS           ; TEST READY
000330 102375      BPL      .-4           ; WAIT FOR READY
000330 001040      INC      CHRCNT        ; +1 CHAR.
000330 001042      INC      LINCNT        ; +1 LINE COUNT
000330 002743      BLT      S2A          ; CONTINUE IF NOT DONE
000330 001764      BEG     S4X2          ; SEND BLANK LINE AT END OF TEST
000330 032777      LPS7:  BIT      #BIT12,BSWR    ; CHECK TO LOOP ON TEST
000330 001311      BNE      SNGCHR       ; LOOP ON TEST

:TEST 10
:DRUM PATTERN CHARACTER TEST

000536 004437      ROTATE: JSR      %4,TYPINT
000542 012410      MOV      TN012,MES15    ; SET TEST NUMBER FOR MESSAGE
000550 007760      JSR      %4,PRNT       ; PRINT TEST NUMBER
000550 000013      M=M+1
000554 032777      BIT      #BIT13,BSWR    ; TEST CHAR SET
000562 001012      BNE      ROT0          ; SKIP IF 96 CHAR
000564 012737      MOV      #137,LINCNT   ; LAST CHAR
000572 012737      MOV      #140,LEGCHR   ; LEGAL CHK
000600 012737      MOV      #100,NUMCHR   ; #CHARS
000606 000411      BR       ROT1          ; CONTINUE

```

```

006610 012737 005177 001042 ROT0: MOV #177,LINCNT :LAST CHAR
006616 012737 002200 001060 MOV #200,LEGCHR :LEGAL CH#
006624 012737 003140 001062 MOV #140,NUMCHR :#CHARS
006630 005237 001044 ROT1: CLR CYCCNT :CLEAR CYCLE COUNT
006636 005237 001044 ROT2: INC CYCCNT :INC CYCLE COUNT
006642 005237 001040 CLR CHRCNT :CLEAR PCIN*ER
006648 005237 001040 ROT3: INC CHRCNT :INC PCIN*ER
006654 012737 001040 MOV CHRCNT,STRCHR :STORE PCIN*ER
006660 063737 001042 001054 ADD LINCNT,STRCHR :FIND CHAR
006666 023737 001054 001060 CMP STRCHR,LEGCHR :LEGAL?
006672 002403 BLT ROT4 :BRANCH IF LEGAL
006678 163737 001062 001054 SUB NUMCHR,STRCHR :MAKE LEGAL
006684 005777 172070 ROT4: TST #LPS :TEST FOR ERRORS
006690 100006 BPL ROT5 :BRANCH IF NO ERRORS
006696 012737 000044 001052 ERR44: MOV #44, ERCOUNT ;SET UP ERROR COUNT 44
006702 004537 010244 JSR %5,STAER :REPORT ERROR
006708 000000 HALT :HALT ON ERROR
006714 012777 001054 172046 ROT5: MOV STRCHR,#LPS :LOAD BUFFER
006720 023727 001040 000021 CMP CHRCNT,#17. :DONE GROUP?
006726 001341 BNE ROT3 :NO GET NEXT CHAR
006732 023727 001044 000010 CMP CYCCNT,#8. :DONE LINE?
006738 001331 BNE ROT2 :NO, NEXT GROUP
006744 012777 000012 172020 MOV #12,#LPS :YES, SEND LF
006750 105777 172012 TSTB #LPS :TEST READY
006756 100375 BPL -4 :WAIT FOR READY
006762 005337 001042 DEC LINCNT :DECREMENT LINE COUNT
006768 023727 001042 000037 CMP LINCNT,#37 :DONE?
006774 003313 BGT ROT1 :NO, NEXT LINE
006780 032777 010000 171772 BIT #BIT12,#SWR :LOOP ON TEST?
006786 001251 BNE ROTATE :LOOP

```

:TEST 11 ----- SPURIOUS HAMMER FIRING TEST  
:LEFT AND RIGHT TRIANGLES

; STARTING WITH A LEFT TRIANGLE

```

007014 004437 010030 LFTTR: JSR %4,TYPINT
007020 012737 012412 011724 MOV TN013,MES15 :SET TEST NUMBER FOR MESSAGE
007026 004437 007760 JSR %4,PRINT :PRINT TEST NUMBER
007032 000014 M=M+1
007038 012737 000204 001042 LFT: MOV #132,LINCNT :SET LINE COUNT
007044 012737 001042 001036 LFT0: MOV LINCNT,CHRCNT :STORE CHAR COUNT
007050 012737 177757 001044 MOV #-17,CYCCNT :SET GROUP COUNT
007056 012737 001036 001040 MOV CHRCNT,CHRCNT :FIND FIRST CHAR ON LINE...
007062 022737 000022 001040 LFT1: CMP #18.,CHRCNT :MORE THAN 17 CHARS?
007068 003004 BGT LFT2 :BRANCH IF LESS THAN 17
007074 162737 000021 001040 SUB #17.,CHRCNT :SUBTRACT 17. IF > 17
007080 000770 BR LFT1 :CONTINUE
007086 005437 001040 LFT2: NEG CHRCNT :NEGATE CHRCNT
007092 062737 000100 001040 ADD #100,CHRCNT :START CHAR IN CHRCNT
007098 012737 001040 001054 MOV CHRCNT,STRCHR :STORE STARTING CHAR
007104 005777 171652 LFT3: TST #LPS :TEST FOR ERROR
007110 100006 BPL LFT4 :CONTINUE IF NO ERROR
007116 012737 000045 001052 ERR45: MOV #45, ERCOUNT ;SET UP ERROR COUNT 45
007122 000046 N=N+1

```

```

007136 004537 010244 JSR %5,STAER ;REPORT ERROR SET
007142 000000 HALT ;HALT ON ERROR
007144 013777 001040 171630 LFT4: MOV CHRGEN,ALPB ;LOAD BUFFER
007150 005337 001036 DEC CHRCNT ;DECREMENT CHAR COUNT
007156 001415 BEQ LFT6 ;BRANCH IF DONE LINE
007160 005237 001044 INC CYCNT ;INCREMENT GROUP COUNT
007164 001403 BEQ LFT5 ;BRANCH IF DONE GROUP
007166 005237 001040 INC CHRGEN ;NEXT CHAR IN GROUP
007170 000753 BR LFT3 ;CONTINUE
007174 013737 001054 001040 LFT5: MOV STRCHR,CHRGEN ;GET START CHAR AGAIN
007202 012737 177757 001044 MOV #17,CYCNT ;RESET GROUP COUNT
007210 000744 BR LFT3 ;CONTINUE
007212 012777 000012 171562 LFT6: MOV #12,ALPB ;SEND LF
007220 105777 171554 TSTB ALPS ;TEST READY
007224 100375 BPL #4 ;WAIT FOR READY
007226 005337 001042 DEC LINCNT ;DECREMENT LINE COUNT
007232 003302 BGT LFT0 ;BRANCH IF NOT DONE
007234 001766 BEQ LFT6 ;SEND BLANK LINE AT END OF TEST
007236 032777 010000 171540 BIT #BIT12,SWR ;LOOP ON TEST?
007244 001263 BNE LFTTR ;LOOP

```

:TEST 1: ----- CONTINUED  
:RIGHT TRIANGLE

```

007246 012737 000000 001042 RTTR: MOV #1,LINCNT ;INITIALIZE LINE
007254 012737 000077 001040 RT1: MOV #77,CHRGEN ;FIRST CHAR IS A ?
007258 013737 001042 001044 MOV LINCNT,CYCNT ;SAVE NO. CHARS ON LINE
007270 012737 177757 001056 MOV #17,STRCNT ;SET GROUP COUNT
007276 012737 000204 001036 MOV #132,CHRCNT ;NO. CHARS PER LINE
007304 163737 001042 001036 SUB LINCNT,CHRCNT ;SUBTRACT NO. OF CHARS ON LINE
007312 001425 BEQ RT3 ;BRANCH IF NO SPACES ON THIS LINE
007314 005777 171460 RT2: TST ALPS ;TEST FOR ERROR
007320 100006 BPL RT2A ;CONTINUE IF NO ERROR
007322 012737 000046 001052 ERR46: MOV #46, ERRCOUNT ;SET UP ERROR COUNT 46
007330 004537 010244 JSR %5,STAER ;REPORT ERROR SET
007334 000000 HALT ;HALT ON ERROR
007336 012777 000040 171436 RT2A: MOV #40,ALPB ;LOAD BUFFER
007344 005237 001056 INC STRCNT ;INCREMENT GROUP COUNT
007350 001003 BNE RT2AA ;BRANCH IF NOT DONE GROUP
007352 012737 177757 001056 MOV #17,STRCNT ;RESET GROUP COUNT
007360 005337 001036 RT2AA: DEC CHRCNT ;DECREMENT SPACE COUNT
007364 001353 BNE RT2 ;BRANCH IF NOT DONE SPACES
007366 005777 171406 RT3: TST ALPS ;TEST FOR ERROR
007372 100006 BPL RT3A ;CONTINUE IF NO ERROR
007374 012737 000047 001052 ERR47: MOV #47, ERRCOUNT ;SET UP ERROR COUNT 47
007402 004537 010244 JSR %5,STAER ;REPORT ERROR SET
007406 000000 HALT ;HALT ON ERROR
007410 013777 001040 171364 RT3A: MOV CHRGEN,ALPB ;LOAD BUFFER
007416 005237 001040 INC CHRGEN ;NEXT CHAR
007422 005237 001056 INC STRCNT ;INCREMENT GROUP COUNT
007426 001036 BNE RT3B ;BRANCH IF NOT DONE GROUP
007430 012737 177757 001056 MOV #17,STRCNT ;RESET GROUP COUNT
007436 162737 000021 001040 SUB #17,CHRGEN ;GET FIRST GROUP CHAR
007444 005337 001044 DEC CYCNT ;DECREMENT CHAR COUNT

```

```

2201 007450 001346 BNE RT3 :CONTINUE
2202 007452 012777 MOV #12,ALPB :SEND LF
2203 007460 105777 TSTB ALPS :TEST READY
2204 007464 100375 BPL -4 :WAIT FOR READY
2205 007466 005237 INC LINCNT :INCREMENT LINE COUNT
2206 007472 022737 CMP #133,.LINCNT :DONE?
2207 007500 003265 BGT RT1 :BRANCH IF NOT DONE
2208 007502 032777 BIT #12,ASWR :LOOP ON TEST?
2209 007510 001256 BNE RTTR :LOOP

:TEST 12
:HAMMER ALIGNMENT

007512 004437 010030 HAMALN: JSR #4,TYPINT :SET TEST NUMBER FOR MESSAGE
007516 013737 012414 MC, :PRINT TEST NUMBER
007524 004437 007760 JSR #4,PRNT
000015 M=M+1
007530 012737 177701 MOV #63,.LINCNT :SET UP FOR 63 LINES
007536 012737 177574 HAM1X: MOV #132,.CHRCNT :SET CHAR COUNT
007544 005777 171230 HAM2: TST ALPS :CHECK FOR ERROR
007550 100006 BPL XHAM1 :BRANCH IF NO ERROR
007552 012737 000050 ERR50: MOV #50, ERRCOUNT :SET UP ERROR COUNT 50
000051
007560 004537 010244 JSR #5,STAER :REPORT ERROR OCCURRED
007564 000000 HALT :HALT ON ERROR
007566
XHAM1: TSTB ALPS :TEST READY
007572 100375 BPL -4 :WAIT FOR READY
007574 100375 BPL -4 :WAIT FOR READY
007576 012777 000105 XHAM1X: MOV #105,ALPB :TRANSMIT E TO PRINTER
007604 005237 001036 INC CHRCNT :+1 CHAR COUNT
007610 001365 BNE HAM2 :TRANSMIT ANOTHER CHAR.
007612 012777 000012 MOV #12,ALPB :TRANSMIT LINE FEED
007620 105777 171154 TSTB ALPS :TEST READY
007624 100375 BPL -4 :WAIT FOR READY
007626 005237 001042 INC LINCNT :+1 TO COUNT
007632 001341 BNE HAM1X :GO DO NEXT LINE
007634 012777 010000 BIT #12,ASWR :CHECK TO LOOP ON TEST
007642 001323 BNE HAMALN :LOOP ON TEST

007644 032777 040000 #BIT14,ASWR :DAVFU AVAILABLE?
007652 001402 E HAMX :NO, RECYCLE PRINTING TESTS
007654 000137 012424 JTP DAVFU :YES, DO DAVFU PRINTING TESTS

007660
HAMX: MOV #42,RO
007660 013700 000042 BEQ DOAGN
007664 001402
007666 000005 RESET
007670
LOGICAL: JSR PC,(RO)
007670 004710
007672 000240 NOP
007674 000240 NOP
007676 000240 NOP
007700
DOAGN: JMP TEST2 :RESTART
007700 000137 004066

```

:MISC. ROUTINES

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2312

```

:ROUTINE TO INITIALIZE PRINTER
:ENTER FROM JSR %S, PRINT

PRINT: TST      QLPS      :TEST FOR ERROR
        BMI     PRIND    :BRANCH IF ERROR
        TSTB   QLPS      :TEST FOR READY
        BMI     RDYOK    :READY SET OK
PRIND:  ADD     #2,%S    :SET UP FOR ERROR REPORT
        RTS     %S       :REPORT READY NOT SET
RDYOK:  MOV     #14,QLPB :ISSUE FORM FEED
        TSTB   QLPS      :TEST FOR READY NOT SET
        BPL    NTRDY    :READY NOT SET OK
        ADC     #2,%S    :SET UP FOR REPORT
        RTS     %S       :EXIT AND REPORT

NTRDY:  TSTB   QLPS      :TEST READY
        BPL    -4        :WAIT FOR READY
        RTS     %S       :READY SET EXIT

:ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER

PRINT:  MOV     #MES14,PRMSG :PRINT TEST NUMBER
        TST     QLPS        :TEST FOR ERROR
        BPL    RINT        :BRANCH IF OK
ERRS1:  MOV     #51, ERRCOUNT :SET UP ERROR COUNT 51
        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
        PRMSG: MES14     :MESSAGE
        TYPINT: MOV     #177564,TPS :RESET VECTORS
        MOV     #177566,TPB :FOR TTY
        RTS     %4       :RETURN

:SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER

TYP:   MOV     @%B,%0      :GET ADDR. THAT CONTAINS MESS.
        ADD     #2,%B      :SET UP EXIT
        MOV     @%0,%0     :ADDRESS OF MESSAGE IN RO
        MOVB   (0)+,TYPDAT :GET CHARACTER
        BNE    TYPB       :BRANCH IF NOT DONE
        RTN
TYPB:  CMPB   #45,TYPDAT  :CHECK FOR "%"
        BEQ   TYPF       :BRANCH IF "%"
        CMPB   #43,TYPDAT  :CHECK FOR "B"
        BEQ   TYPG       :BRANCH IF "B"
        JSR    %7,TYPG    :TYPE CHARACTER IN TYPDAT

```

```

000761 BR TYPD: TYPD: :NEXT CHAR IN MESSAGE
113777 MOV B TYPDAT,ATPB :OUTPUT CHARACTER TO PRINTER
105777 TSTB ATPS
100375 BPL :-4
000207 RTS :7 :CHAR. TYPED EXIT
112737 MOVB #12,TYPDAT :OUTPUT LF
004737 JSR %7,TYPC :GO TYPE CHAR.
112737 MOVB #15,TYPDAT :OUTPUT CR
004737 JSR %7,TYPC :GO TYPE CHAR.
000737 BR TYPD: TYPD:
000000

```

:ROUTINE TO CONVERT OCTAL TO ASCII

:ENTER ROUTINE AS FOLLOWS

```

: JSR %5,CONV
: XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
: XXXXXX=ADDRESS OF ASCII MESSAGE
: XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED

```

```

010162 013537 010242 CONV: MOV (5)+,ACNVX :ADDRS OF NO. TO BE CONVERTED
010166 012501 MOV (5)+,%1 :ADDRESS OF MESSAGE
010170 012502 MOV (5)+,%2 :NUMBER OF ASCII CHARACTERS
010172 060201 ADD %2,%1 :FIRST CHAR ADDRESS
010174 013703 010242 ACVN: MOV ACNVX,%3 :STORE NUMBER
010200 042703 177770 BIC #177770,%3 :ISOLATE LEAST SIGNIFICANT BIT
010204 062703 000060 ADD #60,%3 :SET UP ASCII CHARACTER
010210 110341 MOVB %3,-(1) :STORE CHARACTER
010212 000241 CLC :GET NEXT SIGNIFICANT BIT ...
010214 006037 010242 ROR ACNVX
010220 000241 CLC
010222 006037 010242 ROR ACNVX
010226 000241 CLC
010230 006037 010242 ROR ACNVX
010234 005302 DEC %2 :-1 FROM ASCII CHAR. CNT
010236 001356 BNE ACVN :CONVERT NEXT CHARACTER
010240 000205 RTS %5 :EXIT! CONVERSION DONE

```

ACNVX: 0 :WORK REGISTER

:ROUTINE TO REPORT ERROR COUNT

```

010244 004537 010162 STAER: JSR %5,CONV :CONVERT OCTAL TO ASCII
010250 001052 ERRCOUNT
010252 010274 HED1
010254 000003 3
010256 104000 EMT +0 :TYPE ERROR MESSAGE
010260 010274 HED1
010262 005777 170516 TST #SWR :TEST FOR HALT ON ERROR
010266 100401 BMI .+4 :BRANCH IF NO HALT WANTED
010270 000000 HALT :HALT ON ERROR
010272 000205 RTS %5 :RETURN

```

010274 020040 020040 051105 HED1: .ASCIZ / ERROR COUNT: /

010315	105	051122	051117	MES0A:	.ASCIZ	ERROR SET OK - CLEAR & TURN ON LINE%/
010362	051105	047522	020122	MES0B:	.ASCIZ	ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/
010435	120	044522	052116	MES0C:	.ASCIZ	PRINT SPEED CHECK USING MANUAL TIMING%/
010503	120	052125	051440		.ASCIZ	PUT SWITCH 0 UP TO START TIMING%/
010543	120	052125	051440		.ASCIZ	PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
010611	123	040524	052122	MES0D:	.ASCIZ	STARTING DAYFU PRINTING TESTS%/
010650	046045	030120	020065	MES1:	.ASCIZ	%LPOS LINE PRINTER TEST%/
010701	122	051505	040524	MES2:	.ASCIZ	RESTART ADDRESS 600%/
010726	047520	042527	020122	MES3:	.ASCIZ	POWER ON - TURN ON LINE%/
010757	117	020116	044514	MES4:	.ASCIZ	ON LINE OK - TRY TORN PAPER SWITCH%/
011023	122	040505	054504	MES5:	.ASCIZ	READY SET OK - TRY DRUM GATE SWITCH%/
011070	051105	047522	020122	MES6:	.ASCIZ	ERROR SET OK - TURN ON LINE%/
	011126				.EVEN	
011126	042522			MES7A:	.ASCIZ	RE/
011130	042523	020124	047524	MES7:	.ASCIZ	SET TOP OF FORM SWITCH TO /
011164	020040	020040	044440	MES8:	.ASCIZ	INCHES%/
	011202				.EVEN	
011202	026455	026455	026455	MES9:	.ASCIZ	----- THIS LINE SHOULD BE /
011277	040	020040	020040	MES10:	.ASCIZ	INCHES FROM THE LAST LINE -----
011410	005012			MES11A:	.ASCIZ	<12><12>
011412	051120	047111	020124	MES11:	.ASCIZ	PRINT SPEED IS APPROXIMATELY /
011450	020040	020040	046040	MES12:	.ASCIZ	LINES PER MINUTE%/
011477	055	026455	026455	MES13:	.ASCIZ	-----
011561	055	026455	026455		.ASCIZ	-----
011643	055	026455	026455		.ASCIZ	-----*
	011706				.EVEN	
011706	005012	042524	052123	MES14:	.ASCIZ	<12><12> TEST NUMBER /
011724	020040	005012	000012	MES15:	.ASCIZ	/*<12><12><12>
					.EVEN	
011732	044124	051511	046040	MES16:	.ASCIZ	THIS LINE SHOULD BE PRINTED*/
011767	040	020040	020040	MES17:	.ASCIZ	ALL ON ONE LINE --- IF SLEWED 0 LINES%/
					.EVEN	
012072	026455	026455	026455	MES18:	.ASCIZ	----- THERE SHOULD BE /
012164	020040	020040	020040	MES19:	.ASCIZ	BLANK LINES BEFORE THIS LINE -----
					.EVEN	
012300	052040	051505	044524	MES20:	.ASCIZ	TESTING CHANNEL SLEWING USING CHANNEL NO. /
012354	020040	000		MES20A:	.ASCIZ	/ /
	012360				.EVEN	
012360	030504			TND0V1:	.ASCIZ	/01/ ;TEST NUMBERS FOR DAYFU TESTS
012362	031104			TND0V2:	.ASCIZ	/02/
012364	031504			TND0V3:	.ASCIZ	/03/
012366	020061			TN01:	.ASCIZ	/1/
012370	020062			TN02:	.ASCIZ	/2/
012372	020063			TN03:	.ASCIZ	/3/
012374	020064			TN04:	.ASCIZ	/4/
012376	020065			TN05:	.ASCIZ	/5/
012400	020066			TN06:	.ASCIZ	/6/
012402	020067			TN07:	.ASCIZ	/7/
012404	020070			TN010:	.ASCIZ	/8/
012406	020071			TN011:	.ASCIZ	/9/
012410	030061			TN012:	.ASCIZ	/10/
012412	030461			TN013:	.ASCIZ	/11/
012414	031061			TN014:	.ASCIZ	/12/
012416	031461			TN015:	.ASCIZ	/13/
012420	032061			TN016:	.ASCIZ	/14/
012422	032461			TN017:	.ASCIZ	/15/



.EVEN

:DAVFU PRINTING TESTS IF DAVFU IS AVAILABLE -- SET SWITCH 14

:TESTS D1 AND D2  
:CHECK DAVFU LINE COUNT SLEWING

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000001  
000002  
000003  
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012424 004437 010030  
012430 013737 014454 012166  
012436 104000  
012440 010611  
012442 012737 000220 013136  
012450 012737 000221 013140  
012456 013737 012360 011724  
012464 004437 007760  
012470 012737 013070 001040  
012476 005777 166276  
012502 100010  
012504 012737 000052 001052  
000053  
012512 004537 010244  
012516 000000  
012520 000137 012470  
012524 017777 166310 166250  
012532 062737 000002 001040  
012540 005777 166274  
012544 001405  
012546 105777 166226  
012552 100375  
012554 000137 012476  
012560 012737 000002 001044  
012566 012737 011732 010026  
012574 004437 010010  
012600 005777 166174  
012604 100006  
012606 012737 000053 001052  
000054  
012614 004537 010244  
012620 000000  
012622 013777 013136 166152  
012630 105777 166144  
012634 100375  
012636 012737 011767 010026  
012644 004437 010010  
012650 012737 012072 010026  
012656 013737 013140 001040  
012664 012737 012366 001054  
012672 012737 000017 001036  
012700 005777 166074  
012704 100006  
012706 012737 000054 001052  
000055  
012714 004437 010244  
012720 000000

DAVFU: JSR %4,TYPINT ; INITIALIZE  
MOV SPSP,MES19+2  
EMT +0 ; TYPE MESSAGE  
MESDD ; STARTING DAVFU TESTS  
; SET DAVFU INSTRUCTIONS  
MOV #220,DAVI1  
MOV #221,DAVI2  
MOV TNDAV1,MES15 ; SET TEST NUMBER FOR MESSAGE  
JSR %4,PRMNT ; PRINT TEST NUMBER  
DAVO: MOV #DAVTAB,CHRGEN ; SET TABLE POINTER  
DAVDO: TST @LPS ; TEST FOR ERROR  
BPL DAV1 ; BRANCH IF NO ERROR  
ERR52: MOV #52, ERCOUNT ; SET UP ERROR COUNT 52  
N=N+1  
JSR %5,STAER ; REPORT ERROR SET  
HALT ; HALT ON ERROR  
JMP DAVO ; RESTART TEST  
DAVI: MOV @CHRGEN,@LPB ; LOAD DAVFU  
ADD #2,CHRGEN ; INCREMENT TABLE POINTER  
TST @CHRGEN ; TEST IF DONE LOAD  
BEQ D5 ; CONTINUE IF DONE  
TSTB @LPS ; TEST READY  
BPL -4 ; WAIT FOR READY  
JMP DAVDO  
D5: MOV #2,CYCCNT ; SET CYCLE COUNT  
D0: MOV #MES16,PRMSG ; SET MESSAGE ADDRESS  
JSR %4,RINT ; PRINT MESSAGE  
TST @LPS ; TEST FOR ERROR  
BPL D1 ; CONTINUE IF NO ERROR  
ERR53: MOV #53, ERCOUNT ; SET UP ERROR COUNT 53  
N=N+1  
JSR %5,STAER ; REPORT ERROR SET  
HALT ; HALT ON ERROR  
D1: MOV DAVI1,@LPB ; SEND DAVFU INSTRUCTION, SKIP 3 LINES  
TSTB @LPS ; TEST READY  
BPL -4 ; WAIT FOR READY  
MOV #MES17,PRMSG ; SET PRINTER MESSAGE ADDRESS  
JSR %4,RINT ; PRINT MESSAGE  
MOV #MES18,PRMSG ; SET MESSAGE ADDRESS  
MOV DAVI2,CHRGEN ; FIRST DAVFU INSTRUCTION  
MOV #TN01,STRCHR ; SET TABLE POINTER  
MOV #15.,CHRCNT ; SET TABLE COUNT  
D2: TST @LPS ; TEST FOR ERROR  
BPL D3 ; CONTINUE IF NO ERRORS  
ERR54: MOV #54, ERCOUNT ; SET UP ERROR COUNT 54  
N=N+1  
JSR %4,STAER ; REPORT ERROR SET  
HALT ; HALT ON ERROR

```

012722 013777 001040 166052 D3: MOV CHRGEN,ALPB ;SEND DAVFU INSTR.
012730 105777 166044 TS'B ALPS ;TEST READY
012734 100375 BPL -4 ;WAIT FOR READY
012736 017737 166112 012164 MOV @STRCHR,MES19 ;SET PRINTER MESSAGE
012744 004437 010010 JSR %4,RINT ;PRINT MESSAGE
012750 005337 001036 DEC CHRCNT ;DEC TABLE COUNT
012754 001407 BEQ D4 ;EXIT TEST IF DONE
012756 005237 001040 INC CHRGEN ;NEXT DAVFU INSTR.
012760 052737 000002 001054 ADD #2,STRCHR ;INC TABLE POINTER
012770 000137 012700 JMP D2 ;CONTINUE
012774 005337 001044 D4: DEC CYCCNT ;DEC CYCLE COUNT
012800 001415 BEQ DEXO ;EXIT IF DONE
012802 062737 000140 013136 ADD #140,DAVI1 ;CHANGE DAVFU INSTR.
013010 062737 000140 013140 ADD #140,DAVI2 ;CHANGE DAVFU INSTR.
013016 013737 012362 011724 MOV TNDAY2,MES15 ;SET TEST NUMBER FOR MESSAGE
013024 004437 007760 JSR %4,PRNNT ;PRINT TEST NUMBER
013030 000137 012566 JMP D0 ;RETEST LINE COUNT SLEWING
013034 012737 000220 013136 DEXO: MOV #220,DAVI1 ;RESET DAVFU INSTR.
013042 012737 000221 013140 MOV #221,DAVI2 ;RESET DAVFU INSTR.
013050 032777 010000 BIT #BIT12,@SWR ;LOOP ON TEST?
013056 001002 BNE IS ;LOOP
013060 000137 013142 JMP DAV2 ;NEXT TEST
013064 000137 012424 IS: JMP DAVFU ;LOOP

```

DAYTAB: 356 ;DAVFU LOAD TABLE

013070	000356	1
013072	000001	2
013074	000002	3
013076	000003	4
013100	000004	5
013102	000005	6
013104	000006	7
013106	000007	10
013110	000010	11
013112	000011	12
013114	000012	13
013116	000013	14
013120	000014	15
013122	000015	16
013124	000016	17
013126	000017	20
013130	000020	357
013132	000357	0
013134	000000	

DAVI1: 220  
DAVI2: 221

;TEST D3  
;CHECK DAVFU CHANNEL SLEW COMMANDS

```

013142 004437 010030 DAY2: JSR %4,TYPINT ;INITIALIZE
013146 013737 014454 012166 MOV SPSP,MES19+2 ;SAT TEST NUMBER FOR MESSAGE
013154 013737 012364 011724 MOV TNDAY3,MES15 ;PRINT TEST NUMBER D3
013162 004437 007760 JSR %4,PRNNT

```

```

013166 012737 014436 013720 MOV #MTAB,MTABP ;SET MESSAGE TABLE POINTER
013174 012737 014404 013714 MOV #ITAB,ITABP ;SET INSTRUCTION TABLE POINTER
013202 017737 000506 001054 MOV #ITABP,STRCHR ;SAT FIRST INSTRUCTION
013210 012737 012366 013722 MOV #TNO1,HTABP ;SET HEADER MESSAGE TABLE POINTER
013216 012737 014366 013716 MOV #ICTAB,ICTABP ;SET INSTR COUNT TABLE POINTER
013224 017737 000466 001056 MOV #ICTABP,STRCNT ;GET FIRST INSTR COUNT
013232 012737 013724 013712 LOAD: MOV #DTAB,DTABP ;SET DATA TABLE POINTER
013240 017737 000446 001040 MOV #D*ABP,CHRGEN ;SET FIRST DATA PAIR
013246 005777 165526 TST @LPS ;TEST FOR ERROR
013252 100007 BPL DL1 ;BRANCH IF NO ERROR
013254 012737 000055 001052 ERR55: MOV #55, ERCOUNT ;SET UP ERROR COUNT 55
                                N=N+1
                                JSR %5,STAER ;REPORT ERROR SET
                                HALT ;HALT ON ERROR
                                BR LOAD ;RESTART LOAD
013262 004537 010244 DL1: MOV #2,CHRCNT ;SET PAIR COUNT
013266 000500 DL2: MOV CHRGEN,@LPB ;LOAD DAVFU
013270 000760 TSTB @LPS ;TEST READY
013272 012737 000002 001036 BPL -.4 ;WAIT FOR READY
013300 013777 001040 165474 TST @LPS ;TEST FOR ERROR
013306 105777 165466 BPL DL6 ;BRANCH IF NO ERROR
013312 100375 ERR56: MOV #56, ERCOUNT ;SET UP ERROR COUNT 56
013314 005777 165460 N=N+1
013320 100010 JSR %5,STAER ;REPORT ERROR SET
013322 012737 000056 001052 HALT ;HALT ON ERROR
                                JMP LOAD ;RESTART LOAD
013330 004537 010244 DL6: CMP #356,CHRGEN ;LOAD COMMAND?
013334 000000 BEQ DL6A ;YES, SEND ONLY ONCE
013336 000137 013232 CMP #357,CHRGEN ;LOAD COMMAND?
013342 022737 000356 001040 BEQ DL6A ;YES, SEND ONLY ONCE
013350 001407 DEC CHRCNT ;DEC PAIR COUNT
013352 022737 000357 001040 BNE DL2 ;FINISH PAIR IF NOT DONE
013360 001403 ADD #2,DTABP ;INC DATA TABLE POINTER
013362 005337 001036 MOV #D*ABP,CHRGEN ;SET NEXT DATA PAIR
013366 001344 BNE DL1 ;DONE LOAD
013370 062737 000002 013712 DL6A:
013376 017737 000310 001040 MOV #77777,CHRGEN
013404 022737 077777 001040 CMP DL1
013412 001327 BNE DL1

;START OF CHANNEL SLEW TESTS
DL8:
013414 MOV STRCHR,@LPB ;SEND DAVFU INSTRUCTION
013414 013777 001054 165360 TSTB @LPS ;TEST READY
013422 105777 165352 BPL -.4 ;WAIT FOR READY
013426 100375 TSTB @LPS ;TEST READY
013430 105777 165344 BPL -.4 ;WAIT FOR READY
013434 100375 DL8A:
013436 MOV #HTABP,MES20A ;SET HEADER MSSG ADDRESS
013436 017737 000260 012354 MOV #MES20,PRMSG ;SET HEADER MSG ADDRESS
013444 012737 012300 010026 JSR %4,RINT ;PRINT HEADER MESSAGE
013452 004437 010010 DL9: MOV STRCHR,@LPB ;SEND DAVFU INSTRUCTION
013456 013777 001054 165316 TSTB @LPS ;TEST READY
013464 105777 165310 BPL -.4 ;WAIT FOR READY
013470 100375 TST @LPS ;TEST FOR ERROR
013472 005777 165302 BPL DL10 ;BRANCH IF OK
013476 100010 ERR57: MOV #57, ERCOUNT ;SET UP ERROR COUNT 57
013500 012737 000057 001052 N=N+1
000060

```

2533	013506	004537	010244		JSR	%5, STAER	:REPORT ERROR SET
2534	013512	000000			HALT		:HALT ON ERROR
2535	013514	000137	013232		JMP	LOAD	:RELOAD DAVFU
2536	013520	017737	000174	012164	DL10:	MOV	:SET MESSAGE
2537	013526	027727	000164	000001		MOV	:CHECK IF MAX LINE SLEW
2538	013534	001004				CMP	:NOT, CONTINUE
2539	013536	013737	014452	012166		BNE	:SET MESSAGE
2540	013544	000403				MOV	:CONTINUE
2541	013546	013737	014454	012166	DL10A:	BR	:SET MESSAGE
2542	013554	012737	012072	010026	DL10B:	MOV	:SET MSG ADDRESS
2543	013562	004437	010010			MOV	:PRINT MESSAGE
2544	013566	005337	001056			JSR	:DEC INSTR COUNT
2545	013572	001331				DEC	:FINISH TESTING THIS CHANNEL
2546	013574	062737	000002	013720		BNE	:INC MSG TABLE POINTER
2547	013602	062737	000002	013722		ADD	:INC HEADER MSG TABLE POINTER
2548	013610	062737	000002	013716		ADD	:INC INSTR COUNT TABLE POINTER
2549	013616	005777	000074			ADD	:CHECK INSTR COUNT
2550	013622	001006				TST	
2551	013624	012737	014366	013716		MOV	:RESET TABLE POINTER
2552	013632	012737	014436	013720		MOV	:RESET MSG TABLE POINTER
2553	013640	017737	000052	001056	DL12:	MOV	:GET INSTR COUNT
2554	013646	062737	000002	013714		ADD	:INC INSTR TABLE POINTER
2555	013654	017737	000034	001054		MOV	:GET INSTRUCTION
2556	013662	001254				MOV	:CONTINUE IF NOT DONE TEST
2557	013664	013737	014454	012166		BNE	:RESET MESSAGE
2558	013672	032777	010000	165104		MOV	:LOOP ON TEST?
2559	013700	001402				BIT	
2560	013702	000137	013142			BEQ	:LOOP ON TEST
2561	013706	000137	004066		DLEX:	JMP	:RECYCLE PRINTING TESTS
2562							
2563	013712	000000			DTAB:	0	:DATA TABLE POINTER
2564	013714	000000			ITAB:	0	:INSTRUCTION TABLE POINTER
2565	013716	000000			ICTAB:	0	:INSTR COUNT TABLE POINTER
2566	013720	000000			MTAB:	0	:MESSAGE TABLE POINTER
2567	013722	000000			HTAB:	0	:HEADER MESSAGE TABLE POINTER
2568							
2569							
2570							
2571	013724	000356			DTAB:	356	:START LOAD
2572	013726	000077				77	:HEADER MESSAGES
2573	013730	000000				0	
2574	013732	000001				0	
2575	013734	000002				0	
2576	013736	000005				0	
2577	013740	000000				0	
2578	013742	000003				0	
2579	013744	000010				0	
2580	013746	000005				0	
2581	013750	000002				0	
2582	013752	000001				0	
2583	013754	000000				0	
2584	013756	000007				0	
2585	013760	000000				0	
2586	013762	000011				0	
2587	013764	000002				0	
2588	013766	000005				0	





Vertical column of code on the left side of the page, appearing to be a continuation of the program listing.

Vertical column of code in the middle of the page, likely representing a table or data structure.

:STOP LOAD  
:STOP !!!!!

:INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

ICTAB: 105  
57  
77777

:END OF TABLE

:INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

ITAB: 200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213

:CHANNEL 1  
:CHANNEL 2  
:CHANNEL 3  
:CHANNEL 4  
:CHANNEL 5  
:CHANNEL 6  
:CHANNEL 7  
:CHANNEL 8  
:CHANNEL 9  
:CHANNEL 10  
:CHANNEL 11  
:CHANNEL 12  
: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.

```

014456 004437 010030 SCOPE: JSR %4.TYPINT
014462 017737 164316 MCV @SWP.SAVE :FETCH SWITCHES
014470 012737 177574 @C1036 :SET CHAR COUNT
014476 042737 177400 @C1050 :MASK CHARACTER
LDLX: TSTB @LPS :TEST READY
BPL -4 :WAIT FOR READY
TST @LPS :TEST FOR ERROR
BPL LPSCOPE :BRANCH IF NO ERROR
ERR60: MOV @60. ERCOUNT :SET UP ERROR COUNT 60
N=N+1
JSR %5.STAER :REPORT ERROR SET
HALT :HALT ON ERROR
LPSCOPE: MOV SAVE @LPB :LOAD PRINTER BUFFER
BIT @BIT11.@SWP :SEND ONLY ONE CHAR?
BEG LSCO :NO, BRANCH
HALT :HALT - WAIT FOR OPERATOR
BR SCOPE :NEXT CHAR
LSCO: JMP @LOSCOP :SEND LF?
LSCA: INC CHRCNT :INCREMENT CHAR COUNT
BNE LDLPX :CONTINUE IF NOT DONE LINE
MOV @12.@LPB :SEND LF
TSTB @LPS :TEST READY
BPL -4 :WAIT FOR READY
BR SCOPE :CONTINUE

014606 014562 LOSCOP: LSCA

000001 .ENC

```































