

# LP14/11/05

LINEPRINTER TEST  
MD-11-DZLPK-F

EP-DZLPK-F-DL-A  
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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZLPK-F-D  
PRODUCT NAME: LP14/LP11/LP05 LINE PRINTER TEST  
DATE : JANUARY 25, 1977  
MAINTAINER: DIAGNOSTIC GROUP

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7.0 TEST DESCRIPTIONS

7.1 TEST 1 CONTROL AND OPERATOR INTERACTION

7.1.1 TEST 1 SECTION 1 PRINTER READY TESTS POWER UP  
7.1.2 TEST 1 SECTION 2 MANUAL PRINT SPEED TEST  
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7.3 SCOPE DRIVE TEST

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## 1.0 ABSTRACT

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

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

## 2.0 REQUIREMENTS

## 2.1 EQUIPMENT

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

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

## 2.2 STORAGE

MEMORY LOCATIONS 0 - TO - 17004 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 0 IS DOWN BEFORE STARTING THE TEST.

4.2 STARTING ADDRESS OR ADDRESSES

THE INITIAL STARTING ADDRESS TO RUN THE ENTIRE LP14/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 AT ANY OTHER TEST USE THE START ADDRESS FROM THE FOLLOWING TABLE:

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

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

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

#### 4.3 PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF THE LINE PRINTER DIAGNOSTIC TEST, THE  
HEADER MESSAGE "LPOS/LP11/LP14 LINE PRINTER TEST" WILL BE TYPED OUT ON THE  
TELEPRINTER FOLLOWED BY EXECUTION OF THE PRINTER READY PORTION OF TEST  
1. PRINTING OF THE MESSAGE "POWER-UP" ON THE TELEPRINTER FOLLOWING  
THE TEST HEADER PRINT-OUT INDICATES START OF THIS TEST SEQUENCE. THIS  
TEST IS CARRIED OUT BY AN INTERACTIVE EXCHANGE BETWEEN THE OPERATOR  
AND THE TEST PROGRAM. THE OPERATIONAL DESCRIPTION OF THIS TEST  
APPEARS AS PART OF THE TEST DESCRIPTION FOR TEST 1 (SEE SECTION  
7.1.1). AFTER SUCCESSFUL COMPLETION OF THIS SECTION OF TEST 1, THE  
PRINT SPEED AND TOP OF FORM SWITCH SETTINGS TESTS WILL BE PERFORMED.  
(SEE SECTIONS 7.1.2 AND 7.1.3 RESPECTIVELY.) IF THE 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.

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5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

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

SWITCH	FUNCTION IN "UP" POSITION
15	LOOP ON ERROR (IN TEST : ONLY)
14	OPTIONAL DAVFU AVAILABLE
13	DOWN - 64 CHARACTER SET UP - 96 CHARACTER SET
12	LOOP ON TEST
11	SEND ONLY ONE CHARACTER TO LINE PRINTER IN SCOPE DRIVER - THEN HALT
10	UP - LP14 DOWN - LPO5/LP11
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 - 10

SWITCH 10 SHOULD BE SET IN THE UP FOR TESTING THE LP14 LINE PRINTER. SWITCH 10 SHOULD BE SET DOWN FOR TESTING THE LPO5/LP11 LINE PRINTER.

3. 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



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WITH A LINE FEED SENT AFTER EVERY 132 CHARACTERS. TO STOP  
SENDING CHARACTERS, PUT SWITCH 11 UP.

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4. SWITCH - 12

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

5. SWITCH - 13

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

6. SWITCH - 14

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

7. SWITCH - 15

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

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

5.2 ABSENCE OF HARDWARE SWITCH REGISTER

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

THE DIAGNOSTIC WILL PROMPT THE OPERATOR WITH THE MESSAGE:

SWR = XXXXXX NEW SWR =

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

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

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

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

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AFTER EXECUTION BEGINS, THE OPERATOR MAY CHANGE, AT ANY TIME, THE VALUE OF THE SWR BY ENTERING A CONTROL-G (↑G) AT THE CONSOLE.

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

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

SWR = XXXXXX NEW SWR =

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

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

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

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

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

### 5.3 IOT CHANGES

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

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

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6.0 ERRORS

6.1 COMPUTER DETECTED ERRORS

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

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

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

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

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

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

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## 6.2 VISUALLY DETECTED ERRORS

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

## 7.0 TEST DESCRIPTIONS

## 7.1 TEST 1 - CONTROL TESTS AND OPERATOR INTERACTIVE TESTS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### 7.1.4 TEST 1 - SECTION 4 - DAVFU ERROR TESTS

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

#### 7.2 LINE PRINTER PRINTING TESTS

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

##### 7.2.1 TEST 2 - DATA TRANSFER PATHS TEST

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



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## 7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

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

## 7.2.3 TEST 4 - OVER PRINT TEST

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

## 7.2.4 TEST 5 - SHUTTLE POSITIONING TEST

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

## 7.2.5 TEST 6 - PRINT CONTROL TEST

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

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## 7.2.6 TEST 7 - MULTIPLE LINE ADVANCE TEST

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

## 7.2.7 TEST 8 - HIGH SPEED PRINT TEST

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

## 7.2.8 TEST 9 - SINGLE CHAR, ALL COLUMNS TEST

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

```

?????------?????
jjjjj-----jjjjj
AAAAA-----AAAAA
BBBBB-----BBBBB
-----
-----
ZZZZZ-----ZZZZZ

```

## 7.2.9 TEST 10 - DRUM PATTERN TEST

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

## 7.2.10 TEST 11 - SPURIOUS HAMMER FIRING TEST

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

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

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

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

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## 7.2.11 TEST 12 - HAMMER ALIGNMENT TEST

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

## 7.2.12 TESTS D1 &amp; D2 - DAVFU LINE COUNT SLEWING TESTS

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

## 7.2.13 TEST D3 - DAVFU CHANNEL SLEW COMMAND TEST

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

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## 7.3 SCOPE DRIVE ROUTINE

THE PRUPOSE OF THIS TEST SEQUENCE IS TO PROVIDE THE OPERATOR WITH A SHORT BUT COMPREHENSIVE SCOPE DRIVER ROUTINE FOR USE IN TROUBLE SHOOTING THE PRINTER INTERFACE CONTROL MODULE WITH THE SCOPE. DEPENDING ON THE SETTING OF SWITCH 11 THIS TEST WILL EITHER CONTINUALLY SEND WHATEVER CHARACTER IS SET IN THE SWITCH REGISTER TO THE LINE PRINTER, OR ONLY SEND IT ONCE AND HALT. (SEE DESCRIPTION OF SWITCH 11 OPERATION IN SECTION 5.1)

TO INSERT A LINE FEED CHARACTER AFTER EVERY 132 CHARACTERS, WHEN SENDING CHARACTERS CONTINUOUSLY, START AT LOCATION 700(8).

TO LEAVE OUT THE LINE FEED, START AT LOCATION 710(8). THIS ROUTINE SHOULD BE USEFUL WHEN TROUBLE SHOOTING THE DAVFU.

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

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.TITLE MAINDEC-11-DZLPK-E-D  
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;\*\*\*\*\* LP14/LP11/LPOS LINE PRINTER TEST \*\*\*\*\*

;LIST OF SWITCH SETTINGS USED IN THIS TEST

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

000000	R0=%0
000001	R1=%1
000002	R2=%2
000003	R3=%3
000004	R4=%4
000005	R5=%5
000006	R6=%6
000007	R7=%7
000006	SP=R6
000007	PC=R7
100000	BIT15 =100000
040000	BIT14 =40000
020000	BIT13 =20000
010000	BIT12 =10000
004000	BIT11 =4000
002000	BIT10 =2000
001000	BIT9 =1000
000400	BIT8 =400
000200	BIT7 =200
000100	BIT6 =100
000040	BIT5 =40
000020	BIT4 =20
000010	BIT3 =10
000004	BIT2 =4
000002	BIT1 =2
000001	BIT0 =1
	.ENABLE ABS
	.ENABLE AMA
000000	.=0
000100	.REPT 100
	.+2
	HALT

```

952                                     .ENDR
953
954
955                                     .=30
956                                     000030
957 000030 011510                       TYP
958 000032 000340                       340
959
960
961                                     .=42
962                                     000042
963 000042 000000                       0
964
965                                     .=46
966 000046 011332                       LOGICAL
967                                     =52
968 000052 040000                       BIT14
969
970
971                                     .=60
972 000060 011736                       TKINT
973 000062 000300                       300
974
975
976                                     .=100
977
978 000100 003234                       LKSRV
979 000102 000340                       340
980
981 000104 003244                       CONVRT
982 000106 000340                       340
983
984                                     .=174
985 000174 000000                       DISPREG: 0
986 000176 000000                       SWREG: 0
987
988                                     .=200
989
990 000200 012706 001000               MOV #1000,%6
991 000204 000137 001100               JMP SETUP
992
993
994                                     .=300
995
996
997 000300 000137 004056               JMP INDAT
998 000304 000137 004244               JMP NODAT
999 000310 000137 014550               JMP DAVFU
1000 000314 000137 015304               JMP DAV2
1001
1002
1003                                     .=400
1004
1005
1006 000400 000137 002466               JMP SWTIME
1007 000404 000137 002626               JMP KW11L

```

;KEYBOARD INTERRUPT ROUTINE

;LINE CLOCK SERVICE ROUTINE

;START FOR DAVFU TESTS  
 ;ILLEGAL LOAD TEST  
 ;NO STOP BIT - CHANNEL SLEW TEST  
 ;LINE COUNT SLEW TEST  
 ;CHANNEL SLEW TEST

;1 MINUTE PRINT SPEED CHECK  
 ;START FOR USING SWITCH REG FOR TIMING  
 ;START FOR KW11-L LINE CLOCK

```

1008 000410 000137 002546      JMP      KW11P      ;START FOR KW11-P LINE CLOCK
1009 000414 000137 003444      JMP      SLEWCK    ;CHECK TOP OF FORM SWITCH
1010
1011
1012
1013          000600          . =600
1014
1015 000600 012706 001000      MOV      #1000,%6  ;START OF PRINTING TESTS SEQUENCE
1016 000604 000137 004550      JMP      TEST2     ;TEST 2
1017 000610 000137 005012      JMP      TEST3     ;TEST 3
1018 000614 000137 005366      JMP      CHRCHK    ;TEST 4
1019 000620 000137 005650      JMP      OVRPRT    ;TEST 5
1020 000624 000137 006146      JMP      PRTCTL    ;TEST 6
1021 000630 000137 006446      JMP      MLF       ;TEST 7
1022 000634 000137 006662      JMP      HSPRT     ;TEST 8
1023 000640 000137 007464      JMP      SNGCHR    ;TEST 9
1024 000644 000137 007660      JMP      ROTATE    ;TEST 10
1025 000650 000137 010422      JMP      LFTTR     ;TEST 11
1026 000654 000137 011136      JMP      HAMALN    ;TEST 12
1027
1028
1029          000700          . =700
1030
1031 000700 012737 016760 017004      MOV      #LSCA,LOSCOP ;SEND LF AFTER 132 CHARS
1032 000706 000137 016636      JMP      SCOPE
1033
1034          000720          . =720
1035
1036 000720 012737 016636 017004      MOV      #SCOPE,LOSCOP ;NO LF'S SENT IN SCOPE ROUTINE
1037 000726 000137 016636      JMP      SCOPE     ;DO SCOPE ROUTINE
1038
1039
1040          001000          . =1000
1041
1042          ;LINE PRINTER HARDWARE REGISTERS
1043
1044 001000 177514      LPS:    177514      ;STATUS REGISTER
1045          ;BIT 15=ERROR
1046          ;BIT 7=READY
1047          ;BIT 6=INTERRUPT ENABLE
1048
1049 001002 177516      LPB:    177516      ;DATA BUFFER REGISTER
1050          ;BITS 0-6=7 BIT ASCII CHARACTER BUFFER
1051          ;BITS 7-15=NOT USED
1052
1053
1054 001004 177570      SWR:    177570
1055 001006 177570      DISPLAY:177570
1056 001010 177776      PSW:    177776
1057 001012 177566      TPB:    177566
1058 001014 177562      TKB:    177562
1059 001016 177564      TPS:    177564
1060 001020 177560      TKS:    177560
1061 001022 172542      CSBR:   172542
1062 001024 172540      PLKS:   172540
1063 001026 177546      LKS:    177546
    
```

```

1064 001030 000200 PTRVEC: .WORD 200
1065 001032 000202 PTRPSW: .WORD 202
1066 000240 NOP =240
1067 000000 N =0
1068 000002 M =2
1069
1070 ;MACRO FOR SETTING UP ERROR COUNT
1071
1072 .LIST ME
1073
1074 .MACR SERROR X
1075 ERR'X': MOV #X, ERCOUNT ;SET UP ERROR COUNT X
1076 N=N+1
1077 .ENDM SERROR
1078
1079 ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1080
1081 .LIST ME
1082
1083 .MACR SPRINT Y
1084 MOV TNO'Y', MES15 ;SET TEST NUMBER FOR MESSAGE
1085 JSR %4, PRNNT ;PRINT TEST NUMBER
1086 M=M+1
1087 .ENDM SPRINT
1088
1089 ;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW
1090
1091 .LIST ME
1092
1093 .MACR SWAIT
1094 TSTB %LPS ;TEST READY
1095 BPL -4 ;WAIT FOR READY
1096 .ENDM SWAIT
1097
1098 ;MACRO FOR ENABLING KEYBOARD INTERRUPT IF THERE IS NO
1099 ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1100
1101 .LIST ME
1102
1103 .MACR SENABLE
1104 CMP #176, SWR ;S/W SWR ?
1105 BNE .+10 ;NO- CONTINUE
1106 BIS #100, %TKS ;ENABLE KEYBOARD INTERRUPT
1107 .ENDM SENABLE
1108
1109 ;MACRO USED TO LOAD THE PSW WITH THE
1110 ;CORRECT PROCESSOR PRIORITY LEVEL
1111
1112
1113
1114
1115
1116
1117
1118
1119

```



1120  
1121  
1122  
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1161  
1162  
1163  
1164  
1165  
1166  
1167  
1168  
1169  
1170  
1171  
1172  
(1)  
(1)  
(1)

.LIST ME

```
.MACR  $SETPSW
MOV     PC,-(SP)      ;MOVE PRESENT LOCATION TO STACK
ADD     #6,(SP)       ;SET UP FOR NEXT INSTRUCTION
RTI
.ENDM   $SETPSW      ;LOAD PSW
```

;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

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

;ROUTINE TO TEST THE MECH. OPERATION OF THE LPO5

```
SETUP: JSR     %4,TYPINT
        RESET
        MOV     4,-(SP)      ;CLEAR WORLD
        MOV     6,-(SP)      ;SAVE CURRENT VECTORS
        MOV     #1$ 4
        TST    @SWR
        BR     2$           ;SET UP TIMEOUT VECTOR
                               ;TRY TO ACCESS HARDWARE SWR
                               ;IF THERE, GO TO 2$
1$:     MOV     #SWREG,SWR    ;POINT TO SOFTWARE SWR
        MOV     #DISPRG,DISPLAY ;POINT TO SOFTWARE DISPLAY
        CMP     (SP)+,(SP)+  ;RESTORE STACK
2$:     MOV     (SP)+,6
        MOV     (SP)+,4
        SENBLE
        CMP     #176,SWR     ;S/W SWR ?
        BNE     .+10         ;NO- CONTINUE
        BIS     #100,@TKS    ;ENABLE KEYBOARD INTERRUPT
```

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

001100 004437 011472
001104 000005
001106 013746 000004
001112 013746 000006
001116 012737 001132 000004
001124 005777 177654
001130 000407
001132 012737 000176 001004
001140 012737 000174 001006
001146 022626
001150 012637 000006
001154 012637 000004
001160
022737 000176 001004
001166 001003
052777 000100 177622
```

```

1173
1174 001176 104000 EMT +0
1175 001200 012714 MES1 ;TYPE DIAGNOSTIC TITLE
1176 001202 104000 EMT +0
1177 001204 012757 MES2 ;TYPE RESTART ADDRESS INFO
1178 001206 104000 EMT +0 ;TYPE MESSAGE
1179 001210 013004 MES3 ;POWER UP
1180 001212 000000 HALT ;DEPRESS CONTINUE WHEN READY TO START TEST
1181
1182 001214 005777 177560 STP1: TST QLPS ;TEST FOR ERROR
1183 001220 100006 BPL STP2 ;NO ERROR TEST FOR READY
1184 001222 SERROR \N
(1) 001222 012737 000000 001052 ERRO: MOV #0, ERCOUNT ;SET UP ERROR COUNT 0
(1) 000001 N=N+1
1185 001230 004537 011706 JSR %5,STAER ;REPORT ERROR BIT SET
1186 001234 000767 BR STP1 ;GO TEST FOR ERROR
1187 001236 105777 177536 STP2: TSTB QLPS ;TEST FOR READY
1188 001242 100406 BMI STP3 ;READY SET OK
1189 001244 SERROR \N
(1) 001244 012737 000001 001052 ERR1: MOV #1, ERCOUNT ;SET UP ERROR COUNT 1
(1) 000002 N=N+1
1190 001252 004537 011706 JSR %5,STAER ;REPORT READY NOT SET
1191 001256 000767 BR STP2 ;GO TEST FOR READY
1192 001260 104000 STP3: EMT +0 ;TYPE MESSAGE
1193 001262 013035 MES4 ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1194 001264 000000 HALT ;DEPRESS CONTINUE WHEN READY
1195 001266
1196 001266 012777 000014 177506 STP4: MOV #14,QLPB ;SEND A "FF" TO THE PRINTER
1197 001274 012777 000015 177500 MOV #15,QLPB ;ATTEMPT "FF" BY SENDING A "CR"
1198 001302 005777 177472 TST QLPS ;TEST FOR ERROR
1199 001306 100406 BMI STP5 ;BRANCH IF ERROR SET
1200 001310 SERROR \N
(1) 001310 012737 000002 001052 ERR2: MOV #2, ERCOUNT ;SET UP ERROR COUNT 2
(1) 000003 N=N+1
1201 001316 004537 011706 JSR %5,STAER ;REPORT ERROR NOT SET
1202 001322 000761 BR STP4 ;LOOP ON ERROR
1203 001324 104000 STP5: EMT +0 ;TYPE MESSAGE
1204 001326 013146 MES6 ;ERROR SET OK - TURN ON LINE
1205 001330 000000 HALT ;WAIT FOR OPERATOR
1206
1207 001332 005777 177442 STP5A: TST QLPS ;TEST FOR ERROR
1208 001336 100006 BPL STP5B ;NO ERROR CONTINUE
1209 001340 SERROR \N
(1) 001340 012737 000003 001052 ERR3: MOV #3, ERCOUNT ;SET UP ERROR COUNT 3
(1) 000004 N=N+1
1210 001346 004537 011706 JSR %5,STAER ;REPORT ERROR SET
1211 001352 000767 BR STP5A ;LOOP ON ERROR
1212 001354 105777 177420 STP5B: TSTB QLPS ;TEST READY
1213 001360 100406 BMI STP5C ;READY SET OK
1214 001362 SERROR \N
(1) 001362 012737 000004 001052 ERR4: MOV #4, ERCOUNT ;SET UP ERROR COUNT 4
(1) 000005 N=N+1
1215 001370 004537 011706 JSR %5,STAER ;REPORT ERROR NOT SET
1216 001374 000767 BR STP5B ;LOOP ON ERROR
1217 001376 104000 STP5C: EMT +0 ;TYPE MESSAGE
1218 001400 013101 MESS ;READY SET OK - TRY DRUM GATE SWITCH

```

```

1219 001402 000000          HALT                ;DEPRESS CONTINUE WHEN READY
1220
1221 001404 005777 177370    STP6:  TST      2LPS                ;TEST FOR ERROR
1222 001410 100006          BMI      STP7                ;BRANCH IF ERROR SET
1223 001412          $ERROR  \N
(1) 001412 012737 000005 001052 ERR5:  MOV      #5,      ERCOUNT          ;SET UP ERROR COUNT 5
(1)          000006          N=N+1
1224 001420 004537 011706    JSR      %5,STAER          ;REPORT ERROR NOT SET
1225 001424 000767          BR      STP6                ;LOOP ON ERROR
1226 001426 104000          STP7:  EMT      +0           ;TYPE MESSAGE
1227 001430 013146          MES6
1228 001432 000000          HALT                ;DEPRESS CONTINUE WHEN READY
1229
1230          ;TEST 1
1231          ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING.
1232
1233          ;IS THE PRINTER FREE OF ERRORS
1234
1235 001434 000005          TEST1: RESET              ;CLEAR THE WORLD
1236 001436 005777 177336    TST      2LPS                ;IS ERROR FLAG CLEAR
1237 001442 100006          BPL     TEST1A              ;ERROR IS CLEAR OK
1238 001444          $ERROR  \N
(1) 001444 012737 000006 001052 ERR6:  MOV      #6,      ERCOUNT          ;SET UP ERROR COUNT 6
(1)          000007          N=N+1
1239 001452 004537 011706    JSR      %5,STAER          ;REPORT ERROR SET
1240 001456 000766          BR      TEST1              ;LOOP ON ERROR
1241
1242          ;IS READY SET (NO ERRORS EXIST)
1243
1244 001460 000005          TEST1A: RESET             ;CLEAR THE WORLD
1245 001462 105777 177312    TSTB    2LPS                ;IS READY SET
1246 001466 100406          BMI     TEST1B              ;READY SET! PRINTER OK
1247 001470          $ERROR  \N
(1) 001470 012737 000007 001052 ERR7:  MOV      #7,      ERCOUNT          ;SET UP ERROR COUNT 7
(1)          000010          N=N+1
1248 001476 004537 011706    JSR      %5,STAER          ;REPORT READY NOT SET
1249 001502 000766          BR      TEST1A              ;LOOP ON ERROR
1250
1251          ;DOES LOADING THE BUFFER RESET READY
1252
1253 001504 005037 001046          TEST1B: CLR      WORK        ;CLEAR COUNTER
1254 001510 012777 000015 177264  MOV      #15,2LPB          ;LOAD CARRIAGE RETURN INTO BUFFER
1255 001516 105777 177256    TSTB    2LPS                ;IS READY CLEAR
1256 001522 100006          BPL     LP1                 ;READY TO CLEAR OK!
1257 001524          $ERROR  \N
(1) 001524 012737 000010 001052 ERR10: MOV      #10,     ERCOUNT          ;SET UP ERROR COUNT 10
(1)          000011          N=N+1
1258 001532 004537 011706    JSR      %5,STAER          ;REPORT READY STILL SET
1259 001536 000762          BR      TEST1B              ;LOOP ON ERROR
1260 001540 005777 177234    LP1:   TST      2LPS                ;IS THERE AN ERROR
1261 001544 100006          BPL     LP2                 ;NO ERROR CONTINUE
1262 001546          $ERROR  \N
(1) 001546 012737 000011 001052 ERR11: MOV      #11,     ERCOUNT          ;SET UP ERROR COUNT 11
(1)          000012          N=N+1
1263 001554 004537 011706    JSR      %5,STAER          ;REPORT ERROR OCCURRED
1264 001560 000751          BR      TEST1B              ;LOOP ON ERROR
    
```

```

1265 001562 105777 177212 LP2: TSTB 2LPS ;IS THE PRINTER STILL BUSY
1266 001566 100411 BMI TEST1C ;NO! GO TO NEXT TEST
1267 001570 005237 001046 INC WORK ;YES! GO CHECK FLAGS
1268 001574 001361 BNE LP1 ;PRINTER STILL BUSY WAIT
1269 001576 SERROR \N
(1) 001576 012737 000012 001052 ERR12: MOV #12, ERRCOUNT ;SET UP ERROR COUNT 12
(1) 000013 N=N+1
1270 001604 004537 011706 JSR %5,STAER ;ERROR REPORT TIME OUT
1271 001610 000735 BR TEST1B ;LOOP ON ERROR
1272
1273 ;CHECK INTERRUPT LEVEL OF PRINTER
1274 ;THE PRINTER SHOULD BE AT LEVEL 4
1275
1276 ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
1277
1278 001612 012777 002076 177210 TEST1C: MOV #INT1C,2PTRVEC ;SET UP INT VECTOR
1279 001620 012777 000340 177204 MOV #340,2PTRPSW ;SET PRIORITY
1280 001626 005777 177146 TST 2LPS ;TEST FOR ERROR
1281 001632 100006 BPL LP3 ;NO ERROR CONTINUE
1282 001634 SERROR \N
(1) 001634 012737 000013 001052 ERR13: MOV #13, ERRCOUNT ;SET UP ERROR COUNT 13
(1) 000014 N=N+1
1283 001642 004537 011706 JSR %5,STAER ;REPORT ERROR SET
1284 001646 000761 BR TEST1C ;LOOP ON ERROR
1285 001650 105777 177124 LP3: TSTB 2LPS ;TST FOR READY
1286 001654 100406 BMI LP3X ;READY SET OK
1287 001656 SERROR \N
(1) 001656 012737 000014 001052 ERR14: MOV #14, ERRCOUNT ;SET UP ERROR COUNT 14
(1) 000015 N=N+1
1288 001664 004537 011706 JSR %5,STAER ;REPORT READY NOT SET
1289 001670 000750 BR TEST1C ;LOOP ON ERROR
1290 001672 SERROR \N
(1) 001672 012737 000015 001052 LP3X: ERR15: MOV #15, ERRCOUNT ;SET UP ERROR COUNT 15
(1) 000016 N=N+1
1291 001700 012746 000340 MOV #340,-(SP) ;LOCKUP PROCESSOR, NEW PRIORITY
1292 001704 SSETPSW
(1) 001704 010746 MOV PC,-(SP) ;MOVE PRESENT LOCATION TO STACK
(1) 001706 062716 000006 ADD #6,(SP) ;SET UP FOR NEXT INSTRUCTION
(1) 001712 000002 RTI ;LOAD PSW
1293 001714 052777 000100 177056 BIS #100,2LPS ;SET PRINTER INTO ENABLE
1294 001722 000240 NOP ;WAIT
1295 001724 042777 000100 177046 BIC #100,2LPS ;CLEAR PRINTER INT. ENABLE
1296
1297 ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
1298
1299 001732 SERROR \N
(1) 001732 012737 000016 001052 ERR16: MOV #16, ERRCOUNT ;SET UP ERROR COUNT 16
(1) 000017 N=N+1
1300 001740 012746 000300 MOV #300,-(SP) ;SET PROCESSOR PRIORITY LEVEL 6
1301 001744 SSETPSW
(1) 001744 010746 MOV PC,-(SP) ;MOVE PRESENT LOCATION TO STACK
(1) 001746 062716 000006 ADD #6,(SP) ;SET UP FOR NEXT INSTRUCTION
(1) 001752 000002 RTI ;LOAD PSW
1302 001754 052777 000100 177016 BIS #100,2LPS ;SET PRINTER INT ENABLE
1303 001762 000240 NOP ;WAIT
1304 001764 042777 000100 177006 BIC #100,2LPS ;CLEAR PRINTER INT. ENABLE
    
```

```

1305
1306           ;TEST THAT THE PRINTER WILL NOT INT. AT
1307           ;PROCESSOR LEVEL 5
1308
1309 001772      $ERROR  \N
(1) 001772 012737 000017 001052 ERR17: MOV #17,   ERCOUNT           ;SET UP ERROR COUNT 17
(1)          000020      N=N+1
1310 002000 012746 000240      MOV #240,-(SP)           ;SET UP PROCESSOR TO LEVEL 5
1311 002004      $SETPSW
(1) 002004 010746      MOV PC,-(SP)           ;MOVE PRESENT LOCATION TO STACK
(1) 002006 062716 000006      ADD #6,(SP)           ;SET UP FOR NEXT INSTRUCTION
(1) 002012 000002      RTI           ;LOAD PSW
1312 002014 052777 000100 176756      BIS #100,2LPS           ;SET PRINTER INT ENABLE
1313 002022 000240      NOP           ;WAIT
1314 002024 042777 000100 176746      BIC #100,2LPS           ;CLEAR INT ENABLE PRINTER OK
1315
1316           ;TEST THAT THE PRINTER WILL NOT INTERRUPT
1317           ;WHEN THE PROCESSOR IS AT LEVEL 4
1318
1319 002032      $ERROR  \N
(1) 002032 012737 000020 001052 ERR20: MOV #20,   ERCOUNT           ;SET UP ERROR COUNT 20
(1)          000021      N=N+1
1320 002040 012746 000200      MOV #200,-(SP)           ;SET PROCESSOR TO LEVEL 4
1321 002044      $SETPSW
(1) 002044 010746      MOV PC,-(SP)           ;MOVE PRESENT LOCATION TO STACK
(1) 002046 062716 000006      ADD #6,(SP)           ;SET UP FOR NEXT INSTRUCTION
(1) 002052 000002      RTI           ;LOAD PSW
1322 002054 052777 000100 176716      BIS #100,2LPS           ;SET PRINTER INT. ENABLE
1323 002062 000240      NOP           ;WAIT
1324 002064 042777 000100 176706      BIC #100,2LPS           ;CLEAR PRINTER INT ENABLE
1325 002072 000137 002110      JMP TEST1D           ;PRINTER OK CONTINUE
1326
1327           ;INTERRUPT HANDLE FOR TEST1C
1328           ;RESTORE STACK AND REPORT ERROR
1329
1330 INT1C: CMP (6)+(6)+           ;RESTORE STACK
1331 002100 004537 011706      JSR %5,STAER           ;REPORT ERROR
1332 002104 000137 001612      JMP TEST1C           ;RE-ENTER TEST1C
1333
1334           ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
1335           ;AT PRIORITY LEVEL 4
1336
1337 002110 012777 002230 176712 TEST1D: MOV #INT1D,2PTRVEC           ;SET UP INTERRUPT VECTOR
1338 002116 012777 000340 176706      MOV #340,2PTRPSW           ;LOCK UP PRIORITIES
1339 002124 005777 176650      TST 2LPS           ;IS THERE A PRINTER ERROR
1340 002130 100006      BPL LP4           ;NO! CONTINUE
1341 002132      $ERROR  \N
(1) 002132 012737 000021 001052 ERR21: MOV #21,   ERCOUNT           ;SET UP ERROR COUNT 21
(1)          000022      N=N+1
1342 002140 004537 011706      JSR %5,STAER           ;REPORT PRINTER ERROR
1343 002144 000761      BR TEST1D           ;LOOP ON ERROR
1344 002146 105777 176626      LP4: TSTB 2LPS           ;IS READY SET
1345 002152 100406      BMI LP5           ;YES - PRINTER READY
1346 002154      $ERROR  \N
(1) 002154 012737 000022 001052 ERR22: MOV #22,   ERCOUNT           ;SET UP ERROR COUNT 22
(1)          000023      N=N+1

```

```

1347 002162 004537 011706      JSR      %5,STAER      ;REPORT READY NOT SET
1348 002166 000750              BR       TESTID        ;LOOP ON ERROR
1349 002170 012746 000140      LPS:    MOV      #140,-(SP) ;SET PRIORITY TO LEVEL 3
1350 002174              $SETPSW
(1) 002174 010746      MOV      PC,-(SP)      ;MOVE PRESENT LOCATION TO STACK
(1) 002176 062716 000006      ADD      #6,(SP)      ;SET UP FOR NEXT INSTRUCTION
(1) 002202 000002              RTI                    ;LOAD PSW
1351 002204 052777 000100 176566      BIS      #100,%LPS     ;SET PRINTER INTERRUPT ENABLE
1352 002212 000240              NOP                    ;WAIT
1353 002214              $ERROR \N
(1) 002214 012737 000023 001052 ERR23: MOV      #23,   ERCOUNT ;SET UP ERROR COUNT 23
(1) 000024              N=N+1
1354 002222 004537 011706      JSR      %5,STAER      ;REPORT ERROR
1355 002226 000730              BR       TESTID        ;LOOP ON ERROR
1356
1357              ; INTERRUPT HANDLER FOR TESTID
1358
1359 002230 022626      INTID:  CMP      (6)+,(6)+ ;RESET STACK
1360 002232 042777 000100 176540      BIC      #100,%LPS     ;CLEAR INT. ENABLE FOR PRINTER
1361 002240 012746 000000              MOV      #0,-(SP)     ;CLEAR PROCESSOR STATUS
1362 002244              $SETPSW
(1) 002244 010746      MOV      PC,-(SP)      ;MOVE PRESENT LOCATION TO STACK
(1) 002246 062716 000006      ADD      #6,(SP)      ;SET UP FOR NEXT INSTRUCTION
(1) 002252 000002              RTI                    ;LOAD PSW
1363 002254 012777 012706 176546      MOV      #12706,%PTRVEC ;RESET INSTRUCTION AT 200
1364 002262 012777 001000 176542      MOV      #1000,%PTRPSW ;RESET INSTRUCTION AT 202
1365
1366
1367              ; GET INITIAL SWR VALUE
1368              ; IF THERE IS NO H/W SWR
1369
1370
1371 002270 022737 000176 001004      CMP      #176,SWR      ;S/W SWR ?
1372 002276 001044      BNE     SKIP           ;NO- CONTINUE
1373 002300 005037 001070              CLR     SIGNAL         ;INITIALIZE INTERRUPT ROUTINE
1374 002304 005037 001066              CLR     DIGITS         ;
1375 002310 005037 001072              CLR     SET            ;
1376 002314 005037 001074              CLR     CHAR           ;
1377 002320 013746 000034      MOV      34,-(SP)      ;SAVE VECTOR
1378 002324 013746 000036      MOV      36,-(SP)      ;SAVE VECTOR
1379 002330 012737 011736 000034      MOV      #TKINT,34     ;SET UP NEW VECTOR
1380 002336 012737 000300 000036      MOV      #300,36       ;SET UP NEW VECTOR
1381 002344 005237 001072              INC     SET            ;SET HEADER FLAG
1382 002350 104400      TRAP   +0              ;ENTER INTERRUPT ROUTINE
1383 002352 005037 001072              CLR     SET            ;CLEAR HEADER FLAG
1384 002356 012637 000036      MOV      (SP)+,36      ;RESTORE VECTOR
1385 002362 012637 000034      MOV      (SP)+,34      ;RESTORE VECTOR
1386 002366 012777 000100 176424      MOV      #100,%TKS     ;ENABLE KEYBOARD INTERRUPT
1387 002374 000001      WT:    WAIT
1388 002376 000240              NOP
1389 002400 022737 000001 001070      CMP      #1,SIGNAL     ;SWR VALUE ENTERED ?
1390 002406 001772              BEQ     WT             ;NO- WAIT
1391 002410 000240      SKIP:  NOP
1392
1393
1394

```

```

1395 ;1 MINUTE PRINT SPEED CHECK
1396 ;IF A KW11-L OR KW11-P ARE NOT AVAILABLE, THE SR BITO IS USED
1397 ;FOR MANUAL TIMING OF THE PRINTER.
1398
1399 002412 012737 000002 000006 CLCKAV: MOV #RTI, @#6 ;SET TRAP TO RETURN
1400 002420 012737 000006 000004 MOV #6, @#4
1401 002426 000261 SEC
1402 002430 105777 176372 TSTB @PLKS ;KW11-L AVAILABLE?
1403 002434 103404 BCS IS ;NO BRANCH
1404 002436 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1405 002442 000137 002626 JMP KW11L ;USE KW11L FOR TIMING
1406 002446 000261 1S: SEC
1407 002450 105777 176350 TSTB @PLKS ;KW11-P AVAILABLE?
1408 002454 103404 BCS SWTIME ;NO USE SWITCH REG FOR TIMING
1409 002456 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1410 002462 000137 002546 JMP KW11P ;USE KW11-P FOR TIMING
1411 002466 SWTIME: $ENABLE
(1) 002466 022737 000176 001004 CMP #176, SWR ;S/W SWR ?
(1) 002474 001003 BNE .+10 ;NO- CONTINUE
(1) 002476 052777 000100 176314 BIS #100, @TKS ;ENABLE KEYBOARD INTERRUPT
1412 002504 005037 001042 CLR LINCNT ;CLEAR LINE COUNT
1413 002510 004437 011472 JSR %4, TYPINT
1414 002514 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1415 002520 104000 EMT +0 ;TYPE MESSAGE
1416 002522 012475 MESC ;PRINT SPEED CHECK USING MANUAL TIMING
1417 002524 012737 000002 003232 MOV #2, DIA ;SET DUMMY ADDRESS
1418 002532 032777 000001 176244 1S: BIT #BITO, @SWR ;START?
1419 002540 001774 BEQ IS ;WAIT FOR START
1420 002542 000137 002702 JMP STARO ;START PRINTING
1421
1422
1423 ;START FOR KW11-P.....
1424
1425 002546 KW11P: $ENABLE
(1) 002546 022737 000176 001004 CMP #176, SWR ;S/W SWR ?
(1) 002554 001003 BNE .+10 ;NO- CONTINUE
(1) 002556 052777 000100 176234 BIS #100, @TKS ;ENABLE KEYBOARD INTERRUPT
1426 002564 005037 001042 CLR LINCNT ;CLEAR LINE COUNT
1427 002570 004437 011472 JSR %4, TYPINT
1428 002574 012706 001000 MOV #1000, %6 ;RESET STACK
1429 002600 013777 003226 176214 MOV MINCNT, @CSBR ;SET CLOCK COUNT
1430 002606 013737 001024 003232 MOV PLKS, DIA ;STORE PLKS ADDRESS
1431 002614 012777 000105 176202 MOV #105, @PLKS ;START CLOCK
1432 002622 000137 002702 JMP STARO ;START PRINTING
1433
1434 ;START FOR KW11-L.....
1435
1436 002626 KW11L: $ENABLE
(1) 002626 022737 000176 001004 CMP #176, SWR ;S/W SWR ?
(1) 002634 001003 BNE .+10 ;NO- CONTINUE
(1) 002636 052777 000100 176154 BIS #100, @TKS ;ENABLE KEYBOARD INTERRUPT
1437 002644 005037 001042 CLR LINCNT ;CLEAR LINE COUNT
1438 002650 004437 011472 JSR %4, TYPINT
1439 002654 012706 001000 MOV #1000, %6 ;RESET STACK
1440 002660 013737 003226 003230 MOV MINCNT, CNTR ;SET CLOCK COUNT
1441 002666 013737 001026 003232 MOV LKS, DIA ;STORE LKS ADDRESS

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1442 002674 012777 000100 176124      MOV      #100,ALKS      ;ENABLE CLOCK INTERRUPT
1443
1444      ;PRINTING ROUTINE.....
1445
1446 002702 032777 020000 176074  STARO:  BIT      #BIT13,ASWR      ;CHECK CHAR SET
1447 002710 001007          BNE      STAROA          ;BRANCH IF 96
1448 002712 012737 000140 001060      MOV      #140,LEGCHR    ;LEGAL CHECK
1449 002720 012737 000100 001062      MOV      #100,NUMCHR    ;#CHARS
1450 002726 000406          BR       STAROC          ;CONTINUE
1451 002730 012737 000200 001060  STAROA: MOV      #200,LEGCHR  ;LEGAL CHECK
1452 002736 012737 000140 001062      MOV      #140,NUMCHR    ;#CHARS
1453 002744 013737 001060 001054  STAROC: MOV      LEGCHR,STRCHR ;SET FIRST CHAR IF LP14
1454 002752 032777 002000 176024  STAROB: BIT      #BIT10,ASWR ;CHECK FOR NEW DRUM(LP14)/OLD DRUM
1455 002760 001063          BNE      TMTST          ;
1456 002762 012737 000204 001036      MOV      #132,CHRCNT    ;SET CHAR COUNT
1457 002770 012737 003424 001054      MOV      #PATTB,STRCHR  ;INITIALIZE TABLE POINTER
1458 002776 012737 000021 001044  STARA:  MOV      #17,CYCCNT ;SET GROUP COUNT
1459 003004 017737 176044 001040      MOV      ASSTRCHR,CHRCNT ;GET CHAR FROM TABLE
1460 003012 063737 001042 001040      ADD      LINCNT,CHRCNT  ;ADD LINE COUNT
1461 003020 023737 001060 001040  IS:    CMP      LEGCHR,CHRCNT ;LEGAL CHAR?
1462 003026 003004          BGT      STAR1          ;YES, BRANCH
1463 003030 163737 001062 001040      SUB      NUMCHR,CHRCNT ;NO, MAKE LEGAL
1464 003036 000770          BR       IS             ;RECHECK CHAR
1465 003040 013777 001040 175734  STAR1:  MOV      CHRCNT,ALPB  ;LOAD BUFFER
1466 003046 005337 001036          DEC      CHRCNT         ;DECREMENT CHAR COUNT
1467 003052 001410          BEQ      STARED        ;BRANCH IF DONE LINE
1468 003054 005337 001044          DEC      CYCCNT        ;DECREMENT CYCCLE COUNT
1469 003060 001367          BNE      STAR1         ;CONTINUE IF NOT DONE GROUP
1470 003062 062737 000002 001054      ADD      #2,STRCHR      ;ADD 2 TO TABLE POINTER
1471 003070 000137 002776          JMP      STARA          ;CONTINUE
1472 003074 005237 001042          STARED: INC      LINCNT  ;INCREMENT LINE COUNT
1473 003100 012777 000012 175674      MOV      #12,ALPB      ;SEND LF
1474 003106          $WAIT
(1) 003106 105777 175666      TSTB    ALPS           ;TEST READY
(1) 003112 100375          BPL     #-4           ;WAIT FOR READY
1475 003114 032777 000001 175662      BIT     #BIT0,ASWR     ;STOP PRINT?
1476 003122 001450          BEQ     CONVRT         ;YES, BRANCH
1477 003124 000137 002752          JMP     STAROB         ;CONTINUE
1478
1479      ;LP14 PRINTING ROUTINE
1480
1481 003130 012737 000204 001036  TMTST:  MOV      #132,CHRCNT ;SET CHARACTER COUNT
1482 003136 005337 001054          DEC      STRCHR         ;GET NEXT STARTING CHARACTER
1483 003142 023727 001054 000040      CMP     STRCHR,#40     ;LEGAL CHARACTER ?
1484 003150 100003          BPL     IS             ;YES-CONTINUE
1485 003152 063737 001062 001054      ADD     NUMCHR,STRCHR  ;NO-MAKE LEGAL
1486 003160 013737 001054 001040  IS:    MOV     STRCHR,CHRCNT ;GET CHARACTER
1487 003166 023727 001040 000040  TMTST2: CMP     CHRCNT,#40 ;LEGAL CHARACTER ?
1488 003174 100003          BPL     IS             ;YES-CONTINUE
1489 003176 063737 001062 001040      ADD     NUMCHR,CHRCNT ;NO-MAKE LEGAL
1490 003204 013777 001040 175570  IS:    MOV     CHRCNT,ALPB  ;SEND CHARACTER
1491 003212 005337 001036          DEC     CHRCNT         ;DECREMENT CHARACTER COUNT
1492 003216 001726          BEQ     STARED        ;LINE FINISHED
1493 003220 005337 001040          DEC     CHRCNT         ;GET NEXT CHARACTER
1494 003224 000760          TMTST1: BR     TMTST2  ;CONTINUE
1495

```



1496  
1497 003226 007020  
1498 003230 000000  
1499 003232 000002  
1500  
1501  
1502  
1503  
1504  
1505  
1506 003234 005337 003230  
1507 003240 001401  
1508 003242 000002  
1509  
1510  
1511  
1512  
1513 003244 042777 000100 177760  
1514 003252 005037 011622  
1515 003256 012703 013527  
1516 003262 022737 000144 001042  
1517 003270 003006  
1518 003272 162737 000144 001042  
1519 003300 005237 011622  
1520 003304 000766  
1521 003306 062737 000060 011622  
1522 003314 113723 011622  
1523 003320 005037 011622  
1524 003324 022737 000012 001042  
1525 003332 003006  
1526 003334 162737 000012 001042  
1527 003342 005237 011622  
1528 003346 000766  
1529 003350 062737 000060 011622  
1530 003356 113723 011622  
1531 003362 013737 001042 011622  
1532 003370 062737 000060 011622  
1533 003376 113723 011622  
1534 003402 104000  
1535 003404 013470  
1536 003406 012737 013466 011470  
1537 003414 004437 011452  
1538 003420 000137 003444  
1539  
1540  
1541  
1542 003424 000040  
1543 003426 000117  
1544 003430 000076  
1545 003432 000055  
1546 003434 000134  
1547 003436 000113  
1548 003440 000072  
1549 003442 000051  
1550  
1551

MINCNT: 7020  
CNTR: 0  
DIA: 2

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

;LINE CLOCK SERVICE ROUTINE FOR KW11-L

LKSRV: DEC CNTR ;DECREMENT COUNTER  
BEQ CONVRT ;EXIT IF 1 MINUTE  
RTI ;RETURN

;ROUTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE

CONVRT: BIC #100,ADIA ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE  
CLR TYPDAT ;CLEAR DIGIT COUNT  
MOV #MES12,%3 ;SET MESSAGE POINTER  
1\$: CMP #100.,LINCNT ;GREATER THAN 100?  
BGT 2\$ ;NO, PRINT HUNDRED'S DIGIT  
SUB #100.,LINCNT ;YES, SUBTRACT 100  
INC TYPDAT ;INCREMENT HUNDRED'S DIGIT  
BR 1\$ ;CONTINUE CONVERSION  
2\$: ADD #60,TYPDAT ;MAKE ASCII  
MOVB TYPDAT,(%3)+ ;STORE DIGIT  
CLR TYPDAT ;CLEAR DIGIT COUNTER  
3\$: CMP #10.,LINCNT ;GREATER THEN 10?  
BGT 4\$ ;NO, PRINT DIGIT  
SUB #10.,LINCNT ;YES, SUBTRACT 10  
INC TYPDAT ;INCREMENT TEN'S DIGIT  
BR 3\$ ;CONTINUE CONVERSION  
4\$: ADD #60,TYPDAT ;MAKE ASCII  
MOVB TYPDAT,(%3)+ ;STORE DIGIT  
MOV LINCNT,TYPDAT ;GET ONE'S DIGIT  
ADD #60,TYPDAT ;MAKE ASCII  
MOVB TYPDAT,(%3)+ ;STORE DIGIT  
EMT +0 ;TYPE MESSAGE  
MES11 ;TYPE PRINT SPEED  
MOV #MES11A,PRTMSG ;SET PRINTER MESSAGE ADDRESS  
JSR %4,RINT ;PRINT PRINTER SPEED ON LINE PRINTER  
JMP SLWCK ;NEXT TEST

PATTB: 40  
117  
76  
55  
134  
113  
72  
51

;CHECK TOP OF FORM SWITCH

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1552
1553 003444          SLEWCK: $ENABLE
(1) 003444 022737 000176 001004  CMP      #176,SWR          ;S/W SWR ?
(1) 003452 001003          BNE      .+10         ;NO- CONTINUE
(1) 003454 052777 000100 175336  BIS      #100,ATKS    ;ENABLE KEYBOARD INTERRUPT
1554 003462 004437 011472          JSR      %4,TYPINT
1555 003466 004537 011346          JSR      %5,PRTINT  ;INITIALIZE PRINTER
1556 003472 000406          BR       SLW         ;BRANCH IF OK
1557 003474          $ERROR  \N
(1) 003474 012737 000024 001052  ERR24:  MOV      #24,   ERCOUNT  ;SET UP ERROR COUNT 24
(1)          000025          N=N+1
1558 003502 004537 011706          JSR      %5,STAER   ;REPORT PRINTER NOT READY
1559 003506 000000          HALT          ;HALT ON ERROR
1560 003510 012737 003724 001042  SLW:    MOV      #FFTAB,LINCNT ;LINE COUNT FOR SWITCH SETTING
1561 003516 012704 004002          MOV      #FFSET,%4  ;INIT SWITCH SETTING TABLE POINTER
1562 003522 012703 013242          SLW0:    MOV      #MES8,%3  ;INIT MESSAGE POINTER
1563 003526 012702 013355          MOV      #MES10,%2
1564 003532 111413          SLW1:    MOVB     (%4),(%3)  ;PUT SWITCH SETTINGS INTO MESSAGES
1565 003534 111412          MOVB     (%4),(%2)
1566 003536 122423          CMPB     (%4)+,(%3)+ ;INCREMENT POINTERS
1567 003540 105722          TSTB     (%2)+
1568 003542 105714          TSTB     (%4)        ;DONE MOVING SWITCH SETTINGS TO MSG'S?
1569 003544 001372          BNE      SLW1       ;BRANCH IF NOT DONE
1570 003546 005204          INC      %4        ;TABLE POINTER SET FOR NEXT SWITCH SETTING
1571 003550 104000          EMT      +0        ;TYPE MESSAGE
1572 003552 013206          MES7
1573 003554 000000          HALT          ;SET TOP OF FORM SWITCH TO ---
1574 003556 005777 175260          SLW11:  TST      @LINCNT   ;WAIT FOR OPERATOR TO SET SWITCH
1575 003562 001003          BNE      SLW1A     ;CHECK LINE COUNT
1576 003564 012737 013556 011470          MOV      #MES13,PRTMSG ;BRANCH IF NOT ZERO
1577 003572 005777 175202          SLW1A:  TST      @LPS     ;CHANGE PRINTER MESSAGE
1578 003576 100006          BPL      SLW2     ;TEST FOR ERRORS
1579 003600          $ERROR  \N        ;BRANCH IF NO ERROR
(1) 003600 012737 000025 001052  ERR25:  MOV      #25,   ERCOUNT  ;SET UP ERROR COUNT 25
(1)          000026          N=N+1
1580 003606 004537 011706          JSR      %5,STAER   ;REPORT ERROR SET
1581 003612 000000          HALT          ;HALT ON ERROR
1582 003614 012777 000014 175160  SLW2:    MOV      #14,@LPB   ;SEND FF
1583 003622          $WAIT
(1) 003622 105777 175152          TSTB     @LPS     ;TEST READY
(1) 003626 100375          BPL      .-4       ;WAIT FOR READY
1584 003630 004437 011452          JSR      %4,RINT    ;PRINT MESSAGE ON LINE PRINTER
1585 003634 062737 000002 001042  ADD      #2,LINCNT  ;NEXT LINE COUNT
1586 003642 022737 004000 001042  CMP      #FTABE,LINCNT ;DONE TEST?
1587 003650 001410          BEQ      DAVAV     ;YES, EXIT
1588 003652 005777 175164          TST      @LINCNT  ;DONE CHECK OF THIS SWITCH SETTING?
1589 003656 001721          BEQ      SLW0     ;YES, NEXT SWITCH SETTING
1590 003660 012737 013260 011470          MOV      #MES9,PRTMSG ;NO, CHECK THIS SETTING
1591 003666 000137 003556          JMP      SLW11    ;CONTINUE
1592 003672 013737 014536 013242  DAVAV:  MOV      TN013,MESB ;SET MESSAGE
1593 003700 104000          EMT      +0        ;TYPE MESSAGE
1594 003702 013204          MES7A
1595 003704 000000          HALT          ;RESET TOP OF FORM SWITCH
1596 003706 032777 040000 175070  BIT      #BIT14,@SWR ;WAIT FOR OPERATOR
1597 003714 001060          BNE      INDAT    ;DAVFU AVAILABLE?
1598 003716 000000          HALT          ;YES, DO DAVFU TESTS
;DONE OPERATOR TESTS - HALT

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1599 003720 000137 004550          JMP      TEST2          ;DEPRESS CONTINUE TO START PRINTING TESTS
1600                                     ;LOOP COUNTS FOR SLEW CHECKS
1601                                     FFTAB:  0
1602                                     18.
1603                                     0
1604                                     21.
1605                                     0
1606                                     24.
1607                                     0
1608                                     33.
1609                                     0
1610                                     36.
1611                                     0
1612                                     42.
1613                                     0
1614                                     48.
1615                                     0
1616                                     51.
1617                                     0
1618                                     66.
1619                                     0
1620                                     72.
1621                                     0
1622                                     84.
1623 FTAB:  0
1624
1625
1626 004002 020063 000040          FFSET:  .ASCIZ  /3 /          ;SWITCH SETTINGS FOR MESSAGES
1627 004006 027063 000065          .ASCIZ  /3.5/
1628 004012 020064 000040          .ASCIZ  /4 /
1629 004016 027065 000065          .ASCIZ  /5.5/
1630 004022 020066 000040          .ASCIZ  /6 /
1631 004026 020067 000040          .ASCIZ  /7 /
1632 004032 020070 000040          .ASCIZ  /8 /
1633 004036 027070 000065          .ASCIZ  /8.5/
1634 004042 030461 000040          .ASCIZ  /11 /
1635 004046 031061 000040          .ASCIZ  /12 /
1636 004052 032061 000040          .ASCIZ  /14 /
1637
1638
1639          .EVEN
1640
1641          ;CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1642
1643 004056 022737 000176 001004      INDAT:  $ENABLE
1644 (1) 004056 022737 000176 001004      CMP      #176,SWR          ;S/W SWR ?
1645 (1) 004064 001003          BNE      .+10             ;NO- CONTINUE
1646 (1) 004066 052777 000100 174724      BIS      #100,@TKS        ;ENABLE KEYBOARD INTERRUPT
1647 004074 004437 011472          JSR      %4,TYPINT
1648 004100 012737 004230 001040      MOV      #INDATT,CHRGEN  ;SET TABLE POINTER
1649 004106 005777 174666          INDO:   TST      @LPS      ;TEST FOR ERROR
1650 004112 100010          BPL      INDATO          ;BRANCH IF NO ERROR
1651 (1) 004114 012737 000026 001052      ERR26:  MOV      #26, ERCCOUNT ;SET UP ERROR COUNT 26
1652 (1) 004114 000027          N=N+1
1653 004122 004537 011706          JSR      %5,STAER        ;REPORT ERROR SET

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1650 004126 000000          HALT          ;HALT ON ERROR
1651 004130 000137 004056    JMP          INDAT        ;RESTART TEST
1652 004134 017777 174700 174640 INDATO: MOV      @CHRGEN,@LPB ;LOAD BUFFER
1653 004142 062737 000002 001040 ADD      #2,CHRGEN      ;NEXT DATA
1654 004150 005777 174664    TST      @CHRGEN      ;TEST CHAR
1655 004154 001405          BEQ        INDI         ;CONTINUE IF DONE
1656 004156          $WAIT
(1) 004156 105777 174616    TSTB     @LPS         ;TEST READY
(1) 004162 100375          BPL      -4           ;WAIT FOR READY
1657 004164 000137 004106    JMP          INDO
1658 004170 005777 174604    IND1:  TST      @LPS         ;TEST FOR ERROR SET
1659 004174 100410          BMI      INDAT1       ;BRANCH IF ERROR SET
1660 004176          $ERROR
(1) 004176 012737 000027 001052 ERR27: MOV      #27, ERCCOUNT ;SET UP ERROR COUNT 27
(1)          000030          N=N+1
1661 004204 004537 011706    JSR      %5,STAER     ;REPORT ERROR NOT SET
1662 004210 000000          HALT          ;HALT ON ERROR
1663 004212 000137 004056    JMP          INDAT        ;RESTART TEST
1664 004216 104000          EMT      +0           ;TYPE MESSAGE
1665 004220 012355          MESA
1666 004222 000000          HALT          ;ERROR SET OK - CLEAR & TURN ON LINE
1667          ;WAIT FOR OPERATOR
1668 004224 000137 004244    JMP      NODAT        ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1669          ;NEXT TEST
1670 004230 000356          INDATT: 356          ;DATA TABLE FOR ABOVE TEST
1671 004232 000001          1
1672 004234 000002          2
1673 004236 000003          3
1674 004240 000357          357
1675 004242 000000          0
1676
1677          ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
1678
1679 004244          NODAT: $ENABLE
(1) 004244 022737 000176 001004 CMP      #176,SWR      ;S/W SWR ?
(1) 004252 001003          BNE      +10          ;NO- CONTINUE
(1) 004254 052777 000100 174536 BIS      #100,@TKS     ;ENABLE KEYBOARD INTERRUPT
1680 004262 004437 011472    JSR      %4,TYPINT
1681 004266 012737 000200 001054 MOV      #200,STRCHR   ;SET PAPER INSTRUCTION
1682 004274 012737 004470 001040 NODOA: MOV      #NODAT3,CHRGEN ;SET TABLE POINTER FOR LOAD
1683 004302 005777 174472    NODO:  TST      @LPS         ;TEST FOR ERROR
1684 004306 100007          BPL      NODATO       ;BRANCH IF NO ERROR
1685 004310          $ERROR
(1) 004310 012737 000030 001052 ERR30: MOV      #30, ERCCOUNT ;SET UP ERROR COUNT 30
(1)          000031          N=N+1
1686 004316 004537 011706    JSR      %5,STAER     ;REPORT ERROR SET
1687 004322 000000          HALT          ;HALT ON ERROR
1688 004324 000747          BR
1689 004326 017777 174506 174446 NODATU: MOV      @CHRGEN,@LPB ;LOAD BUFFER
1690 004334 062737 000002 001040 ADD      #2,CHRGEN      ;NEXT DATA
1691 004342 022737 004550 001040 CMP      #NODAT4+2,CHRGEN ;DONE LOAD?
1692 004350 001405          BEQ      NODATA       ;BRANCH IF DONE
1693 004352          $WAIT
(1) 004352 105777 174422    TSTB     @LPS         ;TEST READY
(1) 004356 100375          BPL      -4           ;WAIT FOR READY
1694 004360 000137 004302    JMP      NODO
    
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1695 004364 013777 001054 174410 NODATA: MOV STRCHR,ALPB ;SEND DATA
1696 004372 005037 001036 CLR CHRCNT ;DELAY
1697 004376 005237 001036 1$: INC CHRCNT
1698 004402 001375 BNE 1$
1699 004404 005777 174370 TST ALPS ;TEST FOR ERROR SET
1700 004410 100410 BMI NODAT1 ;BRANCH IF ERROR SET
1701 004412 SERRROR \N
(1) 004412 012737 000031 001052 ERR31: MOV #31, ERCOUNT ;SET UP ERROR COUNT 31
(1) 000032 N=N+1
1702 004420 004537 011706 JSR %5,STAER ;REPORT ERROR NOT SET
1703 004424 000000 HALT ;HALT ON ERROR
1704 004426 000137 004274 JMP NODDA ;RETEST
1705 004432 005237 001054 NODAT1: INC STRCHR ;NEXT PAPER INSTRUCTION
1706 004436 022737 000214 001054 CMP #214,STRCHR ;DONE TEST?
1707 004444 001404 BEQ NODAT2 ;CONTINUE IF NOT DONE
1708 004446 104000 EMT +0 ;TYPE MESSAGE
1709 004450 012422 MESB ;ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1710 004452 000000 HALT ;WAIT FOR OPERATOR
1711 004454 000707 BR NODDA ;RELOAD & TEST NEXT CHANNEL
1712 004456 104000 NODAT2: EMT +0 ;TYPE MESSAGE
1713 004460 012355 MESA ;ERROR SET OK - TURN ON LINE
1714 004462 000000 HALT
1715 004464 000137 004550 JMP TEST2 ;JUMP
1716
1717
1718 004470 000356 NODAT3: 356 ;START LOAD
1719 004472 000000 0
1720 004474 000000 0
1721 004476 000000 0
1722 004500 000000 0
1723 004502 000000 0
1724 004504 000000 0
1725 004506 000000 0
1726 004510 000000 0
1727 004512 000000 0
1728 004514 000000 0
1729 004516 000000 0
1730 004520 000000 0
1731 004522 000000 0
1732 004524 000000 0
1733 004526 000000 0
1734 004530 000000 0
1735 004532 000000 0
1736 004534 000000 0
1737 004536 000000 0
1738 004540 000000 0
1739 004542 000000 0
1740 004544 000000 0
1741 004546 000357 NODAT4: 357 ;STOP LOAD
1742
1743 ;TEST 2
1744 ;TESTS INTERFACE AND PRINTER DATA PATHS
1745 ;WITH ALTERNATING ONES AND ZEROS
1746
1747 004550 TEST2: SENABLE
(1) 004550 022737 000176 001004 CMP #176,SWR ;S/W SWR ?

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(1) 004556 001003 BNE .+10 ;NO- CONTINUE
(1) 004560 052777 000100 174232 BIS #100,DTKS ;ENABLE KEYBOARD INTERRUPT
1748 004566 004437 011472 JSR %4,TYPINT
1749 004572 004537 011346 JSR %5,PRINT ;INITIALIZE PRINTER
1750 004576 000406 BR TST2AX ;BRANCH IF OK
1751 004600 SERROR \N
(1) 004600 012737 000032 001052 ERR32: MOV #32, ERCOUNT ;SET UP ERROR COUNT 32
(1) 000033 N=N+1
1752 004606 004537 011706 JSR %5,STAER ;REPORT PRINTER NOT READY
1753 004612 000000 HALT ;HALT ON ERROR
1754 004614 TST2AX: SPRINT \M
(1) 004614 013737 014514 014002 MOV TNO2,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 004622 004437 011422 JSR %4,PRNT ;PRINT TEST NUMBER
(1) 000003 M=M+1
1755 004626 012737 177740 001044 MOV #-32,CYCCNT ;SET UP LINE COUNT FOR 32 LINES
1756 004634 012737 177574 001036 MOV #-132,CHRCNT ;SET CHAR COUNT TO 132
1757 004642 013737 004716 001054 MOV SCHRSW,STRCHR ;SET CHAR. SWITCH TO U
1758 004650 005777 174124 T3A: TST @LPS ;TEST FOR ERROR
1759 004654 100006 BPL LP2B ;NO ERROR CONTINUE
1760 004656 SERROR \N
(1) 004656 012737 000033 001052 ERR33: MOV #33, ERCOUNT ;SET UP ERROR COUNT 33
(1) 000034 N=N+1
1761 004664 004537 011706 JSR %5,STAER ;REPORT ERROR SET
1762 004670 000000 HALT ;HALT ON ERROR
1763 004672 000177 174156 LP2B: JMP @STRCHR ;LOAD CHAR
1764 004676 013737 004720 001054 T2A: MOV RCHRSW,STRCHR ;RESET CHAR. SWITCH
1765 004704 012737 000125 001050 MOV #125,SAVE ;STORE CHAR
1766 004712 000137 004736 JMP TSA ;LOAD CHAR
1767
1768 004716 004676 SCHRSW: T2A
1769 004720 004722 RCHRSW: T1A
1770
1771 004722 013737 004716 001054 T1A: MOV SCHRSW,STRCHR ;SET CHAR. SWITCH TO U
1772 004730 012737 000052 001050 MOV #52,SAVE ;STORE CHAR
1773 004736 013777 001050 174036 T5A: MOV SAVE,@LPB ;LOAD BUFFER
1774 004744 005237 001036 INC CHRCNT ;INC CHARACTER COUNT
1775 004750 001337 BNE T3A ;CONTINUE
1776 004752 012777 000012 174022 MOV #12,@LPB ;SEND LF
1777 004760 SWAIT
(1) 004760 105777 174014 TSTB @LPS ;TEST READY
(1) 004764 100375 BPL .-4 ;WAIT FOR READY
1778 004766 012737 177574 001036 MOV #-132,CHRCNT ;RESET CHAR COUNT
1779 004774 005237 001044 INC CYCCNT ;INC CYCLE COUNT
1780 005000 001356 BNE TSA ;CONTINUE IF NOT DONE
1781 005002 032777 010000 173774 BIT #BIT12,@SWR ;LOOP ON TEST?
1782 005010 001257 BNE TEST2 ;LOOP
1783
1784 ;TEST 3
1785 ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1786 ;ALL CHARACTERS AND ILLEGAL CHARACTERS
1787
1788 005012 TEST3: SENABLE
(1) 005012 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 005020 001003 BNE .+10 ;NO- CONTINUE
(1) 005022 052777 000100 173770 BIS #100,DTKS ;ENABLE KEYBOARD INTERRUPT
1789 005030 004437 011472 JSR %4,TYPINT

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1790	005034					SPRINT	\M		
(1)	005034	013737	014516	014002		MOV	TN03,MES15		;SET TEST NUMBER FOR MESSAGE
(1)	005042	004437	011422			JSR	%4,PRNNT		;PRINT TEST NUMBER
(1)		000004				M=N+1			
1791	005046	012737	177765	001044		MOV	#-13,CYCCNT		;SET 21 LINES
1792	005054	000137	005206			JMP	LP2H		;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1793	005060	012737	177574	001036	T280:	MOV	#-132,CHRCNT		;SET CHAR COUNT FOR 132
1794	005066	012737	000040	001040	T280A:	MOV	#40,CHRGEN		;SET FIRST CHAR.
1795	005074	005777	173700		T281:	TST	ALPS		;DOES THE PRINTER HAVE AN ERROR
1796	005100	100006				BPL	LP2E		;BRANCH IF NO ERROR
1797	005102					SERROR	\N		
(1)	005102	012737	000034	001052	ERR34:	MOV	#34, ERCOUNT		;SET UP ERROR COUNT 34
(1)		000035				N=N+1			
1798	005110	004537	011706			JSR	%5,STAER		;REPORT ERROR
1799	005114	000000				HALT			;HALT ON ERROR
1800	005116	013777	001040	173656	LP2E:	MOV	CHRGEN,ALPB		;PRINT CHARACTER
1801	005124	005237	001036			INC	CHRCNT		;INC. CHAR. COUNT
1802	005130	001420				BEQ	T282		;BRANCH IF LINE IS FINISHED
1803	005132	005237	001040			INC	CHRGEN		;NEXT CHAR
1804	005136	032777	020000	173640		BIT	#BIT13,ASWR		;CHECK CHAR SET
1805	005144	001405				BEQ	T282B		;BRANCH IF 64 CHARS
1806	005146	022737	000200	001040		CM	#200,CHRGEN		;LEGAL CHAR?
1807	005154	001744				BEQ	T280A		;MAKE SPACE IF ILLEGAL
1808	005156	000746				BR	T281		;CONTINUE IF LEGAL CHAR
1809	005160	022737	000140	001040	T282B:	CMP	#140,CHRGEN		;LEGAL CHAR?
1810	005166	001737				BEQ	T280A		;MAKE SPACE IF ILLEGAL
1811	005170	000741				BR	T281		;CONTINUE IF LEGAL CHAR
1812	005172	012777	000012	173602	T282:	MOV	#12,ALPB		;ISSUE LINE FEED
1813	005200					SWAIT			
(1)	005200	105777	173574			TSTB	ALPS		;TEST READY
(1)	005204	100375				BPL	-4		;WAIT FOR READY
1814	005206	005037	001040		LP2H:	CLR	CHRGEN		;FIRST ILLEGAL CHAR
1815	005212	005777	173562		T283:	TST	ALPS		;TEST FOR ERROR
1816	005216	100006				BPL	LDCH		;BRANCH IF NO ERROR
1817	005220					SERROR	\N		
(1)	005220	012737	000035	001052	ERR35:	MOV	#35, ERCOUNT		;SET UP ERROR COUNT 35
(1)		000036				N=N+1			
1818	005226	004537	011706			JSR	%5,STAER		;REPORT ERROR SET
1819	005232	000000				HALT			;HALT ON ERROR
1820	005234	013777	001040	173540	LDCH:	MOV	CHRGEN,ALPB		;TRANSMIT CHARACTER
1821	005242	005237	001040		T284:	INC	CHRGEN		;NEXT CHAR
1822	005246	022737	000012	001040		CMP	#12,CHRGEN		;TEST FOR LINE FEED
1823	005254	001772				BEQ	T284		;SKIP IF LF
1824	005256	022737	000014	001040		CMP	#14,CHRGEN		;TEST FOR FORM FEED
1825	005264	001766				BEQ	T284		;SKIP IF FF
1826	005266	022737	000015	001040		CMP	#15,CHRGEN		;TEST FOR CARRIAGE RETURN
1827	005274	001762				BEQ	T284		;SKIP IF CR
1828	005276	023727	001040	000040		CMP	CHRGEN,#40		;CHECK IF LEGAL CHAR
1829	005304	002753				BLT	LDCH		;CONTINUE IF STILL ILLEGAL CHAR
1830	005306	032777	020000	173470		BIT	#BIT13,ASWR		;CHECK CHAR SET
1831	005314	001007				BNE	T285		;BRANCH IF 96 CHAR SET
1832	005316	052737	000100	001040		BIS	#100,CHRGEN		;SET BIT 7 IF NOT SET
1833	005324	032737	000200	001040		BIT	#200,CHRGEN		;DONE ILLEGAL CHARS?
1834	005332	001740				BEQ	LDCH		;BRANCH IF NOT DONE
1835	005334	012777	000012	173440	T285:	MOV	#12,ALPB		;ISSUE LINE FEED
1836	005342					SWAIT			

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(1) 005342 105777 173432      TSTB  QALPS      ;TEST READY
(1) 005346 100375      BPL    .-4       ;WAIT FOR READY
1837 005350 005237 001044      INC    CYCCNT    ;INCREMENT LINE COUNT
1838 005354 001241      BNE    T2B0     ;CONTINUE IF NOT DONE
1839 005356 032777 010000 173420      BIT    #BIT12, QSWR ;CHECK TO LOOP ON TEST
1840 005364 001212      BNE    TEST3    ;LOOP
1841
1842      ;TEST 4
1843      ;OVER PRINT TEST
1844      ;OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES
1845
1846 005366      CHRCHK: SENABLE
(1) 005366 022737 000176 001004      CMP    #176, SWR      ;S/W SWR ?
(1) 005374 001003      BNE    .+10       ;NO- CONTINUE
(1) 005376 052777 000100 173414      BIS    #100, QTKS    ;ENABLE KEYBOARD INTERRUPT
1847 005404 004437 011472      JSR    %4, TYPINT
1848 005410      SPRINT  \M
(1) 005410 013737 014520 014002      MOV    TN04, MES15   ;SET TEST NUMBER FOR MESSAGE
(1) 005416 004437 011422      JSR    %4, PRNNT    ;PRINT TEST NUMBER
(1) 005422 000005      M=M+1
1849 005422 012737 177750 001042      MOV    #-24, LINCNT ;SET UP LINE COUNT FOR 24 LINES
1850 005430 012737 177776 001044      MOV    #-2, CYCCNT  ;SET UP CYCLE COUNT
1851 005436 013737 005600 001054      MOV    CHRE, STRCHR ;SET CHAR TAG TO SPACE
1852 005444 012737 177574 001036      MOV    #-132, CHRCNT ;SET CHAR COUNT
1853 005452 005777 173322      CR:  TST  QALPS      ;TEST FOR ERROR
1854 005456 100006      CRO:  BPL  CR1       ;CONTINUE IF NO ERROR
1855 005460      SERROR  \N
(1) 005460 012737 000036 001052      ERR36: MOV    #36, ERCOUNT ;SET UP ERROR COUNT 36
(1) 005466 004537 011706      N=N+1
1856 005466 004537 011706      JSR    %5, STAER    ;REPORT ERROR SET
1857 005472 000000      HALT
1858 005474 000177 173354      CR1:  JMP    QSTRCHR    ;HALT ON ERROR
1859 005500 013737 005600 001054      CR2:  MOV    CHRE, STRCHR ;OPPOSITE CHAR
1860 005506 012737 000105 001050      CR3:  MOV    #105, SAVE  ;SET CHAR SWITCH TO SPACE
1861 005514 013777 001050 173260      MOV    SAVE, QALPB  ;SEND E
1862 005522 005237 001036      INC    CHRCNT      ;LOAD BUFFER
1863 005526 001351      BNE    CRO         ;INCREMENT CHAR COUNT
1864 005530 005237 001044      INC    CYCCNT      ;BRANCH IF NOT DONE
1865 005534 001422      BEQ    CR5         ;INCREMENT CYCLE COUNT
1866 005536 012777 000015 173236      MOV    #15, QALPB  ;BRANCH IF FINISHED OVERPRINTS
1867 005544      $WAIT
(1) 005544 105777 173230      TSTB  QALPS      ;TEST READY
(1) 005550 100375      BPL    .-4       ;WAIT FOR READY

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SEQ 0040

1869	005552	000137	005444			JMP	CR		;OVERPRINT LINE
1870	005556	013737	005576	001054	CR7:	MOV	CHRS,STRCHR		;RESET CHAR SWITCH
1871	005564	012737	000040	001050		MOV	#40,SAVE		;SEND SPACE

1873	005572	000137	005514		JMP	CR3		;CONTINUE
1874								
1875	005576	005500			CHRS:	CR2		
1876	005600	005556			CHRE:	CR7		
1877	005602	012777	000012	173172	CR5:	MOV	#12, @LPB	;SEND LF
1878	005610					\$WAIT		
(1)	005610	105777	173164			TSTB	@LPS	;TEST READY
(1)	005614	100375				BPL	.-4	;WAIT FOR READY
1879	005616	012737	177776	001044		MOV	#-2, CYCCNT	;RESET CYCLE COUNT
1880	005624	012737	177574	001036		MOV	#-132, CHRCNT	;RESET CHAR COUNT
1881	005632	005237	001042			INC	LINCNT	;INCREMENT LINE COUNT
1882	005636	001326				BNE	CR3	;BRANCH IF NOT DONE
1883	005640	032777	010000	173136		BIT	#BIT12, @SWR	;LOOP ON TEST?
1884	005646	001247				BNE	CHRCHK	;YES, LOOP

1885  
1886  
1887  
1888  
1889  
1890

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

1895  
1896  
1897  
1898 005650  
(1) 005650 022737 000176 001004  
(1) 005656 001003  
(1) 005660 052777 000100 173132  
1899 005666 004437 011472  
1900 005672  
(1) 005672 013737 014522 014002  
(1) 005700 004437 011422  
(1) 000006  
1901 005704 012737 177760 001042  
1902 005712 012737 177574 001036  
1903 005720 012737 177776 001044  
1904 005726 013737 001036 001056  
1905 005734 062737 000205 001056  
1906 005742 012737 000040 001040  
1907 005750 000406  
1908 005752 012737 000105 001040

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

OVRPRT: \$ENABLE

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

E04

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SEQ 0043

1910	005760	013777	001040	173014	OVR1:	MOV	CHRGEN,ALPB	:	LOAD BUFFER
1911	005766	005777	173006		OVR2:	TST	ALPS	:	TEST FOR ERROR
1912	005772	100006				BPL	OVR3	:	BRANCH IF NO ERROR
1913	005774					SEERROR	\N		
(1)	005774	012737	000037	001052	ERR37:	MOV	#37, ERCOUNT	:	SET UP ERROR COUNT 37
(1)		000040				N=N+1			
1914	006002	004537	011706			JSR	%5,STAER	:	REPORT ERROR SET
1915	006006	000000				HALT			
1916	006010	005337	001056		OVR3:	DEC	STRCNT	:	DECREMENT SPACE COUNTER

F04

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SEQ 0044

1919 006014 003361

BGT OVR1

;BRANCH IF NOT DONE SPACES

G04

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SEQ 0045

1921 006016 001755  
1922 006020 005237 001036  
1923 006024 001437  
1924 006026 005237 001044

OVR5: BEQ OVR4  
INC CHRCNT  
BEQ OVR8  
INC CYCCNT

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

H04

1926	006032	001352			BNE	OVR1		;CONTINUE SENDING E'S IF NOT DONE
1927	006034	012777	000015	172740	MOV	#15,ALPB		;SEND CR
1928	006042				SWAIT		OVR6:	
(1)	006042	105777	172732		TSTB	ALPS		;TEST READY
(1)	006046	100375			BPL	-4		;WAIT FOR READY
1929	006050	005737	001036		TST	CHRCNT		;LINE DONE?
1930	006054	001321			BNE	OVR0		;NO, CONTINUE OVER PRINT
1931	006056	005237	001042		INC	LINCNT		;YES, INCREMENT LINE COUNT
1932	006062	001425			BEQ	OVRXT		;EXIT IF DONE TEST
1933	006064	032737	000001	001042	BIT	#1,LINCNT		;WHICH LINE NEXT?
1934	006072	001707			BEQ	OVR		;BRANCH TO SEND E'S
1935	006074	012737	000115	001040	MOV	#115,CHGEN		;SET UP TO SEND M'S
1936	006102	012737	177573	001036	MOV	#-133,CHRCNT		;SET CHAR COUNT
1937	006110	005037	001056		CLR	STRCNT		;CLEAR SPACE COUNT
1938	006114	005037	001044		CLR	CYCCNT		;CLEAR CYCLE COUNT

104

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SEQ 0047

1940 006120 000137 005766 JMP OVR2 ;PRINT LINE OF M'S  
1941 006124 012777 000012 172650 OVR8: MOV #12,ALPB ;SEND LF



J04

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SEQ 0048

1944 006132 000137 006042

JMP OVR6

;CONTINUE

K04

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SEQ 0049

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1946 006136 032777 010000 172640 OVREXT: BIT #BIT12,JSWR ;LOOP ON TEST?
1947 006144 001241 BNE OVRPRT ;LOOP
1948
1949 ;TEST 6
1950 ;PRINT CONTROL TEST
1951 ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
1952 ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
1953
1954 006146 PRTCTL: $ENABLE
(1) 006146 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 006154 001003 BNE .+10 ;NO- CONTINUE
(1) 006156 052777 000100 172634 BIS #100,JKS ;ENABLE KEYBOARD INTERRUPT
1955 006164 004437 011472 JSR %4,TYPINT

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L04

1957	006170					SPRINT	\M		
(1)	006170	013737	014524	014002		MOV	TN06,MES15		;SET TEST NUMBER FOR MESSAGE
(1)	006176	004437	011422			JSR	%4,PRNNT		;PRINT TEST NUMBER
(1)		000007				M=M+1			
1958	006202	012737	000060	001054		MOV	#60,STRCHR		;FIRST START CHAR
1959	006210	032777	020000	172566	PRT0:	BIT	#BIT13,JSWR		;TEST FOR CHAR SET
1960	006216	001404				BEQ	PRT1		;BRANCH IF 64 CHARS
1961	006220	012737	177641	001034		MOV	#-95.,SEGCNT		;SET OVERFLOW COUNT
1962	006226	000403				BR	PRT2		;BRANCH
1963	006230	012737	177701	001034	PRT1:	MOV	#-63.,SEGCNT		;SET OVERFLOW COUNT
1964	006236	012737	177574	001036	PRT2:	MOV	#-132.,CHRCNT		;SET CHAR COUNT
1965	006244	013737	001054	001040		MOV	STRCHR,CHRCNT		;GET START CHAR
1966	006252	005777	172522		PRT3:	TST	ALPS		;TEST FOR ERROR
1967	006256	100006				BPL	PRT4		;BRANCH IF NO ERROR
1968	006260					SERROR	\N		
(1)	006260	012737	000040	001052	ERR40:	MOV	#40, ERCOUNT		;SET UP ERROR COUNT 40
(1)		000041				N=N+1			
1969	006266	004537	011706			JSR	%5,STAER		;REPORT ERROR SET
1970	006272	000000				HALT			;HALT ON ERROR
1971	006274	013777	001040	172500	PRT4:	MOV	CHRCNT,ALPB		;LOAD BUFFER
1972	006302	005237	001036			INC	CHRCNT		;INCREMENT CHAR COUNT
1973	006306	002761				BLT	PRT3		;BRANCH IF NOT 132 CHARS
1974	006310	001433				BEQ	PRTA		;START OVERFLOW
1975	006312	005237	001040			INC	CHRCNT		;NEXT CHAR

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1977 006316 005237 001034      INC      SEGCNT      ; INCREMENT OVERFLOW COUNT
1978 006322 001353      BNE      PRT3      ; CONTINUE IF NOT DONE
1979 006324 012777 000012 172450      MOV      #12,ALPB  ; SEND LF
1980 006332      SWAIT
   (1) 006332 105777 172442      TSTB     ALPS      ; TEST READY
   (1) 006336 100375      BPL      .-4      ; WAIT FOR READY
1981 006340 022737 000040 001054      CMP      #40,STRCHR ; LAST START CHAR SPACE?
1982 006346 001421      BEQ      PRT6      ; YES, BRANCH
1983 006350 022737 000065 001054      CMP      #65,STRCHR ; LAST START CHAR 5?
1984 006356 001422      BEQ      PRT7      ; YES, BRANCH
1985 006360 022737 000071 001054      CMP      #71,STRCHR ; DONE?
1986 006366 001423      BEQ      PRT8      ; YES
1987 006370 005237 001054      INC      STRCHR    ; NO, GET NEXT START CHAR
1988 006374 000137 006210      JMP      PRT0      ; CONTINUE
1989 006400 012737 000041 001040 PRTA:  MOV      #41,CHGEN ; GET FIRST CHAR IN SET
1990 006406 000137 006252      JMP      PRT3      ; START OVERFLOW
1991 006412 012737 000066 001054 PRT6:  MOV      #66,STRCHR ; SET START CHAR TO 6
1992 006420 000137 006210      JMP      PRT0      ; CONTINUE
1993 006424 012737 000040 001054 PRT7:  MOV      #40,STRCHR ; SET START CHAR TO SPACE
1994 006432 000137 006210      JMP      PRT0      ; CONTINUE
1995 006436 032777 010000 172340 PRT8:  BIT      #BIT12,SWR ; CHECK LOOP ON TEST
1996 006444 001240      BNE      PRTCTL   ; LOOP
1997
1998
1999
2000      ; TEST 7
2001      ; MULTIPLE LINE ADVANCE TEST
2002      ; TESTS MULTIPLE LINE ADVANCES AND TIMINGS
2003      ; PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER
2003 006446      MLF:  SENABLE
   (1) 006446 022737 000176 001004      CMP      #176,SWR  ; S/W SWR ?
   (1) 006454 001003      BNE      .+10     ; NO- CONTINUE
   (1) 006456 052777 000100 172334      BIS      #100,JKS  ; ENABLE KEYBOARD INTERRUPT
2004 006464 004437 011472      JSR      %4,TYPINT
2005 006470      $PRINT  \M
   (1) 006470 013737 014526 014002      MOV      TN07,MES15 ; SET TEST NUMBER FOR MESSAGE
   (1) 006476 004437 011422      JSR      %4,PRNNT  ; PRINT TEST NUMBER
   (1) 000010      M=M+1
2006 006502 012737 006634 001054      MOV      #TABSTR,STRCHR ; FIRST CHAR
2007 006510 012737 177574 001036 MLFA:  MOV      #-132,CHRCNT ; SET CHAR COUNT
2008 006516 117737 172332 001040      MOVB    @STRCHR,CHGEN ; GET CHAR
2009 006524 001452      BEQ      MLF4      ; BRANCH IF DONE
2010 006526 005777 172246      MLFO:  TST      ALPS    ; TEST FOR ERROR
2011 006532 100006      BPL      MLF1      ; CONTINUE IF NO ERROR
2012 006534      $ERROR  \N
   (1) 006534 012737 000041 001052 ERR41: MOV      #41,ERCOUNT ; SET UP ERROR COUNT 41
   (1) 000042      N=N+1
2013 006542 004537 011706      JSR      %5,STAER  ; REPORT ERROR
2014 006546 000000      HALT
2015 006550 013777 001040 172224 MLF1:  MOV      CHGEN,ALPB ; LOAD BUFFER
2016 006556 005237 001036      INC      CHRCNT   ; INCREMENT CHAR COUNT
2017 006562 001361      BNE      MLFO      ; CONTINUE
2018 006564 117737 172264 001042      MOVB    @STRCHR,LINCNT ; GET ASCII LINE COUNT
2019 006572 042737 177770 001042      BIC      #177770,LINCNT ; MAKE OCTAL
2020 006600 005237 001042      INC      LINCNT   ; ADD 1
2021 006604 012777 000012 172170 MLF2:  MOV      #12,ALPB  ; SEND LF
2022 006612      SWAIT

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N04

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SEQ 0052

(1)	006612	105777	172162
(1)	006616	100375	
2023	006620	005337	001042
2024	006624	001367	
2025	006626	005237	001054

TSTB	2LPS
BPL	.-4
DEC	LINCNT
BNE	MLF2
INC	STRCHR

: TEST READY
: WAIT FOR READY
: DECREMENT LINE COUNT
: CONTINUE
: NEXT CHAR

```

2029 006632 000726 BR MLFA ;CONTINUE
2030
2031 006634 033462 033062 033463 TABSTR: .ASCIZ /272637463540/
006642 033064 032463 030064
006650 000
2032
2033 006652 .EVEN
2034
2035 006652 032777 010000 172124 MLF4: BIT #BIT12,2SWR ;CHECK LOOP ON TEST
2036 006660 001272 BNE MLF ;LOOP
2037 .EVEN
2038
2039 ;TEST 8
2040 ;HIGH SPEED PRINT TEST
2041
2042 006662 HSPRT: SENABLE
(1) 006662 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 006670 001003 BNE .+10 ;NO- CONTINUE
(1) 006672 052777 000100 172120 BIS #100,2TKS ;ENABLE KEYBOARD INTERRUPT
2043 006700 004437 011472 JSR %4,TYPINT
2044 006704 SPRINT \M
(1) 006704 013737 014530 014002 MOV TN010,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 006712 004437 011422 JSR %4,PRINT ;PRINT TEST NUMBER
(1) 000011 M=M+1
2045 006716 032777 002000 172060 BIT #BIT10,2SWR ;CHECK FOR NEW DRUM / OLD DRUM
2046 006724 001135 BNE HSPRT ;BRANCH IF NEW DRUM
2047 006726 032777 020000 172050 BIT #BIT13,2SWR ;CHECK CHAR SET
2048 006734 001007 BNE HSO0A ;BRANCH IF 96 CHAR SET
2049 006736 012737 000140 001060 MOV #140,LEGCHR ;LEGAL CHK
2050 006744 012737 000100 001062 MOV #100,NUMCHR ;#CHARS
2051 006752 000406 BR HSO0 ;CONTINUE
2052 006754 012737 000200 001060 HSO0A: MOV #200,LEGCHR ;LEGAL CHECK
2053 006762 012737 000140 001062 MOV #140,NUMCHR ;#CHARS
2054 006770 012737 000040 001054 HSO0: MOV #40,STRCHR ;SET UP FIRST LINE
2055 006776 012737 000177 001042 HSO: MOV #127,LINCNT ;SET LINE COUNT FOR 2 PAGES
2056 007004 012737 177574 001036 HSO: MOV #-132,CHRCNT ;SET CHAR COUNT
2057 007012 012737 177757 001044 HSO: MOV #-17,CYCCNT ;SET GROUP COUNT
2058 007020 013737 001054 001040 HSO: MOV STRCHR,CHRGEN ;STORE START CHAR
2059 007026 005777 171746 HSI: TST 2LPS ;TEST FOR ERROR
2060 007032 100006 BPL HS2 ;BRANCH IF NO ERROR
2061 007034 SERROR \N
(1) 007034 012737 000042 001052 ERR42: MOV #42, ERCOUNT ;SET UP ERROR COUNT 42
(1) 000043 N=N+1
2062 007042 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2063 007046 000000 HALT ;HALT ON ERROR
2064 007050 013777 001040 171724 HS2: MOV CHRGEN,2LPB ;LOAD BUFFER
2065 007056 005237 001036 HS2: INC CHRCNT ;INCREMENT CHAR COUNT
2066 007062 001424 BEQ HS4 ;BRANCH IF DONE LINE
2067 007064 005237 001040 HS2: INC CHRGEN ;NEXT CHAR
2068 007070 005237 001044 HS2: INC CYCCNT ;INCREMENT GROUP COUNT
2069 007074 001410 BEQ HS3 ;BRANCH IF DONE GROUP
2070 007076 023737 001060 001040 HS2: CMP LEGCHR,CHRGEN ;LEGAL CHAR?
2071 007104 001350 BNE HS1 ;BRANCH AND CONTINUE IF LEGAL CHAR
2072 007106 163737 001062 001040 HS2: SUB NUMCHR,CHRGEN ;MAKE LEGAL
2073 007114 000744 BR HS1 ;CONTINUE
2074 007116 013737 001054 001040 HS3: MOV STRCHR,CHRGEN ;GET FIRST CHAR IN GROUP

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2075 007124 012737 177757 001044      MOV      #-17.,CYCCNT      ;RESET CYCLE COUNT
2076 007132 000735                    BR        HS1             ;CONTINUE
2077 007134 012777 000012 171640 HS4:  MOV      #12,ALPB        ;SEND LF
2078 007142                    $WAIT
(1) 007142 105777 171632      TSTB     ALPS             ;TEST READY
(1) 007146 100375                    BPL      .-4             ;WAIT FOR READY
2079 007150 005337 001042      DEC      LINCNT          ;DECREMENT LINE COUNT
2080 007154 002413                    BLT      HS6             ;EXIT TEST IF DONE
2081 007156 162737 000004 001054      SUB      #4,STRCHR       ;SKIP 4 LINES ON DRUM, FIND START CHAR
2082 007164 022737 000040 001054      CMP      #40,STRCHR      ;START CHAR A LEGAL CHAR?
2083 007172 003704                    BLE      HS0             ;CONTINUE IF LEGAL START CHAR
2084 007174 063737 001062 001054      ADD      NUMCHR,STRCHR   ;MAKE LEGAL AND CONTINUE
2085 007202 000700                    BR        HS0             ;CONTINUE
2086 007204 032777 010000 171572 HS6:  BIT      #BIT12,ASWR     ;LOOP ON TEST?
2087 007212 001223                    BNE      HSPRT          ;LOOP
2088
2089
2090 007214 000137 007464                    JMP      SNGCHR          ;JUMP TO TEST 9 AFTER COMPLETION
2091
2092
2093                    ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
2094
2095 007220 032777 020000 171556 NHSVRT: BIT      #BIT13,ASWR     ;CHECK CHARACTER SET
2096 007226 001007                    BNE      NHS00A         ;BRANCH IF 96 CHARACTER SET
2097
2098 007230 012737 000140 001060      MOV      #140,LEGCHR     ;LEGAL CHARACTER CHECK
2099 007236 012737 000100 001062      MOV      #100,NUMCHR     ;# CHARACTERS = 64
2100 007244 000406                    BR        NHS00          ;CONTINUE
2101 007246 012737 000200 001060 NHS00A: MOV      #200,LEGCHR   ;LEGAL CHARACTER CHECK
2102 007254 012737 000140 001062      MOV      #140,NUMCHR     ;# CHARACTERS = 96
2103 007262 012737 000003 001064 NHS00:  MOV      #3,OFFSET      ;COLUMN/CHARACTER OFFSET
2104 007270 012737 000040 001054      MOV      #40,STRCHR      ;SET UP FIRST CHARACTER OF FIRSTLINE
2105 007276 012737 000177 001042      MOV      #127.,LINCNT    ;SET LINE COUNT FOR 2 PAGES
2106 007304 012737 177574 001036 NHS0:   MOV      #-132.,CHRCNT    ;SET CHARACTER COUNT = # COLUMNS
2107 007312 013737 001054 001040      MOV      STRCHR,CHRCNT   ;STORE STARTING CHARACTER
2108 007320 005777 171454      NHS1:   TST      ALPS        ;TEST FOR ERROR
2109 007324 100006                    BPL      NHS2           ;BRANCH IF NO ERROR
2110 007326                    $ERROR \N
(1) 007326 012737 000043 001052 ERR43: MOV      #43,   ERCOUNT      ;SET UP ERROR COUNT 43
(1) 000044                    N=N+1
2111 007334 004537 011706                    JSR      %5,STAER        ;REPORT ERROR SET
2112 007340 000000                    HALT                    ;HALT ON ERROR
2113 007342 013777 001040 171432 NHS2:   MOV      CHRCNT,ALPB     ;LOAD PRINTER BUFFER
2114 007350 005237 001036                    INC      CHRCNT          ;INCREMENT CHARACTER COUNT
2115 007354 001413                    BEQ      NHS4           ;BRANCH IF LINE DONE
2116 007356 063737 001064 001040      ADD      OFFSET,CHRCNT   ;NEXT CHARACTER
2117 007364 023737 001060 001040      CMP      LEGCHR,CHRCNT   ;LEGAL CHARACTER
2118 007372 003352                    BGT      NHS1           ;BRANCH + CONTINUE IF LEGAL CHARACTER
2119 007374 163737 001062 001040      SUB      NUMCHR,CHRCNT   ;MAKE LEGAL
2120 007402 000746                    BR        NHS1           ;CONTINUE
2121 007404 012777 000012 171370 NHS4:   MOV      #12,ALPB        ;SEND LINE FEED.
2122 007412                    $WAIT
(1) 007412 105777 171362      TSTB     ALPS             ;TEST READY
(1) 007416 100375                    BPL      .-4             ;WAIT FOR READY
2123 007420 005337 001042      DEC      LINCNT          ;DECREMENT LINE COUNT
2124 007424 002413                    BLT      NHS6             ;EXIT IF TEST IS DONE
    
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2125 007426 162737 000004 001054 SUB #4,STRCHR ;SKIP 4 LINES DOWN DRUM,FIND STARTING CHARACTER
2126 007434 022737 000040 001054 CMP #40,STRCHR ;START CHARACTER A LEGAL CHARACTER
2127 007442 003720 BLE NHS0 ;CONTINUE IF LEGAL START CHARACTER
2128 007444 063737 001062 001054 ADD NUMCHR,STRCHR ;MAKE LEGAL + CONTINUE
2129 007452 000714 BR NHS0 ;CONTINUE
2130 007454 032777 010000 171322 NHS6: BIT #BIT12,SWR ;LOOP ON TEST
2131 007462 001256 BNE NHSPRT ;LOOP
2132
2133 ;TEST 9
2134 ;WORST CASE NOISE TEST
2135 ;SINGLE CHAR. ACROSS ALL COLS.
2136
2137 007464 SNGCHR: SENABLE
(1) 007464 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 007472 001003 BNE .+10 ;NO- CONTINUE
(1) 007474 052777 000100 171316 BIS #100,ATKS ;ENABLE KEYBOARD INTERRUPT
2138 007502 004437 011472 JSR %4,TYPINT
2139 007506 $PRINT \M
(1) 007506 013737 014532 014002 MOV TNO11,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 007514 004437 011422 JSR %4,PRNT ;PRINT TEST NUMBER
(1) 000012 M=M+1
2140 007520 032777 020000 171256 BIT #BIT13,SWR ;TEST CHAR SET
2141 007526 001404 BEQ S2 ;BRANCH IF 64
2142 007530 012737 177640 001042 MOV #96.,LINCNT ;96 CHAR.
2143 007536 000403 BR .+10 ;BRANCH
2144 007540 012737 177700 001042 S2: MOV #64.,LINCNT ;64 CHAR.
2145 007546 012737 000040 001040 MOV #40,CHRCNT ;SET UP SPACE
2146 007554 012737 177574 001036 S2A: MOV #132.,CHRCNT ;SET CHAR COUNT FOR 132
2147 007562 005777 171212 S1: TST ALPS ;TEST FOR ERRORS
2148 007566 100006 BPL XS1X ;BRANCH IF NO ERRORS
2149 007570 $ERROR \N
(1) 007570 012737 000044 001052 ERR44: MOV #44, ERCOUNT ;SET UP ERROR COUNT 44
(1) 000045 N=N+1
2150 007576 004537 011706 JSR %5,STAER ;REPORT ERROR
2151 007602 000000 HALT ;HALT ON ERROR
2152 007604 013777 001040 171170 XS1X: MOV CHRCNT,ALPB ;LOAD PRINTER BUFFER
2153 007612 005237 001036 INC CHRCNT ;INCREMENT CHAR COUNT
2154 007616 001361 BNE S1 ;CONTINUE IF NOT DONE LINE
2155 007620 012777 000012 171154 S4X2: MOV #12,ALPB ;ISSUE LINE FEED
2156 007626 $WAIT
(1) 007626 105777 171146 TSTB ALPS ;TEST READY
(1) 007632 100375 BPL .-4 ;WAIT FOR READY
2157 007634 005237 001040 INC CHRCNT ;+1 CHAR.
2158 007640 005237 001042 INC LINCNT ;+1 LINE COUNT
2159 007644 002743 BLT S2A ;CONTINUE IF NOT DONE
2160 007646 001764 BEQ S4X2 ;SEND BLANK LINE AT END OF TEST
2161 007650 032777 010000 171126 LPS7: BIT #BIT12,SWR ;CHECK TO LOOP ON TEST
2162 007656 001302 BNE SNGCHR ;LOOP ON TEST
2163
2164
2165
2166 ;TEST 10
2167 ;DRUM PATTERN CHARACTER TEST
2168
2169 007660 ROTATE: SENABLE
(1) 007660 022737 000176 001004 CMP #176,SWR ;S/W SWR ?

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(1) 007666 001003      BNE      .+10      ;NO- CONTINUE
(1) 007670 052777 000100 171122  BIS      #100,DTKS ;ENABLE KEYBOARD INTERRUPT
2170 007676 004437 011472  JSR      %4,TYPINT
2171 007702          SPRINT      \M
(1) 007702 013737 014534 014002  MOV      TNO12,MSG15 ;SET TEST NUMBER FOR MESSAGE
(1) 007710 004437 011422  JSR      %4,PRNT   ;PRINT TEST NUMBER
(1) 000013
2172
2173 007714 032777 002000 171062  BIT      #BIT10,@SWR ;CHECK FOR NEW DRUM/OLD DRUM
2174 007722 001122      BNE      NROTAT    ;BRANCH IF NEW DRUM
2175 007724 032777 020000 171052  BIT      #BIT13,@SWR ;TEST CHAR SET
2176 007732 001012      BNE      ROTO      ;SKIP IF 96 CHAR
2177 007734 012737 000137 001042  MOV      #137,LINCNT ;LAST CHAR
2178 007742 012737 000140 001060  MOV      #140,LEGCHR ;LEGAL CHK
2179 007750 012737 000100 001062  MOV      #100,NUMCHR ;#CHARS
2180 007756 000411      BR       ROT1      ;CONTINUE
2181 007760 012737 000177 001042  ROT0:  MOV      #177,LINCNT ;LAST CHAR
2182 007766 012737 000200 001060  MOV      #200,LEGCHR ;LEGAL CHK
2183 007774 012737 000140 001062  MOV      #140,NUMCHR ;#CHARS
2184 010002 005037 001044      ROT1:  CLR      CYCCNT   ;CLEAR CYCLE COUNT
2185 010006 005237 001044      ROT2:  INC      CYCCNT   ;INC CYCLE COUNT
2186 010012 005037 001040      CLR      CHRCNT   ;CLEAR POINTER
2187 010016 005237 001040      ROT3:  INC      CHRCNT   ;INC POINTER
2188 010022 013737 001040 001054  MOV      CHRCNT,STRCHR ;STORE POINTER
2189 010030 063737 001042 001054  ADD      LINCNT,STRCHR ;FIND CHAR
2190 010036 023737 001054 001060  CMP      STRCHR,LEGCHR ;LEGAL?
2191 010044 002403      BLT     ROT4      ;BRANCH IF LEGAL
2192 010046 163737 001062 001054  SUB      NUMCHR,STRCHR ;MAKE LEGAL
2193 010054 005777 170720      ROT4:  TST      @LPS     ;TEST FOR ERRORS
2194 010060 100006      BPL     ROT5      ;BRANCH IF NO ERRORS
2195 010062
(1) 010062 012737 000045 001052  ERR45: MOV      #45, ERRCOUNT ;SET UP ERROR COUNT 45
(1) 000046      N=N+1
2196 010070 004537 011706      JSR      %5,STAER  ;REPORT ERROR
2197 010074 000000      HALT     ;HALT ON ERROR
2198 010076 013777 001054 170676  ROT5:  MOV      STRCHR,@LPB ;LOAD BUFFER
2199 010104 023727 001040 000021  CMP      CHRCNT,#17. ;DONE GROUP?
2200 010112 001341      BNE      ROT3      ;NO GET NEXT CHAR
2201 010114 023727 001044 000010  CMP      CYCCNT,#8. ;DONE LINE?
2202 010122 001331      BNE      ROT2      ;NO, NEXT GROUP
2203 010124 012777 000012 170650  MOV      #12,@LPB  ;YES, SEND LF
2204 010132
(1) 010132 105777 170642      SWAIT   ;WAIT
(1) 010136 100375      TSTB    @LPS     ;TEST READY
2205 010140 005337 001042      BPL     .-4       ;WAIT FOR READY
2206 010144 023727 001042 000037  DEC      LINCNT   ;DECREMENT LINE COUNT
2207 010152 003313      CMP      LINCNT,#37 ;DONE?
2208 010154 032777 010000 170622  BGT     ROT1      ;NO, NEXT LINE
2209 010162 001236      BIT      #BIT12,@SWR ;LOOP ON TEST?
2210
2211 010164 000137 010422      BNE      ROTATE   ;LOOP
2212
2213
2214 ;NEW DRUM (LP14) PATTERN CHARACTER TEST
2215
2216 010170 032777 020000 170606  NROTAT: BIT      #BIT13,@SWR ;TEST CHARACTER SET

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2217	010176	001012			BNE	NROT0		;SKIP IF 96 CHARACTERS
2218	010200	012737	000137	001042	MOV	#137,LINCNT		;LAST CHARACTER
2219	010206	012737	000140	001060	MOV	#140,LEGCHR		;LEGAL CHECK
2220	010214	012737	000100	001062	MOV	#100,NUMCHR		;# OF CHARACTERS
2221	010222	000411			BR	NROT1		;CONTINUE
2222	010224	012737	000177	001042	NROT0: MOV	#177,LINCNT		;LAST CHARACTER
2223	010232	012737	000200	001060	MOV	#200,LEGCHR		;LEGAL CHECK
2224	010240	012737	000140	001062	MOV	#140,NUMCHR		;# OF CHARACTERS
2225	010246	012737	000040	001040	NROT1: MOV	#40,CHRGEN		;GET POINTER
2226	010254	005237	001040		NROT6: INC	CHRGEN		;SET POINTER
2227	010260	013737	001040	001054	MOV	CHRGEN,STRCHR		;STORE POINTER
2228	010266	005037	001036		CLR	CHRCNT		;# CHARACTERS PRINTED
2229	010272	005237	001036		NROT2: INC	CHRCNT		;INCREMENT CHARACTERS PRINTED
2230	010276	063737	001064	001054	ADD	OFFSET,STRCHR		;INCREMENT POINTER
2231	010304	023737	001054	001060	CMP	STRCHR,LEGCHR		;LEGAL CHARACTER?
2232	010312	002403			BLT	NROT4		;BRANCH IF LEGAL
2233	010314	163737	001062	001054	SUB	NUMCHR,STRCHR		;MAKE LEGAL
2234	010322	005777	170452		NROT4: TST	@LPS		;TEST FOR ERRORS
2235	010326	100006			BPL	NROT5		;BRANCH IF NO ERRORS
2236	010330				SERROR	\N		
(1)	010330	012737	000046	001052	ERR46: MOV	#46, ERRCOUNT		;SET UP ERROR COUNT 46
(1)		000047			N=N+1			
2237	010336	004537	011706		JSR	%5,STAER		;REPORT ERROR
2238	010342	000000			HALT			
2239	010344	013777	001054	170430	NROT5: MOV	STRCHR,@LPB		;LOAD BUFFER
2240	010352	023727	001036	000204	CMP	CHRCNT,#132.		;LINE FINISHED?
2241	010360	001344			BNE	NROT2		;NO GET NEXT CHARACTER
2242	010362	012777	000012	170412	MOV	#12,@LPB		;YES,SEND LINE FEED
2243	010370				SWAIT			
(1)	010370	105777	170404		TSTB	@LPS		;TEST READY
(1)	010374	100375			BPL	.-4		;WAIT FOR READY
2244	010376	005337	001042		DEC	LINCNT		;DECREMENT LINE COUNT
2245	010402	023727	001042	000037	CMP	LINCNT,#37		;PATTERN FINISHED
2246	010410	003321			BGT	NROT6		;NO, DO NEXT LINE
2247	010412	032777	010000	170364	BIT	#BIT12,@SWR		;LOOP ON TEST
2248	010420	001263			BNE	NROTAT		;LOOP
2249								
2250								;TEST 11 ---- SPURIOUS HAMMER FIRING TEST
2251								;LEFT AND RIGHT TRIANGLES
2252								
2253								; STARTING WITH A LEFT TRIANGLE
2254								
2255	010422				LFTTR: SENABLE			
(1)	010422	022737	000176	001004	CMP	#176,SWR		;S/W SWR ?
(1)	010430	001003			BNE	+.10		;NO- CONTINUE
(1)	010432	052777	000100	170360	BIS	#100,@TKS		;ENABLE KEYBOARD INTERRUPT
2256	010440	004437	011472		JSR	%4,TYPINT		
2257	010444				SPRINT	\M		
(1)	010444	013737	014536	014002	MOV	TNO13,MES15		;SET TEST NUMBER FOR MESSAGE
(1)	010452	004437	011422		JSR	%4,PRINT		;PRINT TEST NUMBER
(1)		000014			M=M+1			
2258	010456	012737	000204	001042	LFT: MOV	#132.LINCNT		;SET LINE COUNT
2259	010464	013737	001042	001036	LFT0: MOV	LINCNT,CHRCNT		;STORE CHAR COUNT
2260	010472	012737	177757	001044	MOV	#-17.CYCCNT		;SET GROUP COUNT
2261	010500	013737	001036	001040	MOV	CHRCNT,CHRGEN		;FIND FIRST CHAR ON LINE...
2262	010506	022737	000022	001040	LFT1: CMP	#18.,CHRGEN		;MORE THAN 17 CHARS?



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2313 011012 005777 167762      RT3:  TST      QLPS      ;TEST FOR ERROR
2314 011016 100006                BPL      RT3A      ;CONTINUE IF NO ERROR
2315 011020                $ERROR  \N
(1) 011020 012737 000051 001052 ERR51: MOV      #51,    ERCOUNT ;SET UP ERROR COUNT 51
(1) 011020 000052                N=N+1
2316 011026 004537 011706                JSR      %5,STAER ;REPORT ERROR SET
2317 011032 000000                HALT                    ;HALT ON ERROR
2318 011034 013777 001040 167740 RT3A:  MOV      CHRGEN,QLPB ;LOAD BUFFER
2319 011042 005237 001040                INC      CHRGEN      ;NEXT CHAR
2320 011046 005237 001056                INC      STRCNT      ;INCREMENT GROUP COUNT
2321 011052 001006                BNE      RT3B        ;BRANCH IF NOT DONE GROUP
2322 011054 012737 177757 001056                MOV      #-17,STRCNT ;RESET GROUP COUNT
2323 011062 162737 000021 001040                SUB      #17,CHRGEN  ;GET FIRST GROUP CHAR
2324 011070 005337 001044                RT3B:  DEC      CYCCNT ;DECREMENT CHAR COUNT
2325 011074 001346                BNE      RT3        ;CONTINUE
2326 011076 012777 000012 167676                MOV      #12,QLPB   ;SEND LF
2327 011104                $WAIT
(1) 011104 105777 167670                TSTB    QLPS      ;TEST READY
(1) 011110 100375                BPL      .-4        ;WAIT FOR READY
2328 011112 005237 001042                INC      LINCNT     ;INCREMENT LINE COUNT
2329 011116 022737 000205 001042                CMP      #133.,LINCNT ;DONE?
2330 011124 003265                BGT      RT1        ;BRANCH IF NOT DONE
2331 011126 032777 010000 167650                BIT      #BIT12,$SWR ;LOOP ON TEST?
2332 011134 001256                BNE      RTTR      ;LOOP
2333
2334 ;TEST 12
2335 ;HAMMER ALIGNMENT
2336
2337 011136                HAMALN: $ENABLE
(1) 011136 022737 000176 001004                CMP      #176,$SWR ;S/W SWR ?
(1) 011144 001003                BNE      .+10      ;NO- CONTINUE
(1) 011146 052777 000100 167644                BIS      #100,$TKS ;ENABLE KEYBOARD INTERRUPT
2338 011154 004437 011472                JSR      %4,TYPINT
2339 011160                $PRINT \M
(1) 011160 013737 014540 014002                MOV      TN014,MES15 ;SET TEST NUMBER FOR MESSAGE
(1) 011166 004437 011422                JSR      %4,PRNT   ;PRINT TEST NUMBER
(1) 011166 000015                M=M+1
2340 011172 012737 177701 001042                MOV      #-63.,LINCNT ;SET UP FOR 63 LINES
2341 011200 012737 177574 001036 HAM1X: MOV      #-132.,CHRCNT ;SET CHAR COUNT
2342 011206 005777 167566                HAM2:  TST      QLPS      ;CHECK FOR ERROR
2343 011212 100006                BPL      XHAM1     ;BRANCH IF NO ERROR
2344 011214                $ERROR \N
(1) 011214 012737 000052 001052 ERR52: MOV      #52,    ERCOUNT ;SET UP ERROR COUNT 52
(1) 011214 000053                N=N+1
2345 011222 004537 011706                JSR      %5,STAER ;REPORT ERROR OCCURRED
2346 011226 000000                HALT                    ;HALT ON ERROR
2347 011230                XHAM1: $WAIT
(1) 011230 105777 167544                TSTB    QLPS      ;TEST READY
(1) 011234 100375                BPL      .-4        ;WAIT FOR READY
2348 011236 100375                BPL      .-4        ;WAIT FOR READY
2349 011240 012777 000105 167534 XHAM1X: MOV      #105,QLPB ;TRANSMIT E TO PRINTER
2350 011246 005237 001036                INC      CHRCNT    ;+1 CHAR COUNT
2351 011252 001355                BNE      HAM2     ;TRANSMIT ANOTHER CHAR.
2352 011254 012777 000012 167520                MOV      #12,QLPB ;TRANSMIT LINE FEED
2353 011262                $WAIT
(1) 011262 105777 167512                TSTB    QLPS      ;TEST READY

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(1) 011266 100375          BPL      .-4          ;WAIT FOR READY
2354 011270 005237 001042    INC      LINCNT      ;+1 TO COUNT
2355 011274 001341          BNE      HAMIX      ;GO DO NEXT LINE
2356 011276 032777 010000 167500 BIT      #BIT12,@SWR ;CHECK TO LOOP ON TEST
2357 011304 001314          BNE      HAMALN     ;LOOP ON TEST
2358
2359 011306 032777 040000 167470 BIT      #BIT14,@SWR ;DAVFU AVAILABLE?
2360 011314 001402          BEQ      HAMX      ;NO, RECYCLE PRINTING TESTS
2361 011316 000137 014550          JMP      DAVFU     ;YES, DO DAVFU PRINTING TESTS
2362 011322          HAMX:
2363 011322 013700 000042          MOV      @#42,RO
2364 011326 001405          BEQ      DOAGN
2365 011330 000005          RESET
2366 011332          LOGICAL:
2367 011332 004710          JSR      PC,(RO)
2368 011334 000240          NOP
2369 011336 000240          NOP
2370 011340 000240          NOP
2371 011342          DOAGN:
2372 011342 000137 004550          JMP      TEST2    ;RESTART
2373
2374          ;MISC. ROUTINES
2375
2376
2377
2378
2379
2380          ;ROUTINE TO INITIALIZE PRINTER
2381          ;ENTER FROM JSR %5, PRTINT
2382
2383 011346 005777 167426          PRTINT: TST      @LPS          ;TEST FOR ERROR
2384 011352 100403          BMI      PRTINO     ;BRANCH IF ERROR
2385 011354 105777 167420          TSTB    @LPS          ;TEST FOR READY
2386 011360 100403          BMI      RDYOK      ;READY SET OK
2387 011362 062705 000002          PRTINO: ADD      #2,%5    ;SET UP FOR ERROR REPORT
2388 011366 000205          RTS          ;REPORT READY NOT SET
2389 011370 012777 000014 167404 RDYOK:  MOV      #14,@LPB   ;ISSUE FORM FEED
2390 011376 105777 167376          TSTB    @LPS          ;TEST FOR READY NOT SET
2391 011402 100003          BPL      NTRDY     ;READY NOT SET OK
2392 011404 062705 000002          ADD      #2,%5    ;SET UP FOR REPORT
2393 011410 000205          RTS          ;EXIT AND REPORT
2394 011412          NTRDY: $WAIT
(1) 011412 105777 167362          TSTB    @LPS          ;TEST READY
(1) 011416 100375          BPL      .-4          ;WAIT FOR READY
2395 011420 000205          RTS      %5          ;READY SET EXIT
2396
2397
2398
2399          ;ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER
2400
2401 011422 012737 013764 011470 PRNNT:  MOV      #MES14,PRTMSG ;PRINT TEST NUMBER
2402 011430 005777 167344          TST      @LPS          ;TEST FOR ERROR
2403 011434 100006          BPL      RINT      ;BRANCH IF OK
2404 011436          $ERROR  \N
(1) 011436 012737 000053 001052 ERR53:  MOV      #53,   ERCOUNT ;SET UP ERROR COUNT 53
(1)          N=N+1
    
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2405 011444 004537 011706      JSR      %5,STAER      ;REPORT ERROR SET
2406 011450 000000              HALT                  ;HALT ON ERROR
2407 011452 013737 001000 001016 RINT:  MOV      LPS,TPS ;SET VECTORS -
2408 011460 013737 001002 001012      MOV      LPB,TPB ;TO PRINT ON LINE PRINTER
2409 011466 104000              EMT                  ;PRINT
2410 011470 013764              PRTMSG: MES14        ;MESSAGE
2411 011472 012737 177564 001016 TYPINT: MOV      #177564,TPS ;RESET VECTORS
2412 011500 012737 177566 001012      MOV      #177566,TPB ;FOR TTY
2413 011506 000204              RTS                  ;RETURN
2414
2415 ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
2416
2417 011510 011600              TYP:   MOV      @%6,%0 ;GET ADDR. THAT CONTAINS MESS.
2418 011512 062716 000002              ADD      #2,%6 ;SET UP EXIT
2419 011516 011000              MOV      @%0,%0 ;ADDRESS OF MESSAGE IN RO
2420 011520 112037 011622              TYPA:  MOVVB   (0)+,TYPDAT ;GET CHARACTER
2421 011524 001001              BNE     TYPC ;BRANCH IF NOT DONE
2422 011526 000002              RTI ;EXIT
2423 011530 122737 000045 011622 TYPC:  CMPB     #45,TYPDAT ;CHECK FOR "%"
2424 011536 001416              BEQ     TYPF ;BRANCH IF "%"
2425 011540 122737 000043 011622      CMPB     #43,TYPDAT ;CHECK FOR "#"
2426 011546 001417              BEQ     TYPG ;BRANCH IF "#"
2427 011550 004737 011556              JSR     %7,TYPD ;TYPE CHARACTER IN TYPDAT
2428 011554 000761              BR      TYPA ;NEXT CHAR IN MESSAGE
2429 011556 113777 011622 167226 TYPD:  MOVVB   TYPDAT,@TPB ;OUTPUT CHARACTER TO PRINTER
2430 011564 105777 167226 TYPDO: TSTB     @TPS
2431 011570 100375              BPL     -4
2432 011572 000207              RTS     %7 ;CHAR. TYPED EXIT
2433 011574 112737 000012 011622 TYPF:  MOVVB   #12,TYPDAT ;OUTPUT LF
2434 011602 004737 011556              JSR     %7,TYPD ;GO TYPE CHAR.
2435 011606 112737 000015 011622 TYPG:  MOVVB   #15,TYPDAT ;OUTPUT CR
2436 011614 004737 011556              JSR     %7,TYPD ;GO TYPE CHAR.
2437 011620 000737              BR      TYPA
2438 011622 000000              TYPDAT: 0
2439
2440 ;ROUTINE TO CONVERT OCTAL TO ASCII
2441
2442 ;ENTER ROUTINE AS FOLLOWS
2443 ;JSR %5,CONV
2444 ;XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
2445 ;XXXXXX=ADDRESS OF ASCII MESSAGE
2446 ;XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
2447
2448
2449 011624 013537 011704      CONV:  MOV      @(%5)+,ACNVX ;ADDRSS OF NO. TO BE CONVERTED
2450 011630 012501              MOV      (5)+,%1 ;ADDRESS OF MESSAGE
2451 011632 012502              MOV      (5)+,%2 ;NUMBER OF ASCII CHARACTERS
2452 011634 060201              ADD      %2,%1 ;FIRST CHAR ADDRESS
2453 011636 013703 011704      ACVN:  MOV      ACNVX,%3 ;STORE NUMBER
2454 011642 042703 177770              BIC     #177770,%3 ;ISOLATE LEAST SIGNIFICANT BIT
2455 011646 062703 000060              ADD      #60,%3 ;SET UP ASCII CHARACTER
2456 011652 110341              MOVVB   %3,-(1) ;STORE CHARACTER
2457 011654 000241              CLC ;GET NEXT SIGNIFICANT BIT ...
2458 011656 006037 011704      ROR     ACNVX
2459 011662 000241              CLC
2460 011664 006037 011704      ROR     ACNVX

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2461 011670 000241          CLC
2462 011672 006037 011704    ROR      ACNVX
2463 011676 005302          DEC      %2      ; -1 FROM ASCII CHAR. CNT
2464 011700 001356          BNE     ACVN     ; CONVERT NEXT CHARACTER
2465 011702 000205          RTS     %5     ; EXIT! CONVERSION DONE
2466
2467 011704 000000          ACNVX: 0      ; WORK REGISTER
2468
2469          ;ROUTINE TO REPORT ERROR COUNT
2470
2471 011706 004537 011624    STAER: JSR     %5, CONV ; CONVERT OCTAL TO ASCII
2472 011712 001052          ERCOUNT
2473 011714 012334          HED1
2474 011716 000003          3
2475 011720 104000          EMT     +0     ; TYPE ERROR MESSAGE
2476 011722 012334          HED1
2477 011724 005777 167054    TST     %SWR   ; TEST FOR HALT ON ERROR
2478 011730 100401          BMI     .+4    ; BRANCH IF NO HALT WANTED
2479 011732 000000          HALT
2480 011734 000205          RTS     %5     ; RETURN
2481
2482
2483          ;KEYBOARD INTERRUPT ROUTINE
2484          ;FOR ACCESS TO THE S/W SWITCH REGISTER
2485
2486
2487 011736 010046          TKINT: MOV     %0, -(SP) ; SAVE REGISTERS
2488 011740 010146          MOV     %1, -(SP)
2489 011742 010246          MOV     %2, -(SP)
2490 011744 010346          MOV     %3, -(SP)
2491 011746 010446          MOV     %4, -(SP)
2492 011750 010546          MOV     %5, -(SP)
2493 011752 005737 001072    TST     SET    ; INITIAL SWR ENTRY ?
2494 011756 001130          BNE     TYPWR  ; YES-PRINT HEADER
2495 011760 005737 001070    TST     SIGNAL ; PREVIOUS CONTROL-G INPUT ?
2496 011764 001477          BEQ     CNTRLG ; YES-CONTINUE
2497 011766 017737 167022 001074 MOV     @TKB, CHAR ; GET INPUT CHARACTER
2498 011774 042737 177600 001074 BIC     #177600, CHAR ; STRIP OFF PARITY BIT
2499 012002 022737 000015 001074 CMP     #15, CHAR ; CARRIAGE RETURN ?
2500 012010 001456          BEQ     DGT5   ; YES-CONTINUE
2501 012012 022737 000025 001074 CMP     #25, CHAR ; CONTROL-U INPUT ?
2502 012020 001530          BEQ     TK4    ; YES-CONTINUE
2503 012022 023727 001074 000060 CMP     CHAR, #60 ; LEGAL CHECK: LESS THAN 60 ?
2504 012030 100001          BPL     TK1   ; NO-CONTINUE
2505 012032 000466          BR     WT3    ; YES-PRINT "?"
2506 012034 022737 000067 001074 TK1:  CMP     #67, CHAR ; LEGAL CHECK: GREATER THAN 67 ?
2507 012042 100001          BPL     TK2   ; NO-CONTINUE
2508 012044 000461          BR     WT3    ; YES-PRINT "?"
2509 012046 005237 001066 001066 TK2:  INC     DIGITS ; NEXT DIGIT OF SWR INPUT
2510 012052 022737 000006 001066 CMP     #6, DIGITS ; MORE THAN SIX DIGITS ?
2511 012060 100453          BMI     WT3    ; YES-PRINT "?"
2512 012062 105777 166730          WT2:  TSTB   @TPS   ; TTY PRINTER READY ?
2513 012066 100375          BPL     WT2   ; NO-WAIT
2514 012070 013777 001074 166714 MOV     CHAR, @TPB ; PRINT CHARACTER
2515 012076 162737 000060 001074 SUB     #60, CHAR ; CONVERT TO OCTAL
2516 012104 022737 000001 001066 CMP     #1, DIGITS ; FIRST DIGIT ?

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2517	012112	001411				BEQ	TK5		: YES-CONTINUE
2518	012114	000241				CLC			: ROTATE LEFT THREE
2519	012116	006137	001076			ROL	OCT		: TIMES
2520	012122	000241				CLC			: THIS WILL SHIFT
2521	012124	006137	001076			ROL	OCT		: SWR VALUE ONE
2522	012130	000241				CLC			: PLACE LEFT
2523	012132	006137	001076			ROL	OCT		: OCTAL
2524	012136	063737	001074	001076	TK5:	ADD	CHAR,OCT		: NEW VALUE OF SWR
2525	012144	000464				BR	TK6		: RETURN FROM INTERRUPT
2526	012146	005737	001066		DGTS:	TST	DIGITS		: SWR VALUE CHANGED ?
2527	012152	001451				BEQ	TK3		: NO-RETURN, NO CHANGE TO SWR
2528	012154	013777	001076	166622		MOV	OCT,2SWR		: YES-ENTER NEW SWR VALUE
2529	012162	000445				BR	TK3		: RETURN FROM INTERRUPT
2530	012164	017737	166624	001074	CNTRLG:	MOV	@TKB,CHAR		: GET CHARACTER
2531	012172	042737	177600	001074		BIC	#177600,CHAR		: STRIP OFF PARITY BIT
2532	012200	022737	000007	001074		CMP	#7,CHAR		: CONTROL-G INPUT ?
2533	012206	001414				BEQ	TYP5WR		: YES-PRINT HEADER
2534	012210	105777	166602		WT3:	TSTB	@TPS		: TTY PRINTER READY ?
2535	012214	100375				BPL	WT3		: NO-WAIT
2536	012216	013777	001074	166566		MOV	CHAR,@TPB		: PRINT CHARACTER
2537	012224	104000				EMT	+0		: PRINT "?"
2538	012226	014440				MES22			
2539	012230	005737	001070			TST	SIGNAL		: BAD VALUE ?
2540	012234	001001				BNE	TYP5WR		: YES-PRINT HEADER
2541	012236	000427				BR	TK6		: RETURN FROM INTERRUPT
2542	012240	012737	000001	001070	TYP5WR:	MOV	#1,SIGNAL		: SET FLAG: CONTROL-G ENTERED
2543	012246	104000				EMT	+0		: PRINT HEADER
2544	012250	014444				MES23			
2545	012252	004537	011624			JSR	%5,CONV		: CONVERT SWR VALUE TO ASCII
2546	012256	000176				176			
2547	012260	014474				MES25			
2548	012262	000006				6			
2549	012264	104000				EMT	+0		: PRINT SWR VALUE
2550	012266	014474				MES25			
2551	012270	104000				EMT	+0		: PRINT HEADER
2552	012272	014455				MES24			
2553	012274	000404				BR	TK7		: RETURN FROM INTERRUPT
2554	012276	005037	001070		TK3:	CLR	SIGNAL		: CLEAR CONTROL-G FLAG
2555	012302	104000			TK4:	EMT	+0		: PRINT LINE FEED AND CARRIAGE RETURN
2556	012304	014436				MES21			
2557	012306	005037	001066		TK7:	CLR	DIGITS		: CLEAR DIGIT COUNT
2558	012312	005037	001076			CLR	OCT		: CLEAR SWR INPUT
2559	012316	012605			TK6:	MOV	(SP)+,%5		: RESTORE REGISTERS
2560	012320	012604				MOV	(SP)+,%4		
2561	012322	012603				MOV	(SP)+,%3		
2562	012324	012602				MOV	(SP)+,%2		
2563	012326	012601				MOV	(SP)+,%1		
2564	012330	012600				MOV	(SP)+,%0		
2565	012332	000002				RTI			: RETURN FROM INTERRUPT
2566									
2567									
2571									
2572	012334	020040	020040	051105	HED1:	.ASCIZ	/ ERROR COUNT%/		
2573	012355	105	051122	051117	MESA:	.ASCIZ	/ERROR SET OK - CLEAR & TURN ON LINE%/		
2574	012422	051105	047522	020122	MESB:	.ASCIZ	/ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/		
2575	012475	045	051120	047111	MESC:	.ASCII	/%PRINT SPEED CHECK USING MANUAL TIMING%/		



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2576 012544 050045 052125 051440 .ASCII /%PUT SWITCH 0 UP TO START TIMING%/
2577 012605 045 052520 020124 .ASCIZ /%PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
2578 012654 051445 040524 052122 MES00: .ASCIZ /%STARTING DAVFU PRINTING TESTS%/
2579 012714 046045 030120 026465 MES1: .ASCIZ /%LPOS-LP11-LP14 LINE PRINTER TEST%/
2580 012757 122 051505 040524 MES2: .ASCIZ /RESTART ADDRESS 600%/
2581 013004 047520 042527 020122 MES3: .ASCIZ /POWER ON - TURN ON LINE%/
2582 013035 117 020116 044514 MES4: .ASCIZ /ON LINE OK - TRY TORN PAPER SWITCH%/
2583 013101 122 040505 054504 MES5: .ASCIZ /READY SET OK - TRY DRUM GATE SWITCH%/
2584 013146 051105 047522 020122 MES6: .ASCIZ /ERROR SET OK - TURN ON LINE%/
2585 013204 042522 .EVEN
2586 013204 042522 MES7A: .ASCII /RE/
2587 013206 042523 020124 047524 MES7: .ASCII /SET TOP OF FORM SWITCH TO /
2588 013242 020040 020040 044440 MES8: .ASCIZ / INCHES%/
2589 013260 026455 026455 026455 MES9: .ASCII /----- THIS LINE SHOULD BE /
2590 013260 026455 026455 026455 MES10: .ASCIZ / INCHES FROM THE LAST LINE -----
2591 013355 040 020040 020040 MES10A: .ASCII <12><12>
2592 013466 005012 044522 052116 MES11: .ASCII /%PRINT SPEED IS APPROXIMATELY /
2593 013470 050045 044522 052116 MES12: .ASCIZ / LINES PER MINUTE%/
2594 013527 040 020040 020040 MES13: .ASCII /-----/
2595 013556 026455 026455 026455 .ASCIZ /-----/
2596 013640 026455 026455 026455 .ASCIZ /-----#/
2597 013722 026455 026455 026455 .EVEN
2598 013764 005012 042524 052123 MES14: .ASCII <12><12>/TEST NUMBER /
2599 014002 020040 005012 000012 MES15: .ASCIZ / /<12><12><12>
2600 014010 044124 051511 046040 MES16: .ASCIZ /THIS LINE SHOULD BE PRINTED#/
2601 014045 040 020040 020040 MES17: .ASCIZ / ALL ON ONE LINE --- IF SLEWED 0 LINES%/
2602 014150 026455 026455 026455 MES18: .ASCII /----- THERE SHOULD BE /
2603 014242 020040 020040 020040 MES19: .ASCIZ / BLANK LINES BEFORE THIS LINE -----
2604 014356 052040 051505 044524 MES20: .ASCII / TESTING CHANNEL SLEWING USING CHANNEL NO. /
2605 014432 020040 000 .ASCIZ / /
2606 014436 000045 .EVEN
2607 014440 037440 000045 MES21: .ASCIZ /%/
2608 014444 051445 051127 036440 MES22: .ASCIZ / ?%/
2609 014455 040 020040 042516 MES23: .ASCIZ /%SWR = /
2610 014474 020040 020040 020040 MES24: .ASCIZ / NEW SWR = /
2611 014504 030504 .EVEN
2612 014506 031104 TNDV1: .ASCII /D1/ ;TEST NUMBERS FOR DAVFU TESTS
2613 014510 031504 TNDV2: .ASCII /D2/
2614 014512 020061 TNDV3: .ASCII /D3/
2615 014514 020062 TN01: .ASCII /1 /
2616 014516 020063 TN02: .ASCII /2 /
2617 014520 020064 TN03: .ASCII /3 /
2618 014522 020065 TN04: .ASCII /4 /
2619 014524 020066 TN05: .ASCII /5 /
2620 014526 020067 TN06: .ASCII /6 /
2621 014530 020070 TN07: .ASCII /7 /
2622 014532 020071 TN010: .ASCII /8 /
2623 014534 030061 TN011: .ASCII /9 /
2624 014536 030461 TN012: .ASCII /10/
2625 014540 031061 TN013: .ASCII /11/
2626 014540 031061 TN014: .ASCII /12/

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2632 014542 031461 TN015: .ASCII /13/
2633 014544 032061 TN016: .ASCII /14/
2634 014546 032461 TN017: .ASCII /15/
2635 .EVEN
2636
2640 ;DAVFU PRINTING TESTS IF DAVFU IS AVAILABLE -- SET SWITCH 14
2641
2642
2643 ;TESTS D1 AND D2
2644 ;CHECK DAVFU LINE COUNT SLEWING
2645
2646
2647 DAVFU: SENABLE
(1) 014550 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 014556 001003 BNE .+10 ;NO- CONTINUE
(1) 014560 052777 000100 164232 BIS #100,ATKS ;ENABLE KEYBOARD INTERRUPT
2648 014566 004437 011472 JSR %4,TYPINT ;INITIALIZE
2649 014572 013737 016634 014244 MOV SPSP,MES19+2
2650 014600 104000 EMT +0 ;TYPE MESSAGE
2651 014602 012654 MESDD ;STARTING DAVFU TESTS
2652 014604 012737 000220 015300 MOV #220,DAVI1 ;SET DAVFU INSTRUCTIONS
2653 014612 012737 000221 015302 MOV #221,DAVI2
2654 014620 013737 014504 014002 MOV TNDAV1,MES15 ;SET TEST NUMBER FOR MESSAGE
2655 014626 004437 011422 JSR %4,PRNNT ;PRINT TEST NUMBER
2656 014632 012737 015232 001040 DAV0: MOV #DAVTAB,CHRGEN ;SET TABLE POINTER
2657 014640 005777 164134 DAV00: TST %LPS ;TEST FOR ERROR
2658 014644 100010 BPL DAV1 ;BRANCH IF NO ERROR
2659 014646 SERROR \N
(1) 014646 012737 000054 001052 ERR54: MOV #54, ERCOUNT ;SET UP ERROR COUNT 54
(1) 000055 N=N+1
2660 014654 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2661 014660 000000 HALT ;HALT ON ERROR
2662 014662 000137 014632 JMP DAV0 ;RESTART TEST
2663 014666 017777 164146 164106 DAV1: MOV %CHRGEN,%LPB ;LOAD DAVFU
2664 014674 062737 000002 001040 ADD #2,CHRGEN ;INCREMENT TABLE POINTER
2665 014702 005777 164132 TST %CHRGEN ;TEST IF DONE LOAD
2666 014706 001405 BEQ D5 ;CONTINUE IF DONE
2667 014710 SWAIT ;WAIT
(1) 014710 105777 164064 TSTB %LPS ;TEST READY
(1) 014714 100375 BPL .-4 ;WAIT FOR READY
2668 014716 000137 014640 JMP DAV00
2669 014722 012737 000002 001044 D5: MOV #2,CYCCNT ;SET CYCLE COUNT
2670 014730 012737 014010 011470 D0: MOV #MES16,PRMSG ;SET MESSAGE ADDRESS
2671 014736 004437 011452 JSR %4,RINT ;PRINT MESSAGE
2672 014742 005777 164032 TST %LPS ;TEST FOR ERROR
2673 014746 100006 BPL D1 ;CONTINUE IF NO ERROR
2674 014750 SERROR \N
(1) 014750 012737 000055 001052 ERR55: MOV #55, ERCOUNT ;SET UP ERROR COUNT 55
(1) 000056 N=N+1
2675 014756 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2676 014762 000000 HALT ;HALT ON ERROR
2677 014764 013777 015300 164010 D1: MOV DAVI1,%LPB ;SEND DAVFU INSTRUCTION, SKIP 0 LINES
2678 014772 SWAIT
(1) 014772 105777 164002 TSTB %LPS ;TEST READY
(1) 014776 100375 BPL .-4 ;WAIT FOR READY
2679 015000 012737 014045 011470 MOV #MES17,PRMSG ;SET PRINTER MESSAGE ADDRESS
    
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2680	015006	004437	011452			JSR	%4,RINT	;PRINT MESSAGE
2681	015012	012737	014150	011470		MOV	#MES18,PRMSG	;SET MESSAGE ADDRESS
2682	015020	013737	015302	001040		MOV	DAVI2,CHRGEN	;FIRST DAVFU INSTRUCTION
2683	015026	012737	014512	001054		MOV	#TNO1,STRCHR	;SET TABLE POINTER
2684	015034	012737	000017	001036		MOV	#15.,CHRCNT	;SET TABLE COUNT
2685	015042	005777	163732		D2:	TST	ALPS	;TEST FOR ERROR
2686	015046	100006				BPL	D3	;CONTINUE IF NO ERRORS
2687	015050					SERROR	\N	
(1)	015050	012737	000056	001052	ERR56:	MOV	#56, ERCOUNT	;SET UP ERROR COUNT 56
(1)		000057				N=N+1		
2688	015056	004437	011706			JSR	%4,STAER	;REPORT ERROR SET
2689	015062	000000				HALT		;HALT ON ERROR
2690	015064	013777	001040	163710	D3:	MOV	CHRGEN,ALPB	;SEND DAVFU INSTR.
2691	015072					SWAIT		;WAIT
(1)	015072	105777	163702			TSTB	ALPS	;TEST READY
(1)	015076	100375				BPL	-4	;WAIT FOR READY
2692	015100	017737	163750	014242		MOV	STRCHR,MES19	;SET PRINTER MESSAGE
2693	015106	004437	011452			JSR	%4,RINT	;PRINT MESSAGE
2694	015112	005337	001036			DEC	CHRCNT	;DEC TABLE COUNT
2695	015116	001407				BEQ	D4	;EXIT TEST IF DONE
2696	015120	005237	001040			INC	CHRGEN	;NEXT DAVFU INSTR.
2697	015124	062737	000002	001054		ADD	#2,STRCHR	;INC TABLE POINTER
2698	015132	000137	015042			JMP	D2	;CONTINUE
2699	015136	005337	001044		D4:	DEC	CYCCNT	;DEC CYCLE COUNT
2700	015142	001415				BEQ	DEXO	;EXIT IF DONE
2701	015144	062737	000140	015300		ADD	#140,DAVI1	;CHANGE DAVFU INSTR.
2702	015152	062737	000140	015302		ADD	#140,DAVI2	;CHANGE DAVFU INSTR.
2703	015160	013737	014506	014002		MOV	TNDV2,MES15	;SET TEST NUMBER FOR MESSAGE
2704	015166	004437	011422			JSR	%4,PRNT	;PRINT TEST NUMBER
2705	015172	000137	014730			JMP	D0	;RETEST LINE COUNT SLEWING
2706	015176	012737	000220	015300	DEXO:	MOV	#220,DAVI1	;RESET DAVFU INSTR.
2707	015204	012737	000221	015302		MOV	#221,DAVI2	;RESET DAVFU INSTR.
2708	015212	032777	010000	163564		BIT	#BIT12,JSWR	;LOOP ON TEST?
2709	015220	001002				BNE	1\$	;LOOP
2710	015222	000137	015304			JMP	DAV2	;NEXT TEST
2711	015226	000137	014550		1\$:	JMP	DAV2	;LOOP
2712								
2713								
2714	015232	000356			DAVTAB: 356			;DAVFU LOAD TABLE
2715	015234	000001					1	
2716	015236	000002					2	
2717	015240	000003					3	
2718	015242	000004					4	
2719	015244	000005					5	
2720	015246	000006					6	
2721	015250	000007					7	
2722	015252	000010					10	
2723	015254	000011					11	
2724	015256	000012					12	
2725	015260	000013					13	
2726	015262	000014					14	
2727	015264	000015					15	
2728	015266	000016					16	
2729	015270	000017					17	
2730	015272	000020					20	
2731	015274	000357					357	

```

2732 015276 000000 0
2733
2734
2735 015300 000220 DAVI1: 220
2736 015302 000221 DAVI2: 221
2737
2738 ;TEST D3
2739 ;CHECK DAVFU CHANNEL SLEW COMMANDS
2740
2741 015304 DAV2: SENABLE
(1) 015304 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
(1) 015312 001003 BNE .+10 ;NO- CONTINUE
(1) 015314 052777 000100 163476 BIS #100,DTKS ;ENABLE KEYBOARD INTERRUPT
2742 015322 004437 011472 JSR %4,TYPINT ;INITIALIZE
2743 015326 013737 016634 014244 MOV SPSP,MES19+2
2744 015334 013737 014510 014002 MOV TNDV3,MES15 ;SAT TEST NUMBER FOR MESSAGE
2745 015342 004437 011422 JSR %4,PRINT ;PRINT TEST NUMBER D3
2746 015346 012737 016616 016100 MOV #MTAB,MTABP ;SET MESSAGE TABLE POINTER
2747 015354 012737 016564 016074 MOV #ITAB,ITABP ;SET INSTRUCTION TABLE POINTER
2748 015362 017737 000506 001054 MOV #ITABP,STRCHR ;SAT FIRST INSTRUCTION
2749 015370 012737 014512 016102 MOV #TNO1,HTABP ;SET HEADER MESSAGE TABLE POINTER
2750 015376 012737 016546 016076 MOV #ICTAB,ICTABP ;SET INSTR COUNT TABLE POINTER
2751 015404 017737 000466 001056 MOV #ICTABP,STRCNT ;SET FIRST INSTR COUNT
2752 015412 012737 016104 016072 LOAD: MOV #DTAB,DTABP ;SET DATA TABLE POINTER
2753 015420 017737 000446 001040 MOV #DTABP,CHRGEN ;SET FIRST DATA PAIR
2754 015426 005777 163346 TST #LPS ;TEST FOR ERROR
2755 015432 100007 BPL DL1 ;BRANCH IF NO ERROR
2756 015434
(1) 015434 012737 000057 001052 ERR57: MOV #57, ERCOUNT ;SET UP ERROR COUNT 57
(1) 000060 N=N+1
2757 015442 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2758 015446 000000 HALT ;HALT ON ERROR
2759 015450 000760 BR LOAD ;RESTART LOAD
2760 015452 012737 000002 001036 DL1: MOV #2,CHRCNT ;SET PAIR COUNT
2761 015460 013777 001040 163314 DL2: MOV CHRGEN,#LPS ;LOAD DAVFU
2762 015466
(1) 015466 105777 163306 SWAIT ;WAIT
(1) 015472 100375 TST #LPS ;TEST READY
2763 015474 005777 163300 BPL .-4 ;WAIT FOR READY
2764 015500 100010 TST #LPS ;TEST FOR ERROR
2765 015502 BPL DL6 ;BRANCH IF NO ERROR
(1) 015502 012737 000060 001052 ERR60: MOV #60, ERCOUNT ;SET UP ERROR COUNT 60
(1) 000061 N=N+1
2766 015510 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2767 015514 000000 HALT ;HALT ON ERROR
2768 015516 000137 015412 JMP LOAD ;RESTART LOAD
2769 015522 022737 000356 001040 DL6: CMP #356,CHRGEN ;LOAD COMMAND?
2770 015530 001407 BEQ DL6A ;YES, SEND ONLY ONCE
2771 015532 022737 000357 001040 CMP #357,CHRGEN ;LOAD COMMAND?
2772 015540 001403 BEQ DL6A ;YES, SEND ONLY ONCE
2773 015542 005337 001036 DEC CHRCNT ;DEC PAIR COUNT
2774 015546 001344 BNE DL2 ;FINISH PAIR IF NOT DONE
2775 015550 062737 000002 016072 DL6A: ADD #2,DTABP ;INC DATA TABLE POINTER
2776 015556 017737 000310 001040 MOV #DTABP,CHRGEN ;SET NEXT DATA PAIR
2777 015564 022737 077777 001040 CMP #77777,CHRGEN ;DONE LOAD?
2778 015572 001327 BNE DL1

```

```

2779
2780 ;START OF CHANNEL SLEW TESTS
2781
2782 015574 DL8: MOV STRCHR,ALPB ;SEND DAVFU INSTRUCTION
2783 015574 013777 001054 163200 $WAIT
2784 015602 TSTB ALPS ;TEST READY
(1) 015602 105777 163172 BPL -4 ;WAIT FOR READY
(1) 015606 100375 TSTB ALPS ;TEST READY
2785 015610 105777 163164 BPL -4 ;WAIT FOR READY
2786 015614 100375
2787 015616 DL8A: MOV @HTABP,MES20A ;SET HEADER MSSG ADDRESS
2788 015616 017737 000260 014432 MOV @MES20,PRMSG ;SET HEADER MSG ADDRESS
2789 015624 012737 014356 011470 JSR %4,RINT ;PRINT HEADER MESSAGE
2790 015632 004437 011452 DL9: MOV STRCHR,ALPB ;SEND DAVFU INSTRUCTION
2791 015636 013777 001054 163136 $WAIT
2792 015644 TSTB ALPS ;TEST READY
(1) 015644 105777 163130 BPL -4 ;WAIT FOR READY
(1) 015650 100375 TST ALPS ;TEST FOR ERROR
2793 015652 005777 163122 BPL DL10 ;BRANCH IF OK
2794 015656 100010 ERROR \N
2795 015660 (1) 015660 012737 000061 001052 ERR61: MOV #61, ERRCOUNT ;SET UP ERROR COUNT 61
(1) 015660 000062 N=N+1
2796 015666 004537 011706 JSR %5,STAER ;REPORT ERROR SET
2797 015672 000000 HALT ;HALT ON ERROR
2798 015674 000137 015412 JMP LOAD ;RELOAD DAVFU
2799 015700 017737 000174 014242 DL10: MOV @HTABP,MES19 ;SET MESSAGE
2800 015706 027727 000164 000001 CMP @ICTABP,#1 ;CHECK IF MAX LINE SLEW
2801 015714 001004 BNE DL10A ;NOT, CONTINUE
2802 015716 013737 016632 014244 MOV FS,MES19+2 ;SET MESSAGE
2803 015724 000403 BR DL10B ;CONTINUE
2804 015726 013737 016634 014244 DL10A: MOV SPSP,MES19+2 ;SET MESSAGE
2805 015734 012737 014150 011470 DL10B: MOV @MES18,PRMSG ;SET MSG ADDRESS
2806 015742 004437 011452 JSR %4,RINT ;PRINT MESSAGE
2807 015746 005337 001056 DEC STRCNT ;DEC INSTR COUNT
2808 015752 001331 BNE DL9 ;FINISH TESTING THIS CHANNEL
2809 015754 062737 000002 016100 ADD #2,MTABP ;INC MSG TABLE POINTER
2810 015762 062737 000002 016102 ADD #2,HTABP ;INC HEADER MSG TABLE POINTER
2811 015770 062737 000002 016076 ADD #2,ICTABP ;INC INSTR COUNT TABLE POINTER
2812 015776 005777 000074 TST @ICTABP ;CHECK INSTR COUNT
2813 016002 001006 BNE DL12
2814 016004 012737 016546 016076 MOV @ICTAB,ICTABP ;RESET TABLE POINTER
2815 016012 012737 016616 016100 MOV @MTAB,MTABP ;RESET MSG TABLE POINTER
2816 016020 017737 000052 001056 DL12: MOV @ICTABP,STRCNT ;GET INSTR COUNT
2817 016026 062737 000002 016074 ADD #2,ITABP ;INC INSTR TABLE POINTER
2818 016034 017737 000034 001054 MOV @ITABP,STRCHR ;GET INSTRUCTION
2819 016042 001254 BNE DL8 ;CONTINUE IF NOT DONE TEST
2820 016044 013737 016634 014244 MOV SPSP,MES19+2 ;RESET MESSAGE
2821 016052 032777 010000 162724 BIT @BIT12,@SWR ;LOOP ON TEST?
2822 016060 001402 BEQ DLEX
2823 016062 000137 015304 JMP DAV2 ;LOOP ON TEST
2824 016066 000137 004550 DLEX: JMP TEST2 ;RECYCLE PRINTING TESTS
2825
2826 016072 000000 DTABP: 0 ;DATA TABLE POINTER
2827 016074 000000 ITABP: 0 ;INSTRUCTION TABLE POINTER
2828 016076 000000 ICTABP: 0 ;INSTR COUNT TABLE POINTER

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2829	016100	000000
2830	016102	000000
2831		
2832		
2833		
2834	016104	000356
2835	016106	000077
2836	016110	000000
2837	016112	000001
2838	016114	000002
2839	016116	000005
2840	016120	000000
2841	016122	000003
2842	016124	000010
2843	016126	000005
2844	016130	000002
2845	016132	000001
2846	016134	000000
2847	016136	000007
2848	016140	000000
2849	016142	000011
2850	016144	000002
2851	016146	000005
2852	016150	000000
2853	016152	000003
2854	016154	000000
2855	016156	000005
2856	016160	000012
2857	016162	000001
2858	016164	000000
2859	016166	000007
2860	016170	000020
2861	016172	000001
2862	016174	000002
2863	016176	000015
2864	016200	000000
2865	016202	000003
2866	016204	000000
2867	016206	000005
2868	016210	000002
2869	016212	000001
2870	016214	000010
2871	016216	000007
2872	016220	000000
2873	016222	000001
2874	016224	000002
2875	016226	000005
2876	016230	000000
2877	016232	000013
2878	016234	000000
2879	016236	000005
2880	016240	000002
2881	016242	000001
2882	016244	000000
2883	016246	000007
2884	016250	000010

MTABP: 0 ;MESSAGE TABLE POINTER  
HTABP: 0 ;HEADER MESSAGE TABLE POINTER

;DATA TABLE FOR DAVFU LOAD

DTAB: 356 ;START LOAD  
77 ;HEADER MESSAGES

0  
1  
2  
3  
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8  
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99  
100

F06

2885	016252	000021
2886	016254	000002
2887	016256	000005
2888	016260	000000
2889	016262	000003
2890	016264	000000
2891	016266	000015
2892	016270	000002
2893	016272	000001
2894	016274	000000
2895	016276	000007
2896	016300	000000
2897	016302	000001
2898	016304	000012
2899	016306	000005
2900	016310	000000
2901	016312	000003
2902	016314	000000
2903	016316	000005
2904	016320	000002
2905	016322	000011
2906	016324	000000
2907	016326	000007
2908	016330	000000
2909	016332	000001
2910	016334	000022
2911	016336	000005
2912	016340	000010
2913	016342	000003
2914	016344	000000
2915	016346	000005
2916	016350	000002
2917	016352	000001
2918	016354	000000
2919	016356	000017
2920	016360	000000
2921	016362	000001
2922	016364	000002
2923	016366	000005
2924	016370	000000
2925	016372	000003
2926	016374	000010
2927	016376	000005
2928	016400	000002
2929	016402	000001
2930	016404	000000
2931	016406	000007
2932	016410	000000
2933	016412	000011
2934	016414	000002
2935	016416	000025
2936	016420	000000
2937	016422	000003
2938	016424	000000
2939	016426	000005
2940	016430	000012

21  
2  
2  
3  
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3  
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2  
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5  
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7  
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5  
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3  
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1  
2

G06

2941	016432	000001
2942	016434	000000
2943	016436	000007
2944	016440	000000
2945	016442	000001
2946	016444	000002
2947	016446	000015
2948	016450	000000
2949	016452	000003
2950	016454	000000
2951	016456	000005
2952	016460	000002
2953	016462	000001
2954	016464	000010
2955	016466	000007
2956	016470	000000
2957	016472	000001
2958	016474	000002
2959	016476	000005
2960	016500	000020
2961	016502	000013
2962	016504	000000
2963	016506	000005
2964	016510	000002
2965	016512	000001
2966	016514	000000
2967	016516	000007
2968	016520	000010
2969	016522	000001
2970	016524	000002
2971	016526	000005
2972	016530	000000
2973	016532	000003
2974	016534	000000
2975	016536	000001
2976	016540	000000
2977	016542	000357
2978	016544	077777

1  
0  
7  
0  
1  
2  
15  
0  
3  
0  
2  
1  
10  
0  
1  
2  
20  
13  
0  
2  
1  
10  
1  
2  
5  
0  
3  
0  
1  
0  
357  
77777

;STOP LOAD  
;STOP !!!!!

;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

ICTAB: 105  
56  
42  
23  
5  
1  
0

;END OF TABLE

;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

ITAB: 200  
201  
202  
203  
204

;CHANNEL 1  
;CHANNEL 2  
;CHANNEL 3  
;CHANNEL 4  
;CHANNEL 5

2992	016564	000200
2993	016566	000201
2994	016570	000202
2995	016572	000203
2996	016574	000204



2997	016576	000205	205	: CHANNEL 6
2998	016600	000206	206	: CHANNEL 7
2999	016602	000207	207	: CHANNEL 8
3000	016604	000210	210	: CHANNEL 9
3001	016606	000211	211	: CHANNEL 10
3002	016610	000212	212	: CHANNEL 11
3003	016612	000213	213	: CHANNEL 12
3004	016614	000000	0	: END OF TABLE

;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE

3008	016616	030440	MTAB:	.ASCII	/ 1/
3009	016620	031040		.ASCII	/ 2/
3010	016622	031440		.ASCII	/ 3/
3011	016624	033040		.ASCII	/ 6/
3012	016626	032062		.ASCII	/24/
3013	016630	032061		.ASCII	/14/
3014	016632	020063	FS:	.ASCII	/3 /
3015	016634	020040	SPSP:	.ASCII	/ /

;SCOPE LOOP ROUTINE

;SET CHARACTER IN SWITCH REGISTER -0.

3021	016636		SCOPE:	SENABLE	
(1)	016636	022737		CMP	#176,SWR ;S/W SWR ?
(1)	016644	001003		BNE	.+10 ;NO- CONTINUE
(1)	016646	052777	000100	BIS	#100,@TKS ;ENABLE KEYBOARD INTERRUPT
3022	016654	004437	011472	JSR	%4,TYPINT
3023	016660	017737	162120	MOV	@SWR,SAVE ;FETCH SWITCHES
3024	016666	012737	177574	MOV	#-132,CHRCNT ;SET CHAR COUNT
3025	016674	042737	177400	BIC	#177400,SAVE ;MASK CHARACTER
3026	016702		LDLPX:	\$WAIT	
(1)	016702	105777		TSTB	@LPS ;TEST READY
(1)	016706	100375		BPL	.-4 ;WAIT FOR READY
3027	016710	005777	162064	TST	@LPS ;TEST FOR ERROR

```

3040 016714 100006      BPL      LPSCOPE      ;BRANCH IF NO ERROR
3041 016716          SERROR  \N
(1) 016716 012737 000062 001052 ERR62: MOV #62,   ERCOUNT      ;SET UP ERROR COUNT 62
(1)          000063      N=N+1

```

J06

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SEQ 0074

3045	016724	004537	011706	JSR	%5, STAER	;REPORT ERROR SET
3046	016730	000000		HALT		;HALT ON ERROR
3047	016732	013777	001050 162042	LPSCOPE:MOV	SAVE, QLPB	;LOAD PRINTER BUFFER

K06

3053	016740	032777	004000	162036	BIT	#BIT11,@SWR	:SEND ONLY ONE CHAR?
3054	016746	001402			BEQ	LSCO	:NO, BRANCH
3055	016750	000000			HALT		:HALT - WAIT FOR OPERATOR
3056	016752	000731			BR	SCOPE	:NEXT CHAR
3057	016754	000177	000024		JMP	@LOSCOP	:SEND LF?
3058	016760	005237	001036		LSCO: INC	CHRCNT	:INCREMENT CHAR COUNT
3059	016764	001346			LSCA: BNE	LDLPX	:CONTINUE IF NOT DONE LINE
3060	016766	012777	000012	162006	MOV	#12,@LPB	:SEND LF
3061	016774				\$WAIT		
(1)	016774	105777	162000		TSTB	@LPS	:TEST READY
(1)	017000	100375			BPL	-4	:WAIT FOR READY
3062	017002	000715			BR	SCOPE	:CONTINUE
3063							
3064							
3065	017004	016760			LOSCOP: LSCA		
3066							
3067							
3068							
3069		000001			.END		





ERR31	004412	1701#								
ERR32	004600	1751#								
ERR33	004656	1760#								
ERR34	005102	1797#								
ERR35	005220	1817#								
ERR36	005460	1855#								
ERR37	005774	1913#								
ERR4	001362	1214#								
ERR40	006260	1968#								
ERR41	006534	2012#								
ERR42	007034	2061#								
ERR43	007326	2110#								
ERR44	007570	2149#								
ERR45	010062	2195#								
ERR46	010330	2236#								
ERR47	010554	2271#								
ERR5	001412	1223#								
ERR50	010746	2304#								
ERR51	011020	2315#								
ERR52	011214	2344#								
ERR53	011436	2404#								
ERR54	014646	2659#								
ERR55	014750	2674#								
ERR56	015050	2687#								
ERR57	015434	2756#								
ERR6	001444	1238#								
ERR60	015502	2765#								
ERR61	015660	2795#								
ERR62	016716	3041#								
ERR7	001470	1247#								
FFSET	004002	1561	1626#							
FFTAB	003724	1560	1601#							
FS	016632	2802	3014#							
FTABE	004000	1586	1623#							
HAMALN	011136	1026	2337#	2357						
HAMX	011322	2360	2362#							
HAM1X	011200	2341#	2355							
HAM2	011206	2342#	2351							
HED1	012334	2473	2476	2572#						
HSPRT	006662	1022	2042#	2087						
H50	007004	2056#	2083	2085						
H500	006770	2051	2054#							
H500A	006754	2048	2052#							
H51	007026	2059#	2071	2073	2076					
H52	007050	2060	2064#							
H53	007116	2069	2074#							
H54	007134	2066	2077#							
H56	007204	2080	2086#							
HTABP	016102	2749#	2788	2810#	2830#					
ICTAB	016546	2750	2814	2982#						
ICTABP	016076	2750#	2751	2800	2811#	2812	2814*	2816	2828#	
INDAT	004056	997	1597	1643#	1651	1663				
INDATT	004230	1645	1670#							
INDATO	004134	1647	1652#							
INDAT1	004216	1659	1664#							
INDO	004106	1646#	1657							















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DZLPKF.P11 01-FEB-77 08:48 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0085

SENABL	1109#	1172	1411	1425	1436	1553	1643	1679	1747	1788	1846	1898	1954	2003	2042
	2137	2169	2255	2337	2647	2741	3021								
SERROR	1074#	1184	1189	1200	1209	1214	1223	1238	1247	1257	1262	1269	1282	1287	1290
	1299	1309	1319	1341	1346	1353	1557	1579	1648	1660	1685	1701	1751	1760	1797
	1817	1855	1913	1968	2012	2061	2110	2149	2195	2236	2271	2304	2315	2344	2404
	2659	2674	2687	2756	2765	2795	3041								
SPRINT	1084#	1754	1790	1848	1900	1957	2005	2044	2139	2171	2257	2339			
SSETPS	1124#	1292	1301	1311	1321	1350	1362								
SWAIT	1095#	1474	1583	1656	1693	1777	1813	1836	1867	1878	1928	1980	2022	2078	2122
	2156	2204	2243	2285	2327	2347	2353	2394	2667	2678	2691	2762	2784	2792	3026
	3061														

. ABS. 017006 000

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

DZLPKF.BIN,DZLPKF.LST/CRF=DZLPKF.P11  
RUN-TIME: 36.9 SECONDS  
RUN-TIME RATIO: 49/10=4.7  
CORE USED: 9K (17 PAGES)

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