LP11/LP05

LINE PRINTER TEST

MD-11-DZLPK-E

EP-DZLPK-E-DL-B

FICHE 1 OF 1

DEC 1976

digital

MADE IN USA

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZLPk-E-D
PRODUCT NAME: LP11/LP05 LINE PRINTER TEST
DATE : DECEMBER 1976
MAINTAINER: DIAGNOSTIC GROUP

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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
LPO5	DATA PRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
TELETYPE	MODEL 33 OR EQUIVALENT CONSOLE UNIT

2.2 STORAGE

MEMORY LOCATIONS 0 - TO - 14600 ARE USED BY THIS DIAGNOSTIC.

2.3 PRELIMINARY PROGRAMS

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

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

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

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

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

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

1. SWITCH - 0

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

2. SWITCH - 11

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

3. 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.

4. 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.

5. SWITCH - 14

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

6. 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 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(8) AND THE CORRECT BUFFER LOCATION IN LOCATION 1002(8), THE CORRECT VECTOR ADDRESS IN LOCATION 1030(8)ANDTHE CORRECT PSW IN LOCATION 1032(8) .

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.

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 DIFFICULTITIES. 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 SPEARATELY.

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.

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 3) 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.

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).

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 PEPEATED 32 TIMES, ALTERNATING THE COLUMN POSITIONS OF THE "*" AND "U" CHARACTERS TO PRODUCE A CHECKER-BOARD PATTERN.

7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

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

7.2.3 TEST 4 - OVER PRINT TEST

THIS TEST CHECKS THE CARRIAGE RETURN (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.

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.

7.2.6 TEST 7 - MULTIPLE LINE ADVANCE TEST

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

7.2.7 TEST 8 - HIGH SPEED PRINT TEST

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

7.2.8 TEST 9 - SINGLE CHAR, ALL COLUMNS TEST

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

```
?????----------?????
@@@@@----------@@@@@
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 USING THE DRUM PATTERN AS FOLLOWS:

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

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

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

7.2.11 TEST 12 - HAMMER ALIGNMENT TEST

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

7.2.12 TESTS D1 & D2 - DAVFU LINE COUNT SLEWING TESTS

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

7.2.13 TEST D3 - DAVFU CHANNEL SLEW COMMAND TEST

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

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.

.ENDR

```
                                .TITLE MAINCEC-11-DZLPK-E-D
                                ;COPYRIGHT (C) 1975,1974 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

                                ;******   LP11 LP05 LINE PRINTER TEST   ******

                                ;AUTHOR:        ROBERT BAKER


                                ;LIST OF SWITCH SETTINGS USED IN THIS TEST

                                ;SWITCH NO.     DESCRIPTION

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

                  000000        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

000000  000002                  .+2
000002  000000                  HALT
000004  000006                  .+2
```

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

```
915  000166  000000                    HALT
916  000170  000172                    .+2
917  000172  000000                    HALT
918  000174  000176                    .+2
919  000176  000000                    HALT
920  000200  000202                    .+2
921  000202  000000                    HALT
922  000204  000206                    .+2
923  000206  000000                    HALT
924  000210  000212                    .+2
925  000212  000000                    HALT
926  000214  000216                    .+2
927  000216  000000                    HALT
930  000220  000222                    .+2
931  000222  000000                    HALT
932  000224  000226                    .+2
933  000226  000000                    HALT
934  000230  000232                    .+2
935  000232  000000                    HALT
936  000234  000236                    .+2
937  000236  000000                    HALT
938  000240  000242                    .+2
939  000242  000000                    HALT
940  000244  000246                    .+2
941  000246  000000                    HALT
942  000250  000252                    .+2
943  000252  000000                    HALT
944  000254  000256                    .+2
945  000256  000000                    HALT
946  000260  000262                    .+2
947  000262  000000                    HALT
950  000264  000266                    .+2
951  000266  000000                    HALT
952  000270  000272                    .+2
953  000272  000000                    HALT
954  000274  000276                    .+2
955  000276  000000                    HALT
956  000300  000302                    .+2
957  000302  000000                    HALT
960  000304  000306                    .+2
961  000306  000000                    HALT
962  000310  000312                    .+2
963  000312  000000                    HALT
964  000314  000316                    .+2
965  000316  000000                    HALT
966  000320  000322                    .+2
967  000322  000000                    HALT
968  000324  000326                    .+2
969  000326  000000                    HALT
970  000330  000332                    .+2
971  000332  000000                    HALT
972  000334  000336                    .+2
973  000336  000000                    HALT
974  000340  000342                    .+2
975  000342  000000                    HALT
976  000344  000346                    .+2
```

```
                                                HALT
                                                .+2
                                                HALT
                                                .+2
                                                HALT
                                                .+2
                                                HALT
                                                .+2
                                                HALT
                                                .+2
                                                HALT
                                                .+2
                                                HALT

                        000030                  .=30

                                                TYP
                                                340

                        000042                  .=42

                                                0

                        000046                  .=46
                                                LOGICAL
                        000052                  .=52
                                                BIT14


                        000100                  .=100

                                                LKSRV                   ;LINE CLOCK SERVICE ROUTINE
                                                340

                                                CONVRT
                                                340

                        000174                  .=174
                                                DISPREG: 0
                                                SWREG:   0

                        000200                  .=200

                                                MOV     #1000,%6
                                                JMP     SETUP


                        000300                  .=300

                                                                        ;START FOR DAVFU TESTS
                                                JMP     INDAT           ;ILLEGAL LOAD TEST
                                                JMP     NODAT           ;NO STOP BIT - CHANNEL SLEW TEST
                                                JMP     DAVFU           ;LINE COUNT SLEW TEST
                                                JMP     DAVFU2          ;CHANNEL SLEW TEST
```

```
                                                                ;; MINUTE PRINT SPEED CHECK
                000400                          .=400
000400  000137  002244          JMP     SWTIME  ;START FOR USING SWITCH REG FOR TIMING
000404  000137  002360          JMP     KW11L   ;START FOR KW11-L LINE CLOCK
000410  000137  002306          JMP     KW11P   ;START FOR KW11-P LINE CLOCK
000414  000137  000334          JMP     SLEWCK  ;CHECK TOP OF FORM SWITCH

                000600                          .=600
000600  012706  001000          MOV     #1000,%6        ;START OF PRINTING TESTS SEQUENCE
000604  000137  004066          JMP     TEST2           ;TEST 2
000610  000137  004312          JMP     TEST3           ;TEST 3
000614  000137  004650          JMP     CHRCHK          ;TEST 4
000620  000137  005114          JMP     OVRPRT          ;TEST 5
000624  000137  005374          JMP     PRTCTL          ;TEST 6
000630  000137  005656          JMP     MLF             ;TEST 7
000634  000137  006054          JMP     HSPRT           ;TEST 8
000640  000137  006360          JMP     SNGCHR          ;TEST 9
000644  000137  006536          JMP     ROTATE          ;TEST 10
000650  000137  007014          JMP     LFTTR           ;TEST 11
000654  000137  007512          JMP     HAMALN          ;TEST 12

                000700                          .=700
000700  012737  014552  014606          MOV     #LSCA,LOSCOP    ;SEND LF AFTER 132 CHARS
000706  000137  014456                  JMP     SCOPE

                000720                          .=720
000720  012737  014456  014606          MOV     #SCOPE,LOSCOP   ;NO LF'S SENT IN SCOPE ROUTINE
000726  000137  014456                  JMP     SCOPE           ;DO SCOPE ROUTINE

                001000                          .=1000

                                :LINE PRINTER HARDWARE REGISTERS

001000  177514                  LPS:    177514          ;STATUS REGISTER
                                                        ;BIT 15=ERROR
                                                        ;BIT 7=READY
                                                        ;BIT 6=INTERRUPT ENABLE

001002  177516                  LPB:    177516          ;DATA BUFFER REGISTER
                                                        ;BITS 0-6=7 BIT ASCII CHARACTER BUFFER
                                                        ;BITS 7-15=NOT USED

001004  177570                  SWR:    177570
001006  177570                  DISPLAY:177570
001010  177776                  PSW:    177776
```

```
  1083  001012  177566                TPB:    177566
  1084  001014  177562                TKB:    177562
  1085  001016  177564                TPS:    177564
  1086  001020  177560                TKS:    177560
  1087  001022  172542                CSBR:   172542
  1088  001024  172540                PLKS:   172540
  1089  001026  177546                LKS:    177546
  1090  001030  000200                PTRVEC: .WORD   200
  1091  001032  000202                PTRPSW: .WORD   202
  1092          000240                NOP     =240
  1093          000000                N       =0
  1094          000002                M       =2
  1095
  1096                                        ;MACRO FOR SETTING UP ERROR COUNT
  1097
  1098                                        .LIST ME
  1099
  1100
  1101
  1102                                        ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
  1103
  1104                                        .LIST ME
  1105
  1106
  1107
  1108                                        ;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW
  1109
  1110                                        .LIST ME
  1111
  1112
  1113
  1114
  1115
  1116
  1117
  1118                                ;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS
  1119
  1120  001034  000000                SEQCNT: 0
  1121  001036  000000                CHRCNT: 0
  1122  001040  000000                CHRGEN: 0
  1123  001042  000000                LINCNT: 0
  1124  001044  000000                CYCCNT: 0
  1125  001046  000000                WORK:   0
  1126  001050  000000                SAVE:   0
  1127  001052  000000                ERCOUNT:0
  1128  001054  000000                STRCHR: 0
  1129  001056  000000                STRCNT: 0
  1130  001060  000000                LEGCHR: 0
  1131  001062  000000                NUMCHR: 0
  1132
  1133                                ;ROUTINE TO TEST THE MECH. OPERATION OF THE LPOS
  1134
  1135  001064  004437  010030        SETUP:  JSR     %4,TYPINT
  1136  001070  000005                        RESET                   ;CLEAR WORLD
  1137  001072  013746  000004                MOV     4.-(SP)         ;SAVE CURRENT VECTORS
  1138  001076  013746  000006                MOV     6.-(SP)         ;
```

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

```
1195  001342  000767                          BR      STP5B           ;LOOP ON ERROR
1196  001344  104000                  STP5C:  EMT     +0              ;TYPE MESSAGE
1197  001346  011023                          MES5                    ;READY SET OK - TRY DRUM GATE SWITCH
1198  001350  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1199
1200  001352  005777  177422          STP6:   TST     @LPS            ;TEST FOR ERROR
1201  001356  100406                          BMI     STP7            ;BRANCH IF ERROR SET
1202  001360  012737  000005  001052  ERR5:   MOV     #5,     ERCOUNT         ;SET UP ERROR COUNT 5
1203          000006                          N=N+1
1204  001366  004537  010244                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1205  001372  000767                          BR      STP6            ;LOOP ON ERROR
1206  001374  104000                  STP7:   EMT     +0              ;TYPE MESSAGE
1207  001376  011070                          MES6                    ;ERROR SET OK - TURN ON LINE
1208  001400  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1209
1210                                  ;TEST 1
1211                                  ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING.
1212
1213                                  ;IS THE PRINTER FREE OF ERRORS
1214
1215  001402  000005                  TEST1:  RESET                   ;CLEAR THE WORLD
1216  001404  005777  177370                  TST     @LPS            ;IS ERROR FLAG CLEAR
1217  001410  100006                          BPL     TEST1A          ;ERROR IS CLEAR OK
1218  001412  012737  000006  001052  ERR6:   MOV     #6,     ERCOUNT         ;SET UP ERROR COUNT 6
1219          000007                          N=N+1
1220  001420  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1221  001424  000766                          BR      TEST1           ;LOOP ON ERROR
1222
1223                                  ;IS READY SET (NO ERRORS EXIST)
1224
1225  001426  000005                  TEST1A: RESET                   ;CLEAR THE WORLD
1226  001430  105777  177344                  TSTB    @LPS            ;IS READY SET
1227  001434  100406                          BMI     TEST1B          ;READY SET! PRINTER OK
1228  001436  012737  000007  001052  ERR7:   MOV     #7,     ERCOUNT         ;SET UP ERROR COUNT 7
1229          000010                          N=N+1
1230  001444  004537  010244                  JSR     %5,STAER        ;REPORT READY NOT SET
1231  001450  000766                          BR      TEST1A          ;LOOP ON ERROR
1232
1233                                  ;DOES LOADING THE BUFFER RESET READY
1234
1235  001452  005037  001046          TEST1B: CLR     WORK            ;CLEAR COUNTER
1236  001456  012777  000015  177316          MOV     #15,@LPB        ;LOAD CARRIAGE RETURN INTO BUFFER
1237  001464  105777  177310                  TSTB    @LPS            ;IS READY CLEAR
1238  001470  100006                          BPL     LP1             ;READY IO CLEAR OK!
1239  001472  012737  000010  001052  ERR10:  MOV     #10,    ERCOUNT         ;SET UP ERROR COUNT 10
1240          000011                          N=N+1
1241  001500  004537  010244                  JSR     %5,STAER        ;REPORT READY STILL SET
1242  001504  000762                          BR      TEST1B          ;LOOP ON ERROR
1243  001506  005777  177266          LP1:    TST     @LPS            ;IS THERE AN ERROR
1244  001512  100006                          BPL     LP2             ;NO ERROR CONTINUE
1245  001514  012737  000011  001052  ERR11:  MOV     #11,    ERCOUNT         ;SET UP ERROR COUNT 11
1246          000012                          N=N+1
1247  001522  004537  010244                  JSR     %5,STAER        ;REPORT ERROR OCCURRED
1248  001526  000751                          BR      TEST1B          ;LOOP ON ERROR
1249  001530  105777  177244          LP2:    TSTB    @LPS            ;IS THE PRINTER STILL BUSY
1250  001534  100411                          BMI     TEST1C          ;NO! GO TO NEXT TEST
```

```
1251  001536  005237  001046                    INC     WORK            ;YES! GO CHECK FLAGS
1252  001542  001361                            BNE     LP1             ;PRINTER STILL BUSY WAIT
1253  001544  012737  000012  001052  ERR12:    MOV     #12,    ERCOUNT         ;SET UP ERROR COUNT 12
1254          000013                            N=N+1
1255  001552  004537  010244                    JSR     %5,STAER        ;ERROR REPORT TIME OUT
1256  001556  000735                            BR      TEST1B          ;LOOP ON ERROR
1257
1258                                    ;CHECK INTERRUPT LEVEL OF PRINTER
1259                                    ;THE PRINTER SHOULD BE AT LEVEL 4
1260
1261                                    ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
1262
1263  001560  012777  002014  177242  TEST1C:   MOV     #INT1C,@PTRVEC  ;SET UP INT VECTOR
1264  001566  012777  000340  177236            MOV     #340,@PTRPSW    ;SET PRIORITY
1265  001574  005777  177200                    TST     @LPS            ;TEST FOR ERROR
1266  001600  100006                            BPL     LP3             ;NO ERROR CONTINUE
1267  001602  012737  000013  001052  ERR13:    MOV     #13.    ERCOUNT         ;SET UP ERROR COUNT 13
1268          000014                            N=N+1
1269  001610  004537  010244                    JSR     %5,STAER        ;REPORT ERROR SET
1270  001614  000761                            BR      TEST1C          ;LOOP ON ERROR
1271  001616  105777  177156          LP3:      TSTB    @LPS            ;TST FOR READY
1272  001622  100406                            BMI     LP3X            ;READY SET OK
1273  001624  012737  000014  001052  ERR14:    MOV     #14.    ERCOUNT         ;SET UP ERROR COUNT 14
1274          000015                            N=N+1
1275  001632  004537  010244                    JSR     %5,STAER        ;REPORT READY NOT SET
1276  001636  000750                            BR      TEST1C          ;LOOP ON ERROR
1277  001640                          LP3X:
1278  001640  012737  000015  001052  ERR15:    MOV     #15,    ERCOUNT         ;SET UP ERROR COUNT 15
1279          000016                            N=N+1
1280  001646  012777  000340  177134            MOV     #340,@PSW       ;LOCKUP PROCESSOR
1281  001654  052777  000100  177116            BIS     #100,@LPS       ;SET PRINTER INTO ENABLE
1282  001662  000240                            NOP                     ;WAIT
1283  001664  042777  000100  177106            BIC     #100,@LPS       ;CLEAR PRINTER INT. ENABLE
1284
1285                                    ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
1286
1287  001672  012737  000016  001052  ERR16:    MOV     #16,    ERCOUNT         ;SET UP ERROR COUNT 16
1288          000017                            N=N+1
1289  001700  012777  000300  177102            MOV     #300,@PSW       ;SET PROCESSOR PRIORITY LEVEL 6
1290  001706  052777  000100  177064            BIS     #100,@LPS       ;SET PRINTER INT ENABLE
1291  001714  000240                            NOP                     ;WAIT
1292  001716  042777  000100  177054            BIC     #100,@LPS       ;CLEAR PRINTER INT. ENABLE
1293
1294                                    ;TEST THAT THE PRINTER WILL NOT INT. AT
1295                                    ;PROCESSOR LEVEL 5
1296
1297  001724  012737  000017  001052  ERR17:    MOV     #17,    ERCOUNT         ;SET JP ERROR COJNT 17
1298          000020                            N=N+1
1299  001732  012777  000240  177050            MOV     #240,@PSW       ;SET UP PROCESSOR TO LEVEL 5
1300  001740  052777  000100  177032            BIS     #100,@LPS       ;SET PRINTER INT ENABLE
1301  001746  000240                            NOP                     ;WAIT
1302  001750  042777  000100  177022            BIC     #100,@LPS       ;CLEAR INT ENABLE PRINTER OK
1303
1304                                    ;TEST THAT THE PRINTER WILL NOT INT
1305                                    ;WHEN THE PROCESSOR IS AT LEVEL 4
1306
```

```
                                ;SET UP ERROR COUNT 20
                                ;SET PROCESSOR TO LEVEL 4
                                ;SET PRINTER INT. ENABLE
                                ;WAIT
                                ;CLEAR PRINTER INT ENABLE
                                ;PRINTER OK CONTINUE

                                ;INTERRUPT HANDLE FOR TEST1C
                                ;RESTORE STACK AND REPORT ERROR

                                ;RESTORE STACK
                                ;REPORT ERROR
                                ;RE-ENTER TEST1C

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

                                ;SET UP INTERRUPT VECTOR
                                ;LOCK UP PRIORITIES
                                ;IS THERE A PRINTER ERROR
                                ;NO! CONTINUE
                                ;SET UP ERROR COUNT 21
                                ;REPORT PRINTER ERROR
                                ;LOOP ON ERROR
                                ;IS READY SET
                                ;YES - PRINTER READY
                                ;SET UP ERROR COUNT 22
                                ;REPORT READY NOT SET
                                ;LOOP ON ERROR
                                ;SET PRIORITY TO LEVEL 3
                                ;SET PRINTER INTERRUPT ENABLE
                                ;WAIT
                                ;SET UP ERROR COUNT 23
                                ;REPORT ERROR
                                ;LOOP ON ERROR

                                ;INTERRUPT HANDLER FOR TEST1D

                                ;RESET STACK
                                ;CLEAR INT.  ENABLE FOR PRINTER
                                ;CLEAR PROCESSOR STATUS
                                ;RESET INSTRUCTION AT 200
                                ;RESET INSTRUCTION AT 202

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

                                ;SET TRAP TO RETURN
                                ;KW11-L AVAILABLE?
```

```
1363  002212  103424                          BCS     1$              ;NO,  BRANCH
1364  002214  005037  000024                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1365  002220  000137  002350                  JMP     KW11L           ;USE KW11L FOR TIMING
1366  002224  000261                  1$:     SEC
1367  002226  105777  176572                  TSTB    @PLKS           ;KW11-P AVAILABLE?
1368  002232  103404                          BCS     SWTIME          ;NO,  USE SWITCH REG FOR TIMING
1369  002234  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1370  002240  000137  002306                  JMP     KW11P           ;USE KW11-P FOR TIMING
1371  002244  005037  001042          SWTIME: CLR     LINCNT          ;CLEAR LINE COUNT
1372  002250  004437  010030                  JSR     %4,TYPINT
1373  002254  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1374  002260  104000                          EMT     +0              ;TYPE MESSAGE
1375  002262  010435                          .MESG                   ;PRINT SPEED CHECK USING MANUAL TIMING
1376  002264  012737  000002  002622          MOV     #2,DIA          ;SET DUMMY ADDRESS
1377  002272  032777  000001  176504  1$:     BIT     #BIT0,@SWR      ;START?
1400  002300  001774                          BEQ     1$              ;WAIT FOR START
1401  002302  000137  002406                  JMP     STARO           ;START PRINTING
1402
1403
1404                                    ;START FOR KW11-P.....
1405
1406  002306  005037  001042          KW11P:  CLR     LINCNT          ;CLEAR LINE COUNT
1407  002312  004437  010030                  JSR     %4,TYPINT
1410  002316  012706  001000                  MOV     #1000,%6        ;RESET STACK
1411  002322  013777  002616  176472          MOV     MINCNT,@CSBR    ;SET CLOCK COUNT
1412  002330  013737  001024  002622          MOV     PLKS,DIA        ;STORE PLKS ADDRESS
1413  002336  012777  000105  176460          MOV     #105,@PLKS      ;START CLOCK
1414  002344  000137  002406                  JMP     STARO           ;START PRINTING
1415
1416                                    ;START FOR KW11-L.....
1417
1420  002350  005037  001042          KW11L:  CLR     LINCNT          ;CLEAR LINE COUNT
1421  002354  004437  010030                  JSR     %4,TYPINT
1422  002360  012706  001000                  MOV     #1000,%6        ;RESET STACK
1423  002364  013737  002616  002620          MOV     MINCNT,CNTR     ;SET CLOCK COUNT
1424  002372  013737  001026  002632          MOV     LKS,DIA         ;STORE LKS ADDRESS
1425  002400  012777  000100  176420          MOV     #100,@LKS       ;ENABLE CLOCK INTERRUPT
1426
1427
1430                                    ;PRINTING ROUTINE.....
1431
1432  002406  032777  020000  176370  STARO:  BIT     #BIT13,@SWR     ;CHECK CHAR SET
1433  002414  001007                          BNE     STAROA          ;BRANCH IF 96
1434  002416  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHECK
1435  002424  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
1436  002432  000406                          BR      STAROB          ;CONTINUE
1437  002434  012737  000200  001060  STAROA: MOV     #200,LEGCHR     ;LEGAL CHECK
1440  002442  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
1441  002450                          STAROB:
1442  002450  012737  000204  001036          MOV     #132.,CHRCNT    ;SET CHAR COUNT
1443  002456  012737  003014  001054          MOV     #PATTB,STRCHR   ;INITIALIZE TABLE POINTER
1444  002464  012737  000021  001044  STARA:  MOV     #17.,CYCCNT     ;SET GROUP COUNT
1445  002472  017737  176356  001040          MOV     @STRCHR,CHRGEN  ;GET CHAR FROM TABLE
1446  002500  063737  001042  001040          ADD     LINCNT,CHRGEN   ;ADD LINE COUNT
1447  002506  023737  001060  001040  1$:     CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
1450  002514  003004                          BGT     STAR1           ;YES,  BRANCH
1451  002516  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;NO,  MAKE LEGAL
```

```
                                                BR      1$              ;RECHECK CHAR
002524  000770
002526  013777  001040  176246                STAR1:  MOV     CHRGEN,@LPB     ;LOAD BUFFER
002534  005337  001036                                DEC     CHRCNT          ;DECREMENT CHAR COUNT
002540  001410                                        BEQ     STARED          ;BRANCH IF DONE LINE
002542  005337  001044                                DEC     CYCCNT          ;DECREMENT CYCCLE COUNT
002546  001367                                        BNE     STAR1           ;CONTINUE IF NOT DONE GROUP
002550  062737  000002  001054                        ADD     #2,STRCHR       ;ADD 2 TO TABLE POINTER
002556  000137  002464                                JMP     STARA           ;CONTINUE
002562  005237  001042                        STARED: INC     LINCNT          ;INCREMENT LINE COUNT
002566  012777  000012  176206                        MOV     #12,@LPB        ;SEND LF
002574  105777  176200                                TSTB    @LPS            ;TEST READY
002600  100375                                        BPL     .-4             ;WAIT FOR READY
002602  032777  000001  176174                        BIT     #BIT0,@SWR      ;STOP PRINT?
002610  001411                                        BEQ     CONVRT          ;YES,  BRANCH
002612  000137  002406                                JMP     STARD           ;CONTINUE

002616  007020                        MINCNT: 7020
002620  000000                        CNTR:   0
002622  000002                        DIA:    2

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

                                        ;LINE CLOCK SERVICE ROUTINE FOR KW11-L

002624  005337  002620                LKSRV:  DEC     CNTR            ;DECREMENT COUNTER
002630  001401                                BEQ     CONVRT          ;EXIT IF 1 MINUTE
002632  000002                                RTI                     ;RETURN


                                        ;ROUNTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE

002634  042777  000100  177760        CONVRT: BIC     #100,@DIA       ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
002642  005037  010160                CLR     TYPDAT          ;CLEAR DIGIT COUNT
002646  012703  011450                        MOV     #MES12,%3       ;SET MESSAGE POINTER
002652  022737  000144  001042        1$:     CMP     #100.,LINCNT    ;GREATER THAN 100?
002660  003006                                BGT     2$              ;NO,  PRINT HUNDRED'S DIGIT
002662  162737  000144  001042                SUB     #100.,LINCNT    ;YES,  SUBTRACT 100
002670  005237  010160                        INC     TYPDAT          ;INCREMENT HUNDRED'S DIGIT
002674  000766                                BR      1$              ;CONTINUE CONVERSION
002676  062737  000060  010160        2$:     ADD     #60,TYPDAT      ;MAKE ASCII
002704  113723  010160                        MOVB    TYPDAT,(%3)+    ;STORE DIGIT
002710  005037  010160                        CLR     TYPDAT          ;CLEAR DIGIT COUNTER
002714  022737  000012  001042        3$:     CMP     #10.,LINCNT     ;GREATER THEN 10?
002722  003006                                BGT     4$              ;NO,  PRINT DIGIT
002724  162737  000012  001042                SUB     #10.,LINCNT     ;YES,  SUBTRACT 10
002732  005237  010160                        INC     TYPDAT          ;INCREMENT TEN'S DIGIT
002736  000766                                BR      3$              ;CONTINUE CONVERSION
002740  062737  000060  010160        4$:     ADD     #60,TYPDAT      ;MAKE ASCII
002746  113723  010160                        MOVB    TYPDAT,(%3)+    ;STORE DIGIT
002752  013737  001042  010160                MOV     LINCNT,TYPDAT   ;GET ONE'S DIGIT
002760  062737  000060  010160                ADD     #60,TYPDAT      ;MAKE ASCII
002766  113723  010160                        MOVB    TYPDAT,(%3)+    ;STORE DIGIT
002772  104000                                EMT     +0              ;TYPE MESSAGE
002774  011412                                MES11                   ;TYPE PRINT SPEED
002776  012737  011410  010026                MOV     #MES11A,PRTMSG  ;SET PRINTER MESSAGE ADDRESS
```

```
                                                    JSR     %4,RINT         ;PRINT PRINTER SPEED ON LINE PRINTER
                                                    JMP     SLEWCK          ;NEXT TEST


003014  000040                          PATTB:  40
003016  000117                                  117
003020  000076                                  76
003022  000055                                  55
003024  000134                                  134
003026  000113                                  113
003030  000072                                  72
003032  000051                                  51

                                        ;CHECK TOP OF FORM SWITCH

003034  004437  010030                  SLEWCK: JSR     %4,TYPINT
003040  004537  007754                          JSR     %5,PRTINT       ;INITIALIZE PRINTER
003044  000406                                  BR      SLW             ;BRANCH IF OK
003046  012737  000024  001052          ERR24:  MOV     #24,    ERCOUNT         ;SET UP ERROR COUNT 24
        000025                                  N=N+1
003054  004537  010244                          JSR     %5,STAER        ;REPORT PRINTER NOT READY
003060  000000                                  HALT                    ;HALT ON ERROR
003062  012737  003276  001042          SLW:    MOV     #FFTAB,LINCNT   ;LINE COUNT FOR SWITCH SETTING
003070  012704  003354                          MOV     #FFSET,%4       ;INIT SWITCH SETTING TABLE POINTER
003074  012703  011164                  SLWO:   MOV     #MES8,%3        ;INIT MESSAGE POINTER
003100  012702  011277                          MOV     #MES10,%2       ;
003104  111413                          SLW1:   MOVB    (%4),(%3)       ;PUT SWITCH SETTINGS INTO MESSAGES
003106  111412                                  MOVB    (%4),(%2)       ;
003110  122423                                  CMPB    (%4)+,(%3)+     ;INCREMENT POINTERS
003112  105722                                  TSTB    (%2)+
003114  105714                                  TSTB    (%4)            ;DONE MOVING SWITCH SETTINGS TO MSG'S?
003116  001372                                  BNE     SLW1            ;BRANCH IF NOT DONE
003120  005234                                  INC     %4              ;TABLE POINTER SET FOR NEXT SWITCH SETTING
003122  104000                                  EMT     +0              ;TYPE MESSAGE
003124  011130                                  MES7                    ;SET TOP OF FORM SWITCH TO ---
003126  000000                                  HALT                    ;WAIT FOR OPERATOR TO SET SWITCH
003130  005777  175706                  SLW11:  TST     @LINCNT         ;CHECK LINE COUNT
003134  001003                                  BNE     SLW1A           ;BRANCH IF NOT ZERO
003136  012737  011477  010026                  MOV     #MES13,PRTMSG   ;CHANGE PRINTER MESSAGE
003144  005777  175630                  SLW1A:  TST     @LPS            ;TEST FOR ERRORS
003150  100006                                  BPL     SLW2            ;BRANCH IF NO ERROR
003152  012737  000025  001052          ERR25:  MOV     #25,    ERCOUNT         ;SET UP ERROR COUNT 25
        000026                                  N=N+1
003160  004537  010244                          JSR     %5,STAER        ;REPORT ERROR SET
003164  000000                                  HALT                    ;HALT ON ERROR
003166  012777  000014  175606          SLW2:   MOV     #14,@LPB        ;SEND FF
003174  105777  175600                          TSTB    @LPS            ;TEST READY
003200  100375                                  BPL     .-4             ;WAIT FOR READY
003202  004437  010010                          JSR     %4,RINT         ;PRINT MESSAGE ON LINE PRINTER
003206  062737  000002  001042                  ADD     #2,LINCNT       ;NEXT LINE COUNT
003214  022737  003352  001042                  CMP     #FTABE,LINCNT   ;DONE TEST?
003222  001410                                  BEQ     DAVAV           ;YES,  EXIT
003224  005777  175612                          TST     @LINCNT         ;DONE CHECK OF THIS SWITCH SETTING?
003230  001721                                  BEQ     SLWO            ;YES,  NEXT SWITCH SETTING
003232  012737  011202  010026                  MOV     #MES9,PRTMSG    ;NO,  CHECK THIS SETTING
```

```
003240  000137  003130                    JMP     SLW11              ;CONTINUE
003244  013737  012412  011164  DAVAV:    MOV     TNC13,MES8         ;SET MESSAGE
003252  104000                            EMT     +0                 ;TYPE MESSAGE
003254  011126                            MES79                      ;RESET TCP OF FORM SWITCH
003256  000000                            HALT                       ;WAIT FOR OPERATOR
003260  032777  040000  175516            BIT     #BIT14,@SWR        ;DAVFU AVAILABLE?
003266  001060                            BNE     INDAT              ;YES,  DO DAVFU TESTS
003270  000000                            HALT                       ;DONE OPERATOR TESTS  -  HALT
003272  000137  004066                    JMP     TEST2              ;DEPRESS CONTINUE TO START PRINTING TESTS

003276  000000                  FFTAB:    0                          ;LOOP COUNTS FOR SLEW CHECKS
003300  000022                            18.
003302  000000                            0
003304  000025                            21.
003306  000000                            0
003310  000030                            24.
003312  000000                            0
003314  000041                            33.
003316  000000                            0
003320  000044                            36.
003322  000000                            0
003324  000052                            42.
003326  000000                            0
003330  000060                            48.
003332  000000                            0
003334  000063                            51.
003336  000000                            0
003340  000102                            66.
003342  000000                            0
003344  000110                            72.
003346  000000                            0
003350  000124                            84.
003352  000000                  FTABE:    0


003354  020063  000040          FFSET:    .ASCIZ  /3  /               ;SWITCH SETTINGS FOR MESSAGES
003360  027063  000065                    .ASCIZ  /3.5/
003364  020064  000040                    .ASCIZ  /4  /
003370  027065  000065                    .ASCIZ  /5.5/
003374  020066  000040                    .ASCIZ  /6  /
003400  020067  000040                    .ASCIZ  /7  /
003404  020070  000040                    .ASCIZ  /8  /
003410  027070  000065                    .ASCIZ  /8.5/
003414  030461  000040                    .ASCIZ  /11 /
003420  031061  000040                    .ASCIZ  /12 /
003424  032061  000040                    .ASCIZ  /14 /


                                          .EVEN

                                ;CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA

003430  004437  010030          INDAT:    JSR     %4,TYPINT
003434  012737  003564  001040            MOV     #INDATT,CHRGEN     ;SET TABLE POINTER
003442  005777  175332          INDO:     TST     @LPS               ;TEST FOR ERROR
003446  100010                            BPL     INDATO             ;BRANCH IF NO ERROR
```

```
:597   003450  012737  000026  001052  ERR26:  MOV     #26,    ERCOUNT         ;SET UP ERROR COUNT 26
:598           000027                          N=N+1
:599   003456  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
:600   003462  000000                          HALT                    ;HALT ON ERROR
:601   003464  000137  003430                  JMP     INDAT           ;RESTART TEST
:602   003470  017777  175344  175304  INDAT0: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
:603   003476  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
:604   003504  005777  175330                  TST     @CHRGEN         ;TEST CHAR
:605   003510  001405                          BEQ     IND1            ;CONTINUE IF DONE
:606   003512  105777  175262                  TSTB    @LPS            ;TEST READY
:607   003516  100375                          BPL     .-4             ;WAIT FOR READY
:608   003520  000137  003442                  JMP     IND0
:609   003524  005777  175252          IND1:   TST     @LPS            ;TEST FOR ERROR SET.
:610   003530  100410                          BMI     INDAT1          ;BRANCH IF ERROR SET.
:611   003532  012737  000027  001052  ERR27:  MOV     #27,    ERCOUNT         ;SET UP ERROR COUNT 27
:612           000030                          N=N+1
:613   003540  004537  010244                  JSR     %5,STAER        ;REPORT ERROR NOT SET
:614   003544  000000                          HALT                    ;HALT ON ERROR
:615   003546  000137  003430                  JMP     INDAT           ;RESTART TEST
:616   003552  104000          INDAT1: EMT     +0                      ;TYPE MESSAGE
:617   003554  010315                  MESA                            ;ERROR SET OK - CLEAR & TURN ON LINE
:618   003556  000000                  HALT                            ;WAIT FOR OPERATOR
:619                                                                    ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
:620   003560  000137  003600                  JMP     NODAT           ;NEXT TEST
:621
:622   003564  000356          INDATT: 356                             ;DATA TABLE FOR ABOVE TEST
:623   003566  000001                  1
:624   003570  000002                  2
:625   003572  000003                  3
:626   003574  000357                  357
:627   003576  000000                  0
:628
:629                           ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
:630
:631   003600  004437  010030  NODAT:  JSR     %4,TYPINT
:632   003604  012737  000200  001054  MOV     #200,STRCHR     ;SET PAPER INSTRUCTION
:633   003612  012737  004006  001040  NODOA:  MOV     #NODAT3,CHRGEN  ;SET TABLE POINTER FOR LOAD
:634   003620  005777  175154  NODO:   TST     @LPS            ;TEST FOR ERROR
:635   003624  100007                  BPL     NODATO          ;BRANCH IF NO ERROR
:636   003626  012737  000030  001052  ERR30:  MOV     #30,    ERCOUNT         ;SET UP ERROR COUNT 30
:637           000031                  N=N+1
:638   003634  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
:639   003640  000000                          HALT                    ;HALT ON ERROR
:640   003642  000756                          BR      NODAT           ;RESTART TEST
:641   003644  017777  175170  175130  NODATO: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
:642   003652  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
:643   003660  022737  004066  001040          CMP     #NODAT4+2,CHRGEN        ;DONE LOAD?
:644   003666  001405                          BEQ     NODATA          ;BRANCH IF DONE
:645   003670  105777  175104                  TSTB    @LPS            ;TEST READY
:646   003674  100375                          BPL     .-4             ;WAIT FOR READY
:647   003676  000137  003620                  JMP     NODO
:648   003702  013777  001054  175072  NODATA: MOV     STRCHR,@LPB     ;SEND DATA
:649   003710  005037  001036                  CLR     CHRCNT          ;DELAY
:650   003714  005237  001036          1$:     INC     CHRCNT
:651   003720  001375                          BNE     1$
:652   003722  005777  175052                  TST     @LPS            ;TEST FOR ERROR SET
```

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

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1699  004114  013737  016370  011724          MOV     TNO2,MES15              ;SET TEST NUMBER FOR MESSAGE
1700  004122  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1701          000003                          M=M+1
1702  004126  012737  177740  001044          MOV     #-32.,CYCCNT    ;SET UP LINE COUNT FOR 32 LINES
1703  004134  012737  177574  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT TO 132
1704  004142  013737  004216  001054          MOV     SCHRSW,STRCHR   ;SET CHAR. SWITCH TO 1
1705  004150  005777  174624          T3A:    TST     @LPS                    ;TEST FOR ERROR
1706  004154  100006                  BPL     LP2B                    ;NO ERROR CONTINUE
1707  004156  012737  000033  001052  ERR33:  MOV     #33,    ERCOUNT         ;SET UP ERROR COUNT 33
1708          000034                          N=N+1
1709  004164  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1710  004170  000000                          HALT                    ;HALT ON ERROR
1711  004172  000177  174656          LP2B:   JMP     @STRCHR         ;LOAD CHAR
1712  004176  013737  004220  001054  T2A:    MOV     RCHRSW,STRCHR   ;RESET CHAR. SWITCH
1713  004204  012737  000125  001050          MOV     #125,SAVE       ;STORE CHAR
1714  004212  000137  004236                  JMP     T5A             ;LOAD CHAR
1715
1716  004216  004176          SCHRSW: T2A
1717  004220  004222          RCHRSW: T1A
1718
1719  004222  013737  004216  001054  T1A:    MOV     SCHRSW,STRCHR   ;SET CHAR. SWITCH TO 0
1720  004230  012737  000052  001050          MOV     #52,SAVE        ;STORE CHAR
1721  004236  013777  001050  174536  T5A:    MOV     SAVE,@LPB       ;LOAD BUFFER
1722  004244  005237  001036                  INC     CHRCNT          ;INC CHARACTER COUNT
1723  004250  001337                          BNE     T3A             ;CONTINUE
1724  004252  012777  000012  174522          MOV     #12,@LPB        ;SEND LF
1725  004260  105777  174514                  TSTB    @LPS            ;TEST READY
1726  004264  100375                          BPL     .-4             ;WAIT FOR READY
1727  004266  012737  177574  001036          MOV     #-132.,CHRCNT   ;RESET CHAR COUNT
1728  004274  005237  001044                  INC     CYCCNT          ;INC CYCLE COUNT
1729  004300  001356                          BNE     T5A             ;CONTINUE IF NOT DONE
1730  004302  032777  010000  174474          BIT     #BIT12,@SWR     ;LOOP ON TEST?
1731  004310  001266                          BNE     TEST2           ;LOOP
1732
1733                          ;TEST 3
1734                          ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1735                          ;ALL CHARACTERS AND ILLEGAL CHARACTERS
1736
1737  004312  004437  010030          TEST3:  JSR     %4,TYPINT
1738  004316  013737  012372  011724          MOV     TNO3,MES15              ;SET TEST NUMBER FOR MESSAGE
1739  004324  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1740          000004                          M=M+1
1741  004330  012737  177765  001044          MOV     #-13,CYCCNT     ;SET 21 LINES
1742  004336  000137  004470                  JMP     LP2H            ;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1743  004342  012737  177574  001036  T2B0:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT FOR 132
1744  004350  012737  000040  001040  T2B0A:  MOV     #40,CHRGEN      ;SET FIRST CHAR.
1745  004356  005777  174416          T2B1:   TST     @LPS            ;DOES THE PRINTER HAVE AN ERROR
1746  004362  100006                  BPL     LP2E            ;BRANCH IF NO ERROR
1747  004364  012737  000034  001052  ERR34:  MOV     #34,    ERCOUNT         ;SET UP ERROR COUNT 34
1748          000035                          N=N+1
1749  004372  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
1750  004376  000000                          HALT                    ;HALT ON ERROR
1751  004400  013777  001040  174374  LP2E:   MOV     CHRGEN,@LPB     ;PRINT CHARACTER
1752  004406  005237  001036                  INC     CHRCNT          ;INC. CHAR. COUNT
1753  004412  001420                          BEQ     T2B2            ;BRANCH IF LINE IS FINISHED
1754  004414  005237  001040                  INC     CHRGEN          ;NEXT CHAR
```

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 1755  004420  032777  020000  174356          BIT     #BIT13,@SWR     ;CHECK CHAR SET
 1756  004426  001405                          BEQ     T2B2B           ;BRANCH IF 64 CHARS
 1757  004430  022737  000200  001040          CMP     #200,CHRGEN     ;LEGAL CHAR?
 1758  004436  001744                          BEQ     T2B0A           ;MAKE SPACE IF ILLEGAL
 1759  004440  000746                          BR      T2B1            ;CONTINUE IF LEGAL CHAR
 1760  004442  022737  000140  001040  T2B2B:  CMP     #140,CHRGEN     ;LEGAL CHAR?
 1761  004450  001737                          BEQ     T2B0A           ;MAKE SPACE IF ILLEGAL
 1762  004452  000744                          BR      T2B1            ;CONTINUE IF LEGAL CHAR
 1763  004454  012777  000012  174320  T2B2:   MOV     #12,@LPB        ;ISSUE LINE FEED
 1764  004462  105777  174312                  TSTB    @LPS            ;TEST READY
 1765  004466  100375                          BPL     .-4             ;WAIT FOR READY
 1766  004470  005037  001040          LP2H:   CLR     CHRGEN          ;FIRST ILLEGAL CHAR
 1767  004474  005777  174300          T2B3:   TST     @LPS            ;TEST FOR ERROR
 1768  004500  100006                          BPL     LDCH            ;BRANCH IF NO ERROR
 1769  004502  012737  000035  001052  ERR35:  MOV     #35,    ERCOUNT         ;SET UP ERROR COUNT 35
 1770          000036                          N=N+1
 1771  004510  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
 1772  004514  000000                          HALT                    ;HALT ON ERROR
 1773  004516  013777  001040  174256  LDCH:   MOV     CHRGEN,@LPB     ;TRANSMIT CHARACTER
 1774  004524  005237  001040          T2B4:   INC     CHRGEN          ;NEXT CHAR
 1775  004530  022737  000012  001040          CMP     #12,CHRGEN      ;TEST FOR LINE FEED
 1776  004536  001772                          BEQ     T2B4            ;SKIP IF LF
 1777  004540  022737  000014  001040          CMP     #14,CHRGEN      ;TEST FOR FORM FEED
 1778  004546  001766                          BEQ     T2B4            ;SKIP IF FF
 1779  004550  022737  000015  001040          CMP     #15,CHRGEN      ;TEST FOR CARRIAGE RETURN
 1780  004556  001762                          BEQ     T2B4            ;SKIP IF CR
 1781  004560  023727  001040  000040          CMP     CHRGEN,#40      ;CHECK IF LEGAL CHAR
 1782  004566  002753                          BLT     LDCH            ;CONTINUE IF STILL ILLEGAL CHAR
 1783  004570  032777  020000  174206          BIT     #BIT13,@SWR     ;CHECK CHAR SET
 1784  004576  001007                          BNE     T2B5            ;BRANCH IF 96 CHAR SET
 1785  004600  052737  000100  001040          BIS     #100,CHRGEN     ;SET BIT 7 IF NOT SET
 1786  004606  032737  000200  001040          BIT     #200,CHRGEN     ;DONE ILLEGAL CHARS?
 1787  004614  001740                          BEQ     LDCH            ;BRANCH IF NOT DONE
 1788  004616  012777  000012  174156  T2B5:   MOV     #12,@LPB        ;ISSUE LINE FEED
 1789  004624  105777  174150                  TSTB    @LPS            ;TEST READY
 1790  004630  100375                          BPL     .-4             ;WAIT FOR READY
 1791  004632  005237  001044                  INC     CYCCNT          ;INCREMENT LINE COUNT
 1792  004636  001241                          BNE     T2B0            ;CONTINUE IF NOT DONE
 1793  004640  032777  010000  174136          BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
 1794  004646  001221                          BNE     TEST3           ;LOOP
 1795
 1796                                  ;TEST 4
 1797                                  ;OVER PRINT TEST
 1798                                  ;OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES
 1799
 1800  004650  004437  010030          CHRCHK: JSR     %4,TYPINT
 1801  004654  013737  012374  011724          MOV     TN04,MES15              ;SET TEST NUMBER FOR MESSAGE
 1802  004662  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
 1803          000005                          M=M+1
 1804  004666  012737  177750  001042          MOV     #-24.,LINCNT    ;SET UP LINE COUNT FOR 24 LINES
 1805  004674  012737  177776  001044          MOV     #-2,CYCCNT      ;SET UP CYCLE COUNT
 1806  004702  013737  005044  001054          MOV     CHRE,STRCHR     ;SET CHAR TAG TO SPACE
 1807  004710  012737  177574  001036  CR:     MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 1808  004716  005777  174056          CR0:    TST     @LPS            ;TEST FOR ERROR
 1809  004722  100006                          BPL     CR1             ;CONTINUE IF NO ERROR
 1810  004724  012737  000036  001052  ERR36:  MOV     #36,    ERCOUNT         ;SET UP ERROR COUNT 36
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                    000037                                  N=N+1
1812    004732  004537  010244                              JSR     %5,STAER        ;REPORT ERROR SET
1813    004736  000000                                      HALT                    ;HALT ON ERROR
1814    004740  000177  174110                    CR1:      JMP     @STRCHR         ;OPPOSITE CHAR
1815    004744  013737  005044  001054            CR2:      MOV     CHRE,STRCHR     ;SET CHAR SWITCH TO SPACE
1816    004752  012737  000105  001050                      MOV     #105.,SAVE      ;SEND E
1817    004760  013777  001050  174014            CR3:      MOV     SAVE,@LPB       ;LOAD BUFFER
1818    004766  005237  001036                              INC     CHRCNT          ;INCREMENT CHAR COUNT
1819    004772  001351                                      BNE     CR0             ;BRANCH IF NOT DONE
1820    004774  005237  001044                              INC     CYCCNT          ;INCREMENT CYCLE COUNT
1821    005000  001422                                      BEQ     CR5             ;BRANCH IF FINISHED OVERPRINTS
1822    005002  012777  000015  173772                      MOV     #15,@LPB        ;SEND CR
1823    005010  105777  173764                              TSTB    @LPS            ;TEST READY
1824    005014  100375                                      BPL     .-4             ;WAIT FOR READY
1825    005016  000137  004710                              JMP     CR              ;OVERPRINT LINE
1826    005022  013737  005042  001054            CR7:      MOV     CHRS,STRCHR     ;RESET CHAR SWITCH
1827    005030  012737  000040  001050                      MOV     #40.,SAVE       ;SEND SPACE
1828    005036  000137  004760                              JMP     CR3             ;CONTINUE
1829
1830    005042  004744                            CHRS:     CR2
1831    005044  005022                            CHRE:     CR7
1832    005046  012777  000012  173726            CR5:      MOV     #12,@LPB        ;SEND LF
1833    005054  105777  173720                              TSTB    @LPS            ;TEST READY
1834    005060  100375                                      BPL     .-4             ;WAIT FOR READY
1835    005062  012737  177776  001044                      MOV     #-2,CYCCNT      ;RESET CYCLE COUNT
1836    005070  012737  177574  001036                      MOV     #-132.,CHRCNT   ;RESET CHAR COUNT
1837    005076  005237  001042                              INC     LINCNT          ;INCREMENT LINE COUNT
1838    005102  001326                                      BNE     CR3             ;BRANCH IF NOT DONE
1839    005104  032777  010000  173672                      BIT     #BIT12,@SWR     ;LOOP ON TEST?
1840    005112  001256                                      BNE     CHRCHK          ;YES,  LOOP
1841
1842
1843
1844
1845                                            ;TEST 5
1846                                            ;SHUTTLE POSITIONING TEST
1847                                            ;SENDS PAIRS OF E'S.  THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER
1848                                            ;PAIR OF E'S TO THE LINE ---  THIS IS REPEATED UNTIL A FULL LINE OF E'S
1849                                            ;HAVE BEEN PRINTED,  THEN A FULL LINE OF M'S ARE PRINTED.
1850
1851    005114  004437  010030            OVRPRT: JSR     %4,TYPINT
1852    005120  013737  012376  011724            MOV     TNO5,MES15              ;SET TEST NUMBER FOR MESSAGE
1853    005126  004437  007760                    JSR     %4,PRNNT                ;PRINT TEST NUMBER
1854                    000006                    M=M+1
1855    005132  012737  177760  001042            MOV     #-16.,LINCNT    ;SET LINE COUNT FOR 16 LINES
1856    005140  012737  177574  001036  OVR:      MOV     #-132.,CHRCNT   ;SET CHAR COUNT
1857    005146  012737  177776  001044  OVRO:     MOV     #-2,CYCCNT      ;SET CYCLE COUNT FOR A PAIR OF E'S
1858    005154  013737  001036  001056            MOV     CHRCNT,STRCNT   ;NO.  CHARS LEFT TO PRINT
1859    005162  062737  000205  001056            ADD     #133.,STRCNT    ;NO.  SPACES +1
1860    005170  012737  000040  001040            MOV     #40,CHRGEN      ;SEND SPACE
1861    005176  000406                            BR      OVR2            ;BRANCH
1862    005200  012737  000105  001040  OVR4:     MOV     #105,CHRGEN     ;SEND E
1863    005206  013777  001040  173565  OVR1:     MOV     CHRGEN,@LPB     ;LOAD BUFFER
1864    005214  005777  173560          OVR2:     TST     @LPS            ;TEST FOR ERROR
1865    005220  100006                            BPL     OVR3            ;BRANCH IF NO ERROR
1866    005222  012737  000037  001052  ERR37:    MOV     #37.    ERCOUNT         ;SET UP ERROR COUNT 37
                    000040                    N=N+1
```

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1867  005230  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1868  005234  000000                          HALT
1869  005236  005337  001056          OVR3:   DEC     STRCNT          ;DECREMENT SPACE COUNTER
1870  005242  003361                          BGT     OVR1            ;BRANCH IF NOT DONE SPACES
1871  005244  001755                          BEQ     OVR4            ;BRANCH IF NOT FIRST E
1872  005246  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
1873  005252  001437                          BEQ     OVR8            ;BRANCH IF DONE LINE
1874  005254  005237  001044          OVR5:   INC     CYCCNT          ;INCREMENT CYCLE COUNT
1875  005260  001352                          BNE     OVR1            ;CONTINUE SENDING E'S IF NOT DONE
1876  005262  012777  000015  173512          MOV     #15,@LPB        ;SEND CR
1877  005270                          OVR6:
1878  005270  105777  173504                  TSTB    @LPS            ;TEST READY
1879  005274  100375                          BPL     .-4             ;WAIT FOR READY
1880  005276  005737  001036                  TST     CHRCNT          ;LINE DONE?
1881  005302  001321                          BNE     OVR0            ;NO,  CONTINUE OVER PRINT
1882  005304  005237  001042                  INC     LINCNT          ;YES,  INCREMENT LINE COUNT
1883  005310  001425                          BEQ     OVREXT          ;EXIT IF DONE TEST
1884  005312  032737  000001  001042          BIT     #1,LINCNT       ;WHICH LINE NEXT?
1885  005320  001707                          BEQ     OVR             ;BRANCH TO SEND E'S
1886  005322  012737  000115  001040          MOV     #115,CHRGEN     ;SET UP TO SEND M'S
1887  005330  012737  177573  001036          MOV     #-133.,CHRCNT   ;SET CHAR COUNT
1888  005336  005037  001056                  CLR     STRCNT          ;CLEAR SPACE COUNT
1889  005342  005037  001044                  CLR     CYCCNT          ;CLEAR CYCLE COUNT
1890  005346  000137  005214                  JMP     OVR2            ;PRINT LINE OF M'S
1891  005352  012777  000012  173422  OVR8:   MOV     #12,@LPB        ;SEND LF
1892  005360  000137  005270                  JMP     OVR6            ;CONTINUE
1893  005364  032777  010000  173412  OVREXT: BIT     #BIT12,@SWR     ;LOOP ON TEST?
1894  005372  001250                          BNE     OVRPRT          ;LOOP
1895
1896                                  ;TEST 6
1897                                  ;PRINT CONTROL TEST
1898                                  ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
1899                                  ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
1900
1901  005374  004437  010030          PRTCTL: JSR     %4,TYPINT
1902  005400  013737  012400  011724          MOV     TN06,MES15              ;SET TEST NUMBER FOR MESSAGE
1903  005406  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1904          000007                          M=M+1
1905  005412  012737  000060  001054          MOV     #60,STRCHR      ;FIRST START CHAR
1906  005420  032777  020000  173356  PRT0:   BIT     #BIT13,@SWR     ;TEST FOR CHAR SET
1907  005426  001404                          BEQ     PRT1            ;BRANCH IF 64 CHARS
1908  005430  012737  177641  001034          MOV     #-95.,SEGCNT    ;SET OVERFLOW COUNT
1909  005436  000403                          BR      PRT2            ;BRANCH
1910  005440  012737  177701  001034  PRT1:   MOV     #-63.,SEGCNT    ;SET OVERFLOW COUNT
1911  005446  012737  177574  001036  PRT2:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT
1912  005454  013737  001054  001040          MOV     STRCHR,CHRGEN   ;GET START CHAR
1913  005462  005777  173312          PRT3:   TST     @LPS            ;TEST FOR ERROR
1914  005466  100006                          BPL     PRT4            ;BRANCH IF NO ERROR
1915  005470  012737  000040  001052  ERR40:  MOV     #40,    ERCOUNT         ;SET UP ERROR COUNT 40
1916          000041                          N=N+1
1917  005476  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1918  005502  000000                          HALT                    ;HALT ON ERROR
1919  005504  013777  001040  173270  PRT4:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
1920  005512  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
1921  005516  002761                          BLT     PRT3            ;BRANCH IF NOT 132 CHARS
1922  005520  001433                          BEQ     PRTA            ;START OVERFLOW
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  1923  005522  005237  001040                  INC     CHRGEN          ;NEXT CHAR
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 1924  005526  005237  001034                  INC     SEGCNT          ;INCREMENT OVERFLOW COUNT
 1925  005532  001353                          BNE     PRT3            ;CONTINUE IF NOT DONE
 1926  005534  012777  000012  173240          MOV     #12,@LPB        ;SEND LF
 1927  005542  105777  173232                  TSTB    @LPS            ;TEST READY
 1928  005546  100375                          BPL     .-4             ;WAIT FOR READY
 1929  005550  022737  000040  001054          CMP     #40,STRCHR      ;LAST START CHAR SPACE?
 1930  005556  001421                          BEQ     PRT6            ;YES,  BRANCH
 1931  005560  022737  000065  001054          CMP     #65,STRCHR      ;LAST START CHAR 5?
 1932  005566  001422                          BEQ     PRT7            ;YES,  BRANCH
 1933  005570  022737  000071  001054          CMP     #71,STRCHR      ;DONE?
 1934  005576  001423                          BEQ     PRT8            ;YES
 1935  005600  005237  001054                  INC     STRCHR          ;NO,  GET NEXT START CHAR
 1936  005604  000137  005420                  JMP     PRT0            ;CONTINUE
 1937  005610  012737  000041  001040  PRTA:   MOV     #41,CHRGEN      ;GET FIRST CHAR IN SET
 1938  005616  000137  005462                  JMP     PRT3            ;START OVERFLOW
 1939  005622  012737  000066  001054  PRT6:   MOV     #66,STRCHR      ;SET START CHAR TO 6
 1940  005630  000137  005420                  JMP     PRT0            ;CONTINUE
 1941  005634  012737  000040  001054  PRT7:   MOV     #40,STRCHR      ;SET START CHAR TO SPACE
 1942  005642  000137  005420                  JMP     PRT0            ;CONTINUE
 1943  005646  032777  010000  173130  PRT8:   BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
 1944  005654  001247                          BNE     PRTCTL          ;LOOP
 1945
 1946                                  ;TEST 7
 1947                                  ;MULTIPLE LINE ADVANCE TEST
 1948                                  ;TESTS MULTIPLE LINE ADVANCES AND TIMINGS
 1949                                  ;PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER
 1950
 1951  005656  004437  010030          MLF:    JSR     %4,TYPINT
 1952  005662  013737  012402  011724          MOV     #NO7,MES15              ;SET TEST NUMBER FOR MESSAGE
 1953  005670  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
 1954          000010                          M=M+1
 1955  005674  012737  006026  001054          MOV     #TABSTR,STRCHR  ;FIRST CHAR
 1956  005702  012737  177574  001036  MLFA:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 1957  005710  117737  173140  001040          MOVB    @STRCHR,CHRGEN  ;GET CHAR
 1958  005716  001452                          BEQ     MLF4            ;BRANCH IF DONE
 1959  005720  005777  173054          MLFC:   TST     @LPS            ;TEST FOR ERROR
 1960  005724  100006                          BPL     MLF1            ;CONTINUE IF NO ERROR
 1961  005726  012737  000041  001052  ERR41:  MOV     #41,    ERCOUNT         ;SET UP ERROR COUNT 41
 1962          000042                          N=N+1
 1963  005734  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
 1964  005740  000000                          HALT                    ;HALT ON ERROR
 1965  005742  013777  001040  173032  MLF1:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
 1966  005750  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
 1967  005754  001361                          BNE     MLFC            ;CONTINUE
 1968  005756  117737  173072  001042          MOVB    @STRCHR,LINCNT  ;GET ASCII LINE COUNT
 1969  005764  042737  177770  001042          BIC     #177770,LINCNT  ;MAKE OCTAL
 1970  005772  005237  001042                  INC     LINCNT          ;ADD 1
 1971  005776  012777  000012  172776  MLF2:   MOV     #12,@LPB        ;SEND LF
 1972  006004  105777  172770                  TSTB    @LPS            ;TEST READY
 1973  006010  100375                          BPL     .-4             ;WAIT FOR READY
 1974  006012  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 1975  006016  001367                          BNE     MLF2            ;CONTINUE
 1976  006020  005237  001054                  INC     STRCHR          ;NEXT CHAR
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                                        BR      MLFA            ;CONTINUE

006026 033462 033062 033463 TABSTR: .ASCIZ  /27263746354C/
006034 033064 032463 030064
006042    000

                    006044              .EVEN

006044 032777 010000 172732 MLF4:   BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
006052 001301               MLF     BNE     MLF             ;LOOP
                                    .EVEN

                                    ;TEST 8
                                    ;HIGH SPEED PRINT TEST

006054 004437 010030        HSPRT:  JSR     %4,TYPINT
006060 013737 012404 011724         MOV     TNO10,MES15             ;SET TEST NUMBER FOR MESSAGE
006066 004437 007760                JSR     %4,PRNNT                ;PRINT TEST NUMBER
                    000011          M=M+1
006072 032777 020000 172704         BIT     #BIT13,@SWR     ;CHECK CHAR SET
006100 001007                       BNE     HS00A           ;BRANCH IF 96 CHAR SET
006102 012737 000140 001060         MOV     #140,LEGCHR     ;LEGAL CHK
006110 012737 000100 001062         MOV     #100,NUMCHR     ;#CHARS
006116 000406                       BR      HS00            ;CONTINUE
006120 012737 000200 001060 HS00A:  MOV     #200,LEGCHR     ;LEGAL CHECK
006126 012737 000140 001062         MOV     #140,NUMCHR     ;#CHARS
006134 012737 000040 001054 HS00:   MOV     #40,STRCHR      ;SET UP FIRST LINE
006142 012737 000177 001042         MOV     #127.,LINCNT    ;SET LINE COUNT FOR 2 PAGES
006150 012737 177574 001036 HS0:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT
006156 012737 177757 001044         MOV     #-17.,CYCCNT    ;SET GROUP COUNT
006164 013737 001054 001040         MOV     STRCHR,CHRGEN   ;STORE START CHAR
006172 005777 172604        HS1:    TST     @LPB            ;TEST FOR ERROR
006176 100006                       BPL     HS2             ;BRANCH IF NO ERROR
006200 012737 000042 001052 ERR42:  MOV     #42.    ERCOUNT         ;SET UP ERROR COUNT 42
                    000043          M=M+1
006206 004537 010244                JSR     %5,STAER        ;REPORT ERROR SET
006212 000000                       HALT                    ;HALT ON ERROR
006214 013777 001040 172560 HS2:    MOV     CHRGEN,@LPB     ;LOAD BUFFER
006222 005237 001036                INC     CHRCNT          ;INCREMENT CHAR COUNT
006226 001424                       BEQ     HS4             ;BRANCH IF DONE LINE
006230 005237 001040                INC     CHRGEN          ;NEXT CHAR
006234 005237 001044                INC     CYCCNT          ;INCREMENT GROUP COUNT
006240 001410                       BEQ     HS3             ;BRANCH IF DONE GROUP
006242 023737 001060 001040         CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
006250 001350                       BNE     HS1             ;BRANCH AND CONTINUE IF LEGAL CHAR
006252 163737 001062 001040         SUB     NUMCHR,CHRGEN   ;MAKE LEGAL
006260 000744                       BR      HS1             ;CONTINUE
006262 013737 001054 001040 HS3:    MOV     STRCHR,CHRGEN   ;GET FIRST CHAR IN GROUP
006270 012737 177757 001044         MOV     #-17.,CYCCNT    ;RESET CYCLE COUNT
006276 000735                       BR      HS1             ;CONTINUE
006300 012777 000012 172474 HS4:    MOV     #12,@LPB        ;SEND LF
006306 105777 172466                TSTB    @LPS            ;TEST READY
006312 100375                       BPL     .-4             ;WAIT FOR READY
006314 005337 001042                DEC     LINCNT          ;DECREMENT LINE COUNT
006320 002413                       BLT     HS6             ;EXIT TEST IF DONE
006322 162737 000004 001054         SUB     #4,STRCHR       ;SKIP 4 LINES ON DRUM, FIND START CHAR
```

```
                                                ;TEST 9
                                                ;WORST CASE NOISE TEST
                                                ;SINGLE CHAR. ACROSS ALL COLS.
006360  004437  010030          SNGCHR: JSR     %4,TYPINT
006364  013737  012406  011724          MOV     TNO11,MES15             ;SET TEST NUMBER FOR MESSAGE
006372  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
                000012                  M=M+1
006376  032777  020000  172400          BIT     #BIT13,@SWR     ;TEST CHAR SET
006404  001404                          BEQ     S2              ;BRANCH IF 64
006406  012737  177640  001042          MOV     #-96.,LINCNT    ;96 CHAR.
006414  000403                          BR      .+10            ;BRANCH
006416  012737  177700  001042  S2:     MOV     #-64.,LINCNT    ;64 CHAR.
006424  012737  000040  001040          MOV     #40,CHRGEN      ;SET UP SPACE
006432  012737  177574  001036  S2A:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT FOR 132
006440  005777  172334          S1:     TST     @LPS            ;TEST FOR ERRORS
006444  100006                          BPL     XS1X            ;BRANCH IF NO ERRORS
006446  012737  000043  001052  ERR43:  MOV     #43.    ERCOUNT         ;SET UP ERROR COUNT 43
                000044                  N=N+1
006454  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
006460  000000                          HALT                    ;HALT ON ERROR
006462  013777  001040  172312  XS1X:   MOV     CHRGEN,@LPB     ;LOAD PRINTER BUFFER
006470  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
006474  001361                          BNE     S1              ;CONTINUE IF NOT DONE LINE
006476  012777  000012  172276  S4X2:   MOV     #12,@LPB        ;ISSUE LINE FEED
006504  105777  172270          TSTB    @LPS            ;TEST READY
006510  100375                          BPL     .-4             ;WAIT FOR READY
006512  005237  001040                  INC     CHRGEN          ;+1 CHAR.
006516  005237  001042                  INC     LINCNT          ;+1 LINE COUNT
006522  002743                          BLT     S2A             ;CONTINUE IF NOT DONE
006524  001764                          BEQ     S4X2            ;SEND BLANK LINE AT END OF TEST
006526  032777  010000  172250  LPS7:   BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
006534  001311                          BNE     SNGCHR          ;LOOP ON TEST


                                                ;TEST 10
                                                ;DRUM PATTERN CHARACTER TEST

006536  004437  010030          ROTATE: JSR     %4,TYPINT
006542  013737  012410  011724          MOV     TNO12,MES15             ;SET TEST NUMBER FOR MESSAGE
006550  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
                000013                  M=M+1
006554  032777  020000  172222          BIT     #BIT13,@SWR     ;TEST CHAR SET
006562  001012                          BNE     ROT0            ;SKIP IF 96 CHAR
006564  012737  000137  001042          MOV     #137,LINCNT     ;LAST CHAR
006572  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHK
006600  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
006606  000411                          BR      ROT1            ;CONTINUE
```

```
007000  006610  012737  000177  001042  ROT0:   MOV     #177,LINCNT     ;LAST CHAR
007006  006616  012737  000200  001060          MOV     #200,LEGCHR     ;LEGAL CHR
007014  006624  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
007022  006632  005037  001044          ROT1:   CLR     CYCCNT          ;CLEAR CYCLE COUNT
007026  006636  005237  001044          ROT2:   INC     CYCCNT          ;INC CYCLE COUNT
007032  006642  005037  001040                  CLR     CHRGEN          ;CLEAR POINTER
007036  006646  005237  001040          ROT3:   INC     CHRGEN          ;INC POINTER
007042  006652  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE POINTER
007050  006660  063737  001042  001054          ADD     LINCNT,STRCHR   ;FIND CHAR
007056  006666  023737  001054  001060          CMP     STRCHR,LEGCHR   ;LEGAL?
007064  006674  002403                  BLT     ROT4            ;BRANCH IF LEGAL
007066  006676  163737  001062  001054          SUB     NUMCHR,STRCHR   ;MAKE LEGAL
007074  006704  005777  172070          ROT4:   TST     @LPS            ;TEST FOR ERRORS
007100  006710  100006                  BPL     ROT5            ;BRANCH IF NO ERRORS
007102  006712  012737  000044  001052  ERR44:  MOV     #44.    ERCOUNT         ;SET UP ERROR COUNT 44
                000045
                        N=N+1
007110  006720  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
007114  006724  000000                  HALT                    ;HALT ON ERROR
007116  006726  013777  001054  172046  ROT5:   MOV     STRCHR,@LPB     ;LOAD BUFFER
007124  006734  023727  001040  000021          CMP     CHRGEN,#17.     ;DONE GROUP?
007132  006742  001341                  BNE     ROT3            ;NO GET NEXT CHAR
007134  006744  023727  001044  000010          CMP     CYCCNT,#8.      ;DONE LINE?
007142  006752  001331                  BNE     ROT2            ;NO, NEXT GROUP
007144  006754  012777  000012  172020          MOV     #12,@LPB        ;YES, SEND LF
007152  006762  105777  172012          TSTB    @LPS            ;TEST READY
007156  006766  100375                  BPL     .-4             ;WAIT FOR READY
007160  006770  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
007164  006774  023727  001042  000037          CMP     LINCNT,#37      ;DONE?
007172  007002  003313                  BGT     ROT1            ;NO, NEXT LINE
007174  007004  032777  010000  171772          BIT     #BIT12,@SWR     ;LOOP ON TEST?
007202  007012  001251                  BNE     ROTATE          ;LOOP

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

                                ; STARTING WITH A LEFT TRIANGLE

007204  007014  004437  010030          LFTTR:  JSR     %4,TYPINT
007210  007020  013737  012412  011724          MOV     TNO13,MES15             ;SET TEST NUMBER FOR MESSAGE
007216  007026  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
                000004
                        M=M+1
007224  007032  012737  000204  001042  LFT:    MOV     #132.,LINCNT    ;SET LINE COUNT
007232  007040  013737  001042  001036  LFTO:   MOV     LINCNT,CHRCNT   ;STORE CHAR COUNT
007240  007046  012737  177757  001044          MOV     #-17.,CYCCNT    ;SET GROUP COUNT
007246  007054  013737  001036  001040          MOV     CHRCNT,CHRGEN   ;FIND FIRST CHAR ON LINE...
007254  007062  022737  000022  001040  LFT1:   CMP     #18.,CHRGEN     ;MORE THAN 17 CHARS?
007262  007070  003004                  BGT     LFT2            ;BRANCH IF LESS THAN 17
007264  007072  162737  000021  001040          SUB     #17.,CHRGEN     ;SUBTRACT 17. IF > 17
007272  007100  000770                  BR      LFT1            ;CONTINUE
007274  007102  005437  001040  LFT2:   NEG     CHRGEN          ;NEGATE CHRGEN
007300  007106  062737  000100  001040          ADD     #100,CHRGEN     ;START CHAR IN CHRGEN
007306  007114  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE STARTING CHAR
007314  007122  005777  171652  LFT3:   TST     @LPS            ;TEST FOR ERROR
007320  007126  100006                  BPL     LFT4            ;CONTINUE IF NO ERROR
007322  007130  012737  000045  001052  ERR45:  MOV     #45.    ERCOUNT         ;SET UP ERROR COUNT 45
                000046
                        N=N+1
```

```
 2145  007136  004537  010244                    JSR     %5,STAER        ;REPORT ERROR SET
 2146  007142  000000                            HALT                    ;HALT ON ERROR
 2147  007144  013777  001040  171630  LFT4:     MOV     CHRGEN,@LPB     ;LOAD BUFFER
 2148  007152  005337  001036                    DEC     CHRCNT          ;DECREMENT CHAR COUNT
 2149  007156  001415                            BEQ     LFT6            ;BRANCH IF DONE LINE
 2150  007160  005237  001044                    INC     CYCCNT          ;INCREMENT GROUP COUNT
 2151  007164  001403                            BEQ     LFT5            ;BRANCH IF DONE GROUP
 2152  007166  005237  001040                    INC     CHRGEN          ;NEXT CHAR IN GROUP
 2153  007172  000753                            BR      LFT3            ;CONTINUE
 2154  007174  013737  001054  001040  LFT5:     MOV     STRCHR,CHRGEN   ;GET START CHAR AGAIN
 2155  007202  012737  177757  001044            MOV     #-17.,CYCCNT    ;RESET GROUP COUNT
 2156  007210  000744                            BR      LFT3            ;CONTINUE
 2157  007212  012777  000012  171562  LFT6:     MOV     #12,@LPB        ;SEND LF
 2158  007220  105777  171554                    TSTB    @LPS            ;TEST READY
 2159  007224  100375                            BPL     .-4             ;WAIT FOR READY
 2160  007226  005337  001042                    DEC     LINCNT          ;DECREMENT LINE COUNT
 2161  007232  003302                            BGT     LFT0            ;BRANCH IF NOT DONE
 2162  007234  001766                            BEQ     LFT6            ;SEND BLANK LINE AT END OF TEST
 2163  007236  032777  010000  171540            BIT     #BIT12,@SWR     ;LOOP ON TEST?
 2164  007244  001263                            BNE     LFTTR           ;LOOP
 2165
 2166                                    ;TEST 11 ----- CONTINUED
 2167                                    ;RIGHT TRIANGLE
 2168
 2169  007246  012737  000001  001042  RTTR:     MOV     #1,LINCNT       ;INITIALIZE LINE
 2170  007254  012737  000077  001040  RT1:      MOV     #77,CHRGEN      ;FIRST CHAR IS A ?
 2171  007262  013737  001042  001044            MOV     LINCNT,CYCCNT   ;SAVE NO.  CHARS ON LINE
 2172  007270  012737  177757  001056            MOV     #-17.,STRCNT    ;SET GROUP COUNT
 2173  007276  012737  000204  001036            MOV     #132.,CHRCNT    ;NO.  CHARS PER LINE
 2174  007304  163737  001042  001036            SUB     LINCNT,CHRCNT   ;SUBTRACT NO.. OF CHARS ON LINE
 2175  007312  001425                            BEQ     RT3             ;BRANCH IF NO SPACES ON THIS LINE
 2176  007314  005777  171460          RT2:      TST     @LPS            ;TEST FOR ERROR
 2177  007320  100006                            BPL     RT2A            ;CONTINUE IF NO ERROR
 2178  007322  012737  000046  001052  ERR46:    MOV     #46.,   ERCOUNT         ;SET UP ERROR COUNT 46
 2179                  000047                    N=N+1
 2180  007330  004537  010244                    JSR     %5,STAER        ;REPORT ERROR SET
 2181  007334  000000                            HALT                    ;HALT ON ERROR
 2182  007336  012777  000040  171436  RT2A:     MOV     #40,@LPB        ;LOAD BUFFER
 2183  007344  005237  001056                    INC     STRCNT          ;INCREMENT GROUP COUNT
 2184  007350  001003                            BNE     RT2AA           ;BRANCH IF NOT DONE GROUP
 2185  007352  012737  177757  001056            MOV     #-17.,STRCNT    ;RESET GROUP COUNT
 2186  007360  005337  001036          RT2AA:    DEC     CHRCNT          ;DECREMENT SPACE COUNT
 2187  007364  001353                            BNE     RT2             ;BRANCH IF NOT DONE SPACES
 2188  007366  005777  171406          RT3:      TST     @LPS            ;TEST FOR ERROR
 2189  007372  100006                            BPL     RT3A            ;CONTINUE IF NO ERROR
 2190  007374  012737  000047  001052  ERR47:    MOV     #47.,   ERCOUNT         ;SET UP ERROR COUNT 47
 2191                  000050                    N=N+1
 2192  007402  004537  010244                    JSR     %5,STAER        ;REPORT ERROR SET
 2193  007406  000000                            HALT                    ;HALT ON ERROR
 2194  007410  013777  001040  171364  RT3A:     MOV     CHRGEN,@LPB     ;LOAD BUFFER
 2195  007416  005237  001040                    INC     CHRGEN          ;NEXT CHAR
 2196  007422  005237  001056                    INC     STRCNT          ;INCREMENT GROUP COUNT
 2197  007426  001006                            BNE     RT3B            ;BRANCH IF NOT DONE GROUP
 2198  007430  012737  177757  001056            MOV     #-17.,STRCNT    ;RESET GROUP COUNT
 2199  007436  162737  000021  001040            SUB     #17.,CHRGEN     ;GET FIRST GROUP CHAR
 2200  007444  005337  001044          RT3B:     DEC     CYCCNT          ;DECREMENT CHAR COUNT
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2201  007450  001346                          BNE     RT3             ;CONTINUE
2202  007452  012777  000012  171322          MOV     #12,@LPB        ;SEND LF
2203  007460  105777  171314                  TSTB    @LPS            ;TEST READY
2204  007464  100375                          BPL     .-4             ;WAIT FOR READY
2205  007466  005237  001042                  INC     LINCNT          ;INCREMENT LINE COUNT
2206  007472  022737  000205  001042          CMP     #133.,LINCNT    ;DONE?
2207  007500  003265                          BGT     RT1             ;BRANCH IF NOT DONE
2208  007502  032777  010000  171274          BIT     #BIT12,@SWR     ;LOOP ON TEST?
2209  007510  001256                          BNE     RTTR            ;LOOP
2210
2211
2212                                  ;TEST 12
2213                                  ;HAMMER ALIGMENT
2214
2215  007512  004437  010030          HAMALN: JSR     %4,TYPINT
2216  007516  013737  012414  011724          MOV     TNO,4,MES1S             ;SET TEST NUMBER FOR MESSAGE
2217  007524  004437  007760                  JSR     %4,PRINT                ;PRINT TEST NUMBER
2218                  000015                  M=M+1
2219  007530  012737  177701  001042          MOV     #-63.,LINCNT    ;SET UP FOR 63 LINES
2220  007536  012737  177574  001036  HAM1X:  MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2221  007544  005777  171230          HAM2:   TST     @LPS            ;CHECK FOR ERROR
2222  007550  100006                          BPL     XHAM1           ;BRANCH IF NO ERROR
2223  007552  012737  000050  001052  ERR50:  MOV     #50,    ERCOUNT         ;SET UP ERROR COUNT 50
2224                  000051                  N=N+1
2225  007560  004537  012244                  JSR     %5,STAER        ;REPORT ERROR OCCURRED
2226  007564  000000                          HALT                    ;HALT ON ERROR
2227  007566                          XHAM1:
2228  007566  105777  171206                  TSTB    @LPS            ;TEST READY
2229  007572  100375                          BPL     .-4             ;WAIT FOR READY
2230  007574  100375                          BPL     .-4             ;WAIT FOR READY
2231  007576  012777  000105  171176  XHAM1X: MOV     #105,@LPB       ;TRANSMIT E TO PRINTER
2232  007604  005237  001036                  INC     CHRCNT          ;+1 CHAR COUNT
2233  007610  001355                          BNE     HAM2            ;TRANSMIT ANOTHER CHAR.
2234  007612  012777  000012  171162          MOV     #12,@LPB        ;TRANSMIT LINE FEED
2235  007620  105777  171154                  TSTB    @LPS            ;TEST READY
2236  007624  100375                          BPL     .-4             ;WAIT FOR READY
2237  007626  005237  001042                  INC     LINCNT          ;+1 TO COUNT
2238  007632  001341                          BNE     HAM1X           ;GO DO NEXT LINE
2239  007634  032777  010000  171142          BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
2240  007642  001323                          BNE     HAMALN          ;LOOP ON TEST
2241
2242  007644  032777  040000  171132                  #BIT14,@SWR     ;DAVFU AVAILABLE?
2243  007652  001402                          BEQ     HAMX            ;NO,  RECYCLE PRINTING TESTS
2244  007654  000137  012424                  JMP     DAVFU           ;YES,  DO DAVFU PRINTING TESTS
2245  007660                          HAMX:
2246  007660  013700  000042                  MOV     @#42,R0
2247  007664  001405                          BEQ     DOAGN
2248  007666  000005                          RESET
2249  007670                          LOGICAL:
2250  007670  004710                          JSR     PC,(R0)
2251  007672  000240                          NOP
2252  007674  000240                          NOP
2253  007676  000240                          NOP
2254  007700                          DOAGN:
2255  007700  000137  004066                  JMP     TEST2           ;RESTART
2256
2257                                  ;MISC. ROUTINES
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                                        ;ROUTINE TO INITIALIZE PRINTER
                                        ;ENTER FROM JSR %5, PRTINT
007704  005777  171070        PRTINT: TST     @LPS            ;TEST FOR ERROR
007710  100403                        BMI     PRTINO          ;BRANCH IF ERROR
007712  105777  171062                TSTB    @LPS            ;TEST FOR READY
007716  100403                        BMI     RDYOK           ;READY SET OK
007720  062705  000002        PRTINO: ADD     #2,%5           ;SET UP FOR ERROR REPORT
007724  000205                        RTS     %5              ;REPORT READY NOT SET
007726  012777  000014  171046 RDYOK:  MOV     #14,@LPB        ;ISSUE FORM FEED
007734  105777  171040                TSTB    @LPS            ;TEST FOR READY NOT SET
007740  100003                        BPL     NTRDY           ;READY NOT SET OK
007742  062705  000002                ADD     #2,%5           ;SET UP FOR REPORT
007746  000205                        RTS     %5              ;EXIT AND REPORT
007750                          NTRDY:
007750  105777  171024                TSTB    @LPS            ;TEST READY
007754  100375                        BPL     .-4             ;WAIT FOR READY
007756  000205                        RTS     %5              ;READY SET EXIT


                                        ;ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER

010760  012737  011706  010026 PRNNT:  MOV     #MES14,PRTMSG   ;PRINT TEST NUMBER
010766  005777  171006                TST     @LPS            ;TEST FOR ERROR
010772  100006                        BPL     RINT            ;BRANCH IF OK
010774  012737  000051  001052 ERRS1:  MOV     #51,    ERCOUNT         ;SET UP ERROR COUNT 51
                000052                  N=N+1
011002  004537  010244                JSR     %5,STAER        ;REPORT ERROR SET
011006  000000                        HALT                    ;HALT ON ERROR
011010  013737  001000  001016 RINT:  MOV     LPS,TPS ;SET VECTORS -
011016  013737  001002  001012        MOV     LPB,TPB ;TO PRINT ON LINE PRINTER
011024  104000                        EMT     +0              ;PRINT
011026  011706                PRTMSG: MES14                   ;MESSAGE
011030  012737  177564  001016 TYPINT: MOV     #177564,TPS     ;RESET VECTORS
011036  012737  177566  001012        MOV     #177566,TPB     ;FOR TTY
011044  000204                        RTS     %4              ;RETURN


                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER

011046  011600                TYP:    MOV     @%6,%0          ;GET ADDR. THAT CONTAINS MESS.
011050  062716  000002                ADD     #2,@%6          ;SET UP EXIT
011054  011000                        MOV     @%0,%0          ;ADDRESS OF MESSAGE IN R0
011056  112037  010160        TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
011062  001001                        BNE     TYPC            ;BRANCH IF NOT DONE
011064  000002                        RTI                     ;EXIT
011066  122737  000045  010160 TYPC:  CMPB    #45,TYPDAT      ;CHECK FOR "%"
011074  001416                        BEQ     TYPF            ;BRANCH IF "%"
011076  122737  000043  010160        CMPB    #43,TYPDAT      ;CHECK FOR "#"
011104  001417                        BEQ     TYPG            ;BRANCH IF "#"
011106  004737  010114                JSR     %7,TYPC         ;TYPE CHARACTER IN TYPDAT
```

```
2313  010112  000761                        BR      TYPA            ;NEXT CHAR IN MESSAGE
2314  010114  113777  010160  170670  TYPD: MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
2315  010122  105777  170670          TYPDO: TSTB   @TPS
2316  010126  100375                        BPL     .-4
2317  010130  000207                        RTS     %7              ;CHAR. TYPED EXIT
2318  010132  112737  000012  010160  TYPF: MOVB    #12,TYPDAT      ;OUTPUT LF
2319  010140  004737  010114                JSR     %7,TYPD         ;GO TYPE CHAR.
2320  010144  112737  000015  010160  TYPG: MOVB    #15,TYPDAT      ;OUTPUT CR
2321  010152  004737  010114                JSR     %7,TYPD         ;GO TYPE CHAR.
2322  010156  000737                        BR      TYPA
2323  010160  000000                TYPDAT: 0
2324
2325
2326                                  ;ROUTINE TO CONVERT OCTAL TO ASCII
2327
2328                                  ;ENTER ROUTINE AS FOLLOWS
2329                                  ;       JSR     %5,CONV
2330                                  ;XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
2331                                  ;XXXXXX=ADDRESS OF ASCII MESSAGE
2332                                  ;XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
2333
2334  010162  013537  010242          CONV:   MOV     @(5)+,ACNVX     ;ADDRSS OF NO. TO BE CONVERTED
2335  010166  012501                          MOV     (5)+,%1         ;ADDRESS OF MESSAGE
2336  010170  012502                          MOV     (5)+,%2         ;NUMBER OF ASCII CHARACTERS
2337  010172  060201                          ADD     %2,%1           ;FIRST CHAR ADDRESS
2338  010174  013703  010242          ACVN:   MOV     ACNVX,%3        ;STORE NUMBER
2339  010200  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT BIT
2340  010204  062703  000060                  ADD     #60,%3          ;SET UP ASCII CHARACTER
2341  010210  110341                          MOVB    %3,-(1)         ;STORE CHARACTER
2342  010212  000241                          CLC                     ;GET NEXT SIGNIFICANT BIT ...
2343  010214  006037  010242                  ROR     ACNVX
2344  010220  000241                          CLC
2345  010222  006037  010242                  ROR     ACNVX
2346  010226  000241                          CLC
2347  010230  006037  010242                  ROR     ACNVX
2348  010234  005302                          DEC     %2              ;-1 FROM ASCII CHAR. CNT
2349  010236  001356                          BNE     ACVN            ;CONVERT NEXT CHARACTER
2350  010240  000205                          RTS     %5              ;EXIT! CONVERSION DONE
2351
2352  010242  000000          ACNVX:  0                               ;WORK REGISTER
2353
2354                                  ;ROUTINE TO REPORT ERROR COUNT
2355
2356  010244  004537  010162          STAER:  JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
2357  010250  001052                          ERCOUNT
2358  010252  010274                          HED1
2359  010254  000003                          3
2360  010256  104000                          EMT     +0              ;TYPE ERROR MESSAGE
2361  010260  010274                          HED1
2362  010262  005777  170516                  TST     @SWR            ;TEST FOR HALT ON ERROR
2363  010266  100401                          BMI     .+4             ;BRANCH IF NO HALT WANTED
2364  010270  000000                          HALT                    ;HALT ON ERROR
2365  010272  000205                          RTS     %5              ;RETURN
2366
2367
      010274  020040  020040  051105  HED1:   .ASCIZ  /    ERROR COUNT%/
```

```
010315     105  051122  051117  MES8A:   .ASCIZ   ERROR SET OK - CLEAR & TURN ON LINE%/
010362  051105  047522  020122  MES8B:   .ASCIZ  /ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/
010435     120  044522  052116  MESC:    .ASCII  /PRINT SPEED CHECK USING MANUAL TIMING%/
010503     120  052125  051440           .ASCII  /PUT SWITCH 0 UP TO START TIMING%/
010543     120  052125  051440           .ASCIZ  /PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
010611     123  040524  052122  MESDD:   .ASCIZ  /STARTING DAVFU PRINTING TESTS%/
010650  046045  030120  020065  MES1:    .ASCIZ  /%LPOS LINE PRINTER TEST%/
010701     122  051505  040524  MES2:    .ASCIZ  /RESTART ADDRESS 600%/
010726  047520  042527  020122  MES3:    .ASCIZ  /POWER ON - TURN ON LINE%/
010757     117  020116  044514  MES4:    .ASCIZ  /ON LINE OK - TRY TORN PAPER SWITCH%/
011023     122  040505  054504  MES5:    .ASCIZ  /READY SET OK - TRY DRUM GATE SWITCH%/
011070  051105  047522  020122  MES6:    .ASCIZ  /ERROR SET OK - TURN ON LINE%/
            011126                       .EVEN
011126  042522                   MES7A:   .ASCII  /RE/
011130  042523  020124  047524  MES7:    .ASCII  /SET TOP OF FORM SWITCH TO   /
011164  020040  020040  044440  MES8:    .ASCIZ  /     INCHES%/
            011202                       .EVEN
011202  026455  026455  026455  MES9:    .ASCII  /-----------------------------------     THIS LINE SHOULD BE /
011277     040  020040  020040  MES10:   .ASCIZ  /     INCHES FROM THE LAST LINE     ----------------------------------
011410  005012                   MES11A:  .ASCII  <12><12>
011412  051120  047111  020124  MES11:   .ASCII  /PRINT SPEED IS APPROXIMATELY  /
011450  020040  020040  046040  MES12:   .ASCIZ  /     LINES PER MINUTE%/
011477     055  026455  026455  MES13:   .ASCII  /-------------------------------------------------/
011561     055  026455  026455           .ASCII  /-------------------------------------------------/
011643     055  026455  026455           .ASCIZ  /---------------------------------#/
            011706                       .EVEN
011706  005012  042524  052123  MES14:   .ASCII  <12><12>/TEST NUMBER /
011724  020040  005012  000012  MES15:   .ASCIZ  /  /<12><12><12>
                                         .EVEN
011732  044124  051511  046040  MES16:   .ASCIZ  /THIS LINE SHOULD BE PRINTED#/
011767     040  020040  020040  MES17:   .ASCIZ  /                                ALL ON ONE LINE --- IF SLEWED 0 LINES%/
                                         .EVEN
012072  026455  026455  026455  MES18:   .ASCII  /-----------------------------------      THERE SHOULD BE  /
012164  020040  020040  020040  MES19:   .ASCIZ  /      BLANK LINES BEFORE THIS LINE     ------------------------------
                                         .EVEN
012300  052040  051505  044524  MES20:   .ASCII  / TESTING CHANNEL SLEWING USING CHANNEL NO.  /
012354  020040     000          MES20A:  .ASCIZ  /  /
            012360                       .EVEN
012360  030504                   TNDAV1:  .ASCII  /D1/              ;TEST NUMBERS FOR DAVFU TESTS
012362  031104                   TNDAV2:  .ASCII  /D2/
012364  031504                   TNDAV3:  .ASCII  /D3/
012366  020061                   TNO1:    .ASCII  /1 /
012370  020062                   TNO2:    .ASCII  /2 /
012372  020063                   TNO3:    .ASCII  /3 /
012374  020064                   TNO4:    .ASCII  /4 /
012376  020065                   TNO5:    .ASCII  /5 /
012400  020066                   TNO6:    .ASCII  /6 /
012402  020067                   TNO7:    .ASCII  /7 /
012404  020070                   TNO10:   .ASCII  /8 /
012406  020071                   TNO11:   .ASCII  /9 /
012410  030061                   TNO12:   .ASCII  /10/
012412  030461                   TNO13:   .ASCII  /11/
012414  031061                   TNO14:   .ASCII  /12/
012416  031461                   TNO15:   .ASCII  /13/
012420  032061                   TNO16:   .ASCII  /14/
012422  032461                   TNO17:   .ASCII  /15/
```

```
                                        .EVEN

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


                                ;TESTS D1 AND D2
                                ;CHECK DAVFU LINE COUNT SLEWING

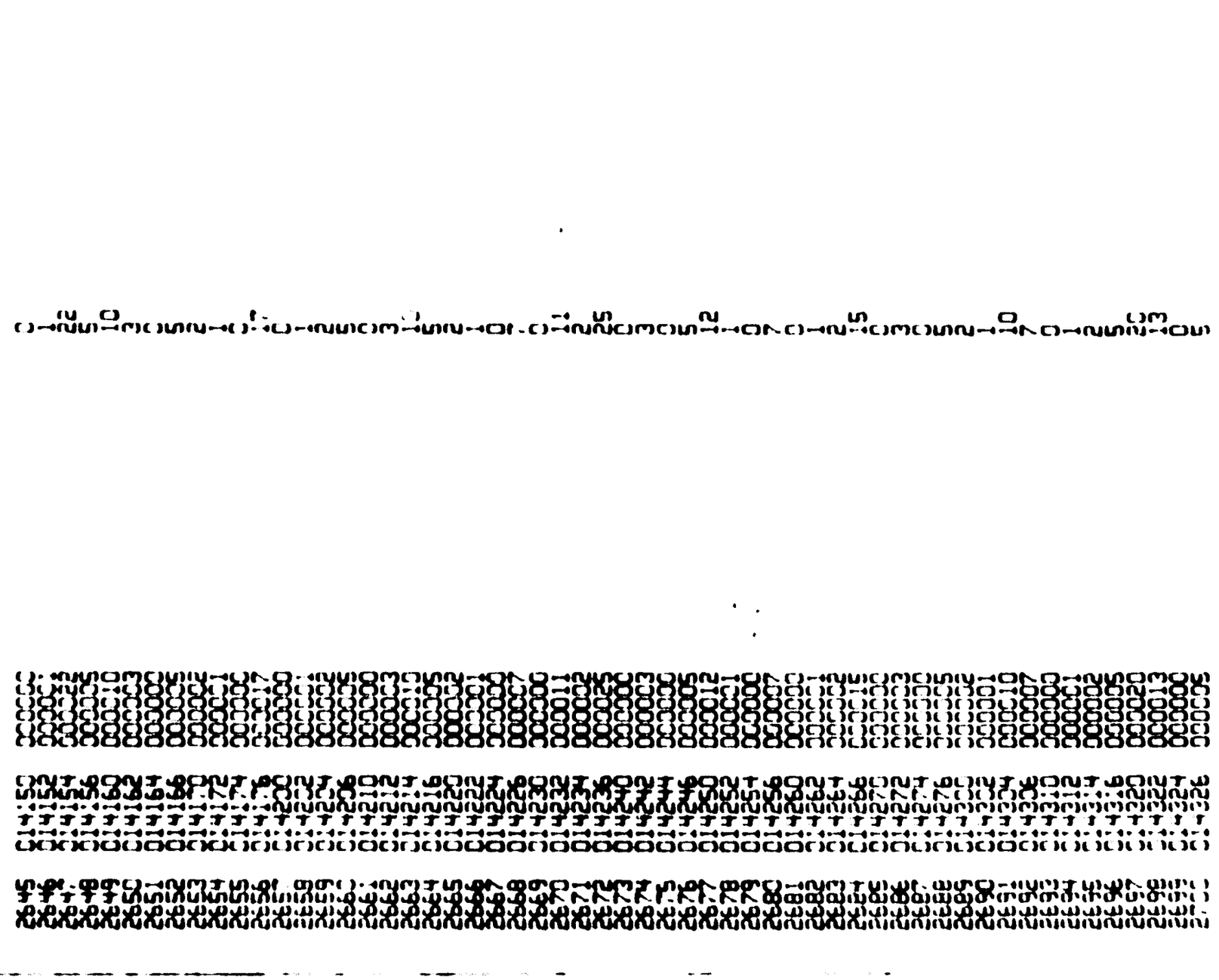
012424  004437  010030         DAVFU:  JSR     %4,TYPINT       ;INITIALIZE
012430  013737  014454  012166         MOV     SPSP,MES19+2
012436  104000                       EMT     +0              ;TYPE MESSAGE
012440  010611                       MESDD                   ;STARTING DAVFU TESTS
012442  012737  000220  013136       MOV     #220,DAVI1      ;SET DAVFU INSTRUCTIONS
012450  012737  000221  013140       MOV     #221,DAVI2
012456  013737  012360  011724       MOV     TNDAV1,MES15    ;SET TEST NUMBER FOR MESSAGE
012464  004437  007760               JSR     %4,PRNNT        ;PRINT TEST NUMBER
012470  012737  013070  001040 DAV0:  MOV     #DAVTAB,CHRGEN  ;SET TABLE POINTER
012476  005777  166276       DAV00:  TST     @LPS            ;TEST FOR ERROR
012502  100010                       BPL     DAV1            ;BRANCH IF NO ERROR
012504  012737  000052  001052 ERR52: MOV     #52.    ERCOUNT         ;SET UP ERROR COUNT 52
                000053               N=N+1
012512  004537  010244               JSR     %5,STAER        ;REPORT ERROR SET
012516  000000                       HALT                    ;HALT ON ERROR
012520  000137  012470               JMP     DAV0            ;RESTART TEST
012524  017777  166310  166250 DAV1:  MOV     @CHRGEN,@LPB    ;LOAD DAVFU
012532  062737  000002  001040       ADD     #2,CHRGEN       ;INCREMENT TABLE POINTER
012540  005777  166274               TST     @CHRGEN         ;TEST IF DONE LOAD
012544  001405                       BEQ     D5              ;CONTINUE IF DONE
012546  105777  166226               TSTB    @LPS            ;TEST READY
012552  100375                       BPL     .-4             ;WAIT FOR READY
012554  000137  012476               JMP     DAV00
012560  012737  000002  001044 D5:    MOV     #2,CYCCNT       ;SET CYCLE COUNT
012566  012737  011732  010026 D0:    MOV     #MES16,PRTMSG   ;SET MESSAGE ADDRESS
012574  004437  010010               JSR     %4,RINT         ;PRINT MESSAGE
012600  005777  166174               TST     @LPS            ;TEST FOR ERROR
012604  100006                       BPL     D1              ;CONTINUE IF NO ERROR
012606  012737  000053  001052 ERR53: MOV     #53,    ERCOUNT         ;SET UP ERROR COUNT 53
                000054               N=N+1
012614  004537  010244               JSR     %5,STAER        ;REPORT ERROR SET
012620  000000                       HALT                    ;HALT ON ERROR
012622  013777  013136  166152 D1:    MOV     DAVI1,@LPB      ;SEND DAVFU INSTRUCTION,  SKIP 3 LINES
012630  105777  166144               TSTB    @LPS            ;TEST READY
012634  100375                       BPL     .-4             ;WAIT FOR READY
012636  012737  011767  010026       MOV     #MES17,PRTMSG   ;SET PRINTER MESSAGE ADDRESS
012644  004437  010010               JSR     %4,RINT         ;PRINT MESSAGE
012650  012737  012072  010026       MOV     #MES18,PRTMSG   ;SET MESSAGE ADDRESS
012656  013737  013140  001040       MOV     DAVI2,CHRGEN    ;FIRST DAVFU INSTRUCTION
012664  012737  012366  001054       MOV     #TN01,STRCHR    ;SET TABLE POINTER
012672  012737  000017  001036       MOV     #15.,CHRCNT     ;SET TABLE COUNT
012700  005777  166074       D2:     TST     @LPS            ;TEST FOR ERROR
012704  100006                       BPL     D3              ;CONTINUE IF NO ERRORS
012706  012737  000054  001052 ERR54: MOV     #54,    ERCOUNT         ;SET UP ERROR COUNT 54
                000055               N=N+1
012714  004437  010244               JSR     %4,STAER        ;REPORT ERROR SET
012720  000000                       HALT                    ;HALT ON ERROR
```

```
2421  012722  013777  001040  166052  D3:     MOV     CHRGEN,@LPB     ;SEND DAVFU INSTR.
2422  012730  105777  166044          D3:     TSTB    @LPS            ;TEST READY
2423  012734  100375                  D3:     BPL     .-4             ;WAIT FOR READY
2424  012736  012737  166112  012164  D3:     MOV     @STRCHR,MES19   ;SET PRINTER MESSAGE
2425  012744  004437  010010          D3:     JSR     %4,RINT         ;PRINT MESSAGE
2426  012750  005337  001036          D3:     DEC     CHRCNT          ;DEC TABLE COUNT
2427  012754  001407                  D3:     BEQ     D4              ;EXIT TEST IF DONE
2428  012756  005237  001040          D3:     INC     CHRGEN          ;NEXT DAVFU INSTR.
2429  012762  062737  000002  001054  D3:     ADD     #2,STRCHR       ;INC TABLE POINTER
2430  012770  000137  012700          D3:     JMP     D2              ;CONTINUE
2431  012774  005337  001044  D4:     D4:     DEC     CYCCNT          ;DEC CYCLE COUNT
2432  013000  001415                  D4:     BEQ     DEXD            ;EXIT IF DONE
2433  013002  062737  000140  013136  D4:     ADD     #140,DAVI1      ;CHANGE DAVFU INSTR.
2434  013010  062737  000140  013140  D4:     ADD     #140,DAVI2      ;CHANGE DAVFU INSTR.
2435  013016  013737  012362  011724  D4:     MOV     TNDAV2,MES15    ;SET TEST NUMBER FOR MESSAGE
2436  013024  004437  007760          D4:     JSR     %4,PRNNT        ;PRINT TEST NUMBER
2437  013030  000137  012566          D4:     JMP     D0              ;RETEST LINE COUNT SLEWING
2438  013034  012737  000220  013136  DEXD:   MOV     #220,DAVI1      ;RESET DAVFU INSRT.
2439  013042  012737  000221  013140  D4:     MOV     #221,DAVI2      ;RESET DAVFU INSTR.
2440  013050  032777  010000  165726  D4:     BIT     #BIT12,@SWR     ;LOOP ON TEST?
2441  013056  001002                  D4:     BNE     1$              ;LOOP
2442  013060  000137  013142          D4:     JMP     DAV2            ;NEXT TEST
2443  013064  000137  012424  1$:     D4:     JMP     DAVFU           ;LOOP
2444
2445
2446  013070  000356          DAVTAB: 356                             ;DAVFU LOAD TABLE
2447  013072  000001                  1
2448  013074  000002                  2
2449  013076  000003                  3
2450  013100  000004                  4
2451  013102  000005                  5
2452  013104  000006                  6
2453  013106  000007                  7
2454  013110  000010                  10
2455  013112  000011                  11
2456  013114  000012                  12
2457  013116  000013                  13
2458  013120  000014                  14
2459  013122  000015                  15
2460  013124  000016                  16
2461  013126  000017                  17
2462  013130  000020                  20
2463  013132  000357                  357
2464  013134  000000                  0
2465
2466
2467  013136  000220          DAVI1:  220
2468  013140  000221          DAVI2:  221
2469
2470                          ;TEST D3
2471                          ;CHECK DAVFU CHANNEL SLEW COMMANDS
2472
2473  013142  004437  010030  DAV2:   JSR     %4,TYPINT       ;INITIALIZE
2474  013146  013737  014454  012166  MOV     SPSP,MES19+2
2475  013154  013737  012364  011724  MOV     TNDAV3,MES15    ;SAT TEST NUMBER FOR MESSAGE
2476  013162  004437  007760          JSR     %4,PRNNT        ;PRINT TEST NUMBER D3
```

```
2477  013166  012737  014436  013720          MOV     #MTAB,MTABP     ;SET MESSAGE TABLE POINTER
2478  013174  012737  014404  013714          MOV     #ITAB,ITABP     ;SET INSTRUCTION TABLE POINTER
2479  013202  017737  000506  001054          MOV     @ITABP,STRCHR   ;SAT FIRST INSTRUCTION
2480  013210  012737  012366  013722          MOV     #TNO1,HTABP     ;SET HEADER MESSAGE TABLE POINTER
2481  013216  012737  014366  013716          MOV     #ICTAB,ICTABP   ;SET INSTR COUNT TABLE POINTER
2482  013224  017737  000466  001056          MOV     @ICTABP,STRCNT  ;GET FIRST INSTR COUNT
2483  013232  012737  013724  013712  LOAD:   MOV     #DTAB,DTABP     ;SET DATA TABLE POINTER
2484  013240  017737  000446  001040          MOV     @DTABP,CHRGEN   ;SET FIRST DATA PAIR
2485  013246  005777  165526                  TST     @LPS            ;TEST FOR ERROR
2486  013252  100007                          BPL     DL1             ;BRANCH IF NO ERROR
2487  013254  012737  000055  001052  ERR55:  MOV     #55.    ERCOUNT         ;SET UP ERROR COUNT 55
2488          000056                          N=N+1
2489  013262  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
2490  013266  000000                          HALT                    ;HALT ON ERROR
2491  013270  000760                          BR      LOAD            ;RESTART LOAD
2492  013272  012737  000002  001036  DL1:    MOV     #2,CHRCNT       ;SET PAIR COUNT
2493  013300  013777  001040  165474  DL2:    MOV     CHRGEN,@LPB     ;LOAD DAVFU
2494  013306  105777  165466                  TSTB    @LPS            ;TEST READY
2495  013312  100375                          BPL     .-4             ;WAIT FOR READY
2496  013314  005777  165460                  TST     @LPS            ;TEST FOR ERROR
2497  013320  100010                          BPL     DL6             ;BRANCH IF NO ERROR
2498  013322  012737  000056  001052  ERR56:  MOV     #56,    ERCOUNT         ;SET UP ERROR COUNT 56
2499          000057                          N=N+1
2500  013330  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
2501  013334  000000                          HALT                    ;HALT ON ERROR
2502  013336  000137  013232                  JMP     LOAD            ;RESTART LOAD
2503  013342  022737  000356  001040  DL6:    CMP     #356,CHRGEN     ;LOAD COMMAND?
2504  013350  001407                          BEQ     DL6A            ;YES, SEND ONLY ONCE
2505  013352  022737  000357  001040          CMP     #357,CHRGEN     ;LOAD COMMAND?
2506  013360  001403                          BEQ     DL6A            ;YES.  SEND ONLY ONCE
2507  013362  005337  001036                  DEC     CHRCNT          ;DEC PAIR COUNT
2508  013366  001344                          BNE     DL2             ;FINISH PAIR IF NOT DONE
2509  013370  062737  000002  013712  DL6A:   ADD     #2,DTABP        ;INC DATA TABLE POINTER
2510  013376  017737  000310  001040          MOV     @DTABP,CHRGEN   ;SET NEXT DATA PAIR
2511  013404  022737  077777  001040          CMP     #77777,CHRGEN   ;DONE LOAD?
2512  013412  001327                          BNE     DL1
2513
2514                                  ;START OF CHANNEL SLEW TESTS
2515
2516  013414                          DL8:
2517  013414  013777  001054  165360          MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2518  013422  105777  165352                  TSTB    @LPS            ;TEST READY
2519  013426  100375                          BPL     .-4             ;WAIT FOR READY
2520  013430  105777  165344                  TSTB    @LPS            ;TEST READY
2521  013434  100375                          BPL     .-4             ;WAIT FOR READY
2522  013436                          DL8A:
2523  013436  017737  000260  012354          MOV     @HTABP,MES20A   ;SET HEADER MSSG ADDRESS
2524  013444  012737  012300  010026          MOV     #MES20,PRTMSG   ;SET HEADER MSG ADDRESS
2525  013452  004437  010010                  JSR     %4,RINT         ;PRINT HEADER MESSAGE
2526  013456  013777  001054  165316  DL9:    MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2527  013464  105777  165310                  TSTB    @LPS            ;TEST READY
2528  013470  100375                          BPL     .-4             ;WAIT FOR READY
2529  013472  005777  165302                  TST     @LPS            ;TEST FOR ERROR
2530  013476  100010                          BPL     DL10            ;BRANCH IF OK
2531  013500  012737  000057  001052  ERR57:  MOV     #57.    ERCOUNT         ;SET UP ERROR COUNT 57
2532          000060                          N=N+1
```

```
2533  013506  004537  010244                JSR     %5,STAER        ;REPORT ERROR SET
2534  013512  000000                        HALT                    ;HALT ON ERROR
2535  013514  000137  013232                JMP     LOAD            ;RELOAD DAVFU
2536  013520  017737  000174  012164  DL10: MOV     @MTABP,MES19    ;SET MESSAGE
2537  013526  027727  000164  000001        CMP     @ICTABP,#1      ;CHECK IF MAX LINE SLEW
2538  013534  001004                        BNE     DL10A           ;NOT, CONTINUE
2539  013536  013737  014452  012166        MOV     FS,MES19+2      ;SET MESSAGE
2540  013544  000403                        BR      DL10B           ;CONTINUE
2541  013546  013737  014454  012166  DL10A: MOV     SPSP,MES19+2    ;SET MESSAGE
2542  013554  012737  012072  010026  DL10B: MOV     #MES18,PRTMSG   ;SET MSG ADDRESS
2543  013562  004437  010010                JSR     %4,RINT         ;PRINT MESSAGE
2544  013566  005337  001056                DEC     STRCNT          ;DEC INSTR COUNT
2545  013572  001331                        BNE     DL9             ;FINISH TESTING THIS CHANNEL
2546  013574  062737  000002  013720        ADD     #2,MTABP        ;INC MSG TABLE POINTER
2547  013602  062737  000002  013722        ADD     #2,HTABP        ;INC HEADER MSG TABLE POINTER
2548  013610  062737  000002  013716        ADD     #2,ICTABP       ;INC INSTR COUNT TABLE POINTER
2549  013616  005777  000074                TST     @ICTABP         ;CHECK INSTR COUNT
2550  013622  001006                        BNE     DL12
2551  013624  012737  014366  013716        MOV     #ICTAB,ICTABP   ;RESET TABLE POINTER
2552  013632  012737  014436  013720        MOV     #MTAB,MTABP     ;RESET MSG TABLE POINTER
2553  013640  017737  000052  001056  DL12: MOV     @ICTABP,STRCNT  ;GET INSTR COUNT
2554  013646  062737  000002  013714        ADD     #2,ITABP        ;INC INSTR TABLE POINTER
2555  013654  017737  000034  001054        MOV     @ITABP,STRCHR   ;GET INSTRUCTION
2556  013662  001254                        BNE     DL8             ;CONTINUE IF NOT DONE TEST
2557  013664  013737  014454  012166        MOV     SPSP,MES19+2    ;RESET MESSAGE
2558  013672  032777  010000  165104        BIT     #BIT12,@SWR     ;LOOP ON TEST?
2559  013700  001402                        BEQ     DLEX
2560  013702  000137  013142                JMP     DAV2            ;LOOP ON TEST
2561  013706  000137  004066          DLEX: JMP     TEST2           ;RECYCLE PRINTING TESTS
2562
2563  013712  000000          DTABP:  0               ;DATA TABLE POINTER
2564  013714  000000          ITABP:  0               ;INSTRUCTION TABLE POINTER
2565  013716  000000          ICTABP: 0               ;INSTR COUNT TABLE POINTER
2566  013720  000000          MTABP:  0               ;MESSAGE TABLE POINTER
2567  013722  000000          HTABP:  0               ;HEADER MESSAGE TABLE POINTER
2568
2569                          ;DATA TABLE FOR DAVFU LOAD
2570
2571  013724  000356          DTAB:   356             ;START LOAD
2572  013726  000077                  77              ;HEADER MESSAGES
2573  013730  000000                  0
2574  013732  000001                  1
2575  013734  000002                  2
2576  013736  000005                  5
2577  013740  000000                  0
2578  013742  000003                  3
2579  013744  000010                  10
2580  013746  000005                  5
2581  013750  000002                  2
2582  013752  000001                  1
2583  013754  000000                  0
2584  013756  000007                  7
2585  013760  000000                  0
2586  013762  000011                  11
2587  013764  000002                  2
2588  013766  000005                  5
```

```
 2589  013770  000000                                    0
 2590  013772  000003                                    3
 2591  013774  000000                                    0
 2592  013776  000005                                    5
 2593  014000  000012                                   12
 2594  014002  000001                                    1
 2595  014004  000000                                    0
 2596  014006  000007                                    7
 2597  014010  000020                                   20
 2598  014012  000001                                    1
 2599  014014  000002                                    2
 2600  014016  000015                                   15
 2601  014020  000000                                    0
 2602  014022  000003                                    3
 2603  014024  000000                                    0
 2604  014026  000005                                    5
 2605  014030  000002                                    2
 2606  014032  000001                                    1
 2607  014034  000010                                   10
 2608  014036  000007                                    7
 2609  014040  000000                                    0
 2610  014042  000001                                    1
 2611  014044  000002                                    2
 2612  014046  000005                                    5
 2613  014050  000000                                    0
 2614  014052  000013                                   13
 2615  014054  000000                                    0
 2616  014056  000005                                    5
 2617  014060  000002                                    2
 2618  014062  000001                                    1
 2619  014064  000000                                    0
 2620  014066  000007                                    7
 2621  014070  000010                                   10
 2622  014072  000021                                   21
 2623  014074  000002                                    2
 2624  014076  000005                                    5
 2625  014100  000000                                    0
 2626  014102  000003                                    3
 2627  014104  000000                                    0
 2628  014106  000015                                   15
 2629  014110  000002                                    2
 2630  014112  000001                                    1
 2631  014114  000000                                    0
 2632  014116  000007                                    7
 2633  014120  000000                                    0
 2634  014122  000001                                    1
 2635  014124  000012                                   12
 2636  014126  000005                                    5
 2637  014130  000000                                    0
 2638  014132  000003                                    3
 2639  014134  000000                                    0
 2640  014136  000005                                    5
 2641  014140  000002                                    2
 2642  014142  000011                                   11
 2643  014144  000000                                    0
 2644  014146  000007                                    7
```



```
                                        2
                                        1
                                        0
                                        10
                                        12
                                        5
                                        4
                                        3
                                        2
                                        1
                                        0
                                        357             ;STOP LOAD
                                        77777           ;STOP !!!!!

                        ;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

014366  000105        ICTAB:  105
014370  000056                56
014372  000042                42
014374  000023                23
014376  000005                5
014400  000001                1
014402  000000                0                       ;END OF TABLE

                        ;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

014404  000200          ITAB:   200                     ;CHANNEL 1
014406  000201                  201                     ;CHANNEL 2
014410  000202                  202                     ;CHANNEL 3
014412  000203                  203                     ;CHANNEL 4
014414  000204                  204                     ;CHANNEL 5
014416  000205                  205                     ;CHANNEL 6
014420  000206                  206                     ;CHANNEL 7
014422  000207                  207                     ;CHANNEL 8
014424  000210                  210                     ;CHANNEL 9
014426  000211                  211                     ;CHANNEL 10
014430  000212                  212                     ;CHANNEL 11
014432  000213                  213                     ;CHANNEL 12
014434  000000                  0                       ;END OF TABLE

                        ;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE

014436  030440          MTAB:   .ASCII  / 1/
014440  031040                  .ASCII  / 2/
014442  031440                  .ASCII  / 3/
014444  033040                  .ASCII  / 6/
014446  032062                  .ASCII  /24/
014450  032061                  .ASCII  /14/
014452  020063          FS:     .ASCII  /3 /
014454  020040          SPSP:   .ASCII  /  /

                        ;SCOPE LOOP ROUTINE

                        ;SET CHARACTER IN SWITCH REGISTER -0.
```

```
                                
014456  004537  010030          SCOPE:  JSR     %4,TYPINT
014462  017737  164316  001050          MOV     @SWR,SAVE       ;FETCH SWITCHES
014470  012737  177754  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT
014476  042737  177400  001050          BIC     #177400,SAVE    ;MASK CHARACTER
014504                          LDLPX:
014504  105777  164270                  TSTB    @LPS            ;TEST READY
014510  100375                          BPL     .-4             ;WAIT FOR READY
014512  005777  164262                  TST     @LPS            ;TEST FOR ERROR
014516  100006                          BPL     LPSCOPE         ;BRANCH IF NO ERROR
014520  012737  000060  001052  ERR60:  MOV     #60.,   ERCOUNT         ;SET UP ERROR COUNT 60
                000061                  N=N+1
014526  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
014532  000000                          HALT                    ;HALT ON ERROR
014534  013777  001050  164240  LPSCOPE:MOV     SAVE,@LPB       ;LOAD PRINTER BUFFER
014542  032777  004000  164234          BIT     #BIT11,@SWR     ;SEND ONLY ONE CHAR?
014550  001402                          BEQ     LSCO            ;NO,  BRANCH
014552  000000                          HALT                    ;HALT - WAIT FOR OPERATOR
014554  000740                          BR      SCOPE           ;NEXT CHAR
014556  000177  000024          LSCO:   JMP     @LOSCOP         ;SEND LF?
014562  005237  001036          LSCA:   INC     CHRCNT          ;INCREMENT CHAR COUNT
014566  001346                          BNE     LDLPX           ;CONTINUE IF NOT DONE LINE
014570  012777  000012  164204          MOV     #12,@LPB        ;SEND LF
014576  105777  164176                  TSTB    @LPS            ;TEST READY
014602  100375                          BPL     .-4             ;WAIT FOR READY
014604  000724                          BR      SCOPE           ;CONTINUE

014606  014562          LOSCOP: LSCA

                000001                  .END
```

```
ACNVX   010242          2334*  2338   2343*  2345*  2347*  2352*
ACVN    010174          2338*  2349
BIT0  = 000001           848*  1377   1431
BIT1  = 000002           847*
BIT10 = 002000           838*
BIT11 = 004000           837*  2772
BIT12 = 010000           836*  1730   1793   1839   1893   1943   1985   2037   2071   2118   2163   2208   2238
                        2440   2558
BIT13 = 020000           835*  1403   1755   1783   1906   1996   2048   2083
BIT14 = 040000           834*   999   1536   2241
BIT15 = 100000           833*
BIT2  = 000004           846*
BIT3  = 000010           845*
BIT4  = 000020           844*
BIT5  = 000040           843*
BIT6  = 000100           842*
BIT7  = 000200           841*
BIT8  = 000400           840*
BIT9  = 001000           839*
CHRCHK  004650          1044   1800*  1840
CHRCNT  001036          1121*  1411*  1421*  1639*  1640*  1703*  1722*  1727*  1743*  1752*  1807*  1818*  1836*
                        1855*  1857   1872*  1880   1887*  1911*  1920*  1956*  1966*  2005*  2015*  2054*  2062*
                        2131*  2133   2148*  2173*  2174*  2186*  2219*  2231*  2414*  2426*  2492*  2507*  2760*
                        2777*
CHRE    005044          1806   1815   1831*
CHRGEN  001040          1122*  1414*  1415*  1416   1418*  1420   1584*  1592   1593*  1594   1623*  1631   1632*
                        1633   1744*  1751   1754*  1757   1760   1766*  1773   1774*  1775   1777   1779   1781
                        1785*  1786   1859*  1861*  1862   1886*  1912*  1919   1923*  1937*  1957*  1965   2007*
                        2014   2017*  2020   2022*  2024*  2053*  2061   2067*  2094*  2095*  2096   2108   2133*
                        2134   2136*  2138*  2139*  2140   2147   2152*  2154*  2170*  2194   2195*  2199*  2382*
                        2390   2391*  2392   2412*  2421   2428*  2484*  2493   2503   2505   2510*  2511
CHRS    005042          1826   1830*
CLOKAV  002170          1359*
CNTR    002620          1397*  1436*  1444*
CONV    010162          2334*  2356
CONVRT  002634          1007   1433   1445   1451*
CR      004710          1807*  1825
CR0     004716          1808*  1819
CR1     004740          1809   1814*
CR2     004744          1815*  1830
CR3     004760          1817*  1828   1838
CR5     005046          1821   1832*
CR7     005022          1826*  1831
CSBR    001022          1087*  1387*
CYCCNT  001044          1124*  1413*  1423*  1702*  1728*  1741*  1791*  1805*  1820*  1835*  1956*  1874*  1889*
                        2006*  2018*  2025*  2092*  2093*  2110   2132*  2150*  2155*  2171*  2200*  2397*  2431*
DAVAV   003244          1527   1532*
DAVFU   012424          1025   2243   2374*  2443
DAVI1   013136          2378*  2406   2433*  2438*  2467*
DAVI2   013140          2379*  2412   2434*  2439*  2468*
DAVTRB  013070          2382   2446*
DAVO    012470          2382*  2389
DAVOO   012476          2383*  2396
DAVI    012524          2384   2390*
DAVZ    013142          1026   2442   2473*  2560
DEVC    013034          2432   2436*
```

F05


```
DIA       002622        1376*  1388*  1398*  1437#  1451*
DISPLA    001006        1081#  1144*
DISPRE    000174        1011#  1144
DLEX      013706        2559   2561#
DL1       013272        2486   2492#  2512
DL10      013520        2530   2536#
DL10A     013546        2538   2541#
DL10B     013554        2540   2542#
DL12      013640        2550   2553#
DL2       013300        2493#  2508
DL6       013342        2497   2503#
DL6A      013370        2504   2506   2509#
DL8       013414        2516#  2556
DL8A      013436        2522#
DL9       013456        2526#  2545
DRAGN     007700        2246   2253#
DXAB      013724        2483   2571#
DXABP     013712        2483*  2484   2509*  2510   2563#
[illegible] 012566      2398#  2437
[illegible] 012622      2401   2406#
[illegible] 012700      2415#  2430
[illegible] 012722      2416   2421#
[illegible] 012774      2427   2431#
[illegible] 012560      2393   2397#
ERCOUN    001052        1127#  1158*  1164*  1176*  1186*  1192*  1202*  1212*  1228*  1239*  1245*  1253*  1267*
                        1273*  1278*  1287*  1297*  1307*  1329*  1335*  1342*  1494*  1517*  1587*  1601*  1626*
                        1644*  1694*  1707*  1747*  1769*  1810*  1865*  1915*  1951*  2010*  2057*  2103*  2143*
                        2178*  2190*  2222*  2288*  2357   2385*  2402*  2417*  2437*  2498*  2531*  2767*
ERR0      001170        1158#
ERR1      001212        1164#
ERR10     001472        1239#
ERR11     001514        1245#
ERR12     001544        1253#
ERR13     001602        1267#
ERR14     001624        1273#
ERR15     001640        1278#
ERR16     001672        1287#
ERR17     001724        1297#
ERR2      001256        1176#
ERR20     001756        1307#
ERR21     002050        1329#
ERR22     002072        1335#
ERR23     002124        1342#
ERR24     003046        1494#
ERR25     003152        1517#
ERR26     003450        1587#
ERR27     003532        1601#
ERR3      001306        1186#
ERR30     003626        1626#
ERR31     003730        1644#
ERR32     004100        1694#
ERR33     004156        1707#
ERR34     004364        1747#
ERR35     004502        1769#
ERR36     004724        1810#
ERR37     005222        1865#
```

```
ERR4    001330          1192#
ERR40   005470          1915#
ERR41   005726          1961#
ERR42   006200          2010#
ERR43   006446          2057#
ERR44   006712          2103#
ERR45   007130          2143#
ERR46   007322          2178#
ERR47   007374          2190#
ERR5    001360          1202#
ERR50   007550          2222#
ERR5:0  007744          2288#
ERR52   012524          2385#
ERR53   012606          2402#
ERR54   012706          2417#
ERR55   013254          2487#
ERR56   013322          2498#
ERR57   013500          2531#
ERR6    001412          1218#
ERR60   014520          2767#
ERR7    001436          1229#
FFSET   003364          1499    1566#
FFTAB   003276          1498    1541#
FS      014456          2539    2751#
FTABE   003352          1526    1563#
KBMAIN  007512          1052    2214#   2239
KBSTA   007660          2242    2244#
KBSTA1  007536          2216#   2237
KBSTA2  007544          2220#   2232
KEY1    010274          2358    2361    2367#
KEYB1   006054          1048    1992#   2038
KEYB   006150          2005#   2034    2036
KEYB0   006132          2000    2003#
KEYB00  006120          1997    2001#
KEYB01  006172          2008#   2021    2023    2026
KEYB02  006214          2009    2014#
KEYB03  006262          2019    2024#
KEYB04  006300          2016    2027#
KEYB05  006340          2031    2037#
KEYBOF  013722          2480#   2523    2547#   2567#
KEYBUF  014366          2481    2551    2719#
KEYBUF  013716          2481#   2482    2537    2548#   2549    2551#   2553    2565#
KGDAT   003430          1523    1537    1583#   1591    1605
KGDATA  003564          1584    1612#
KGDATO  003470          1586    1592#
KGDATI  003552          1600    1606#
KGDO    003442          1585#   1598
KGDI    003524          1595    1599#
KGTIC   002014          1263    1318#
KGTID   002140          1325    1349#
KTAB    014404          2478    2729#
KTABP   013714          2478#   2479    2554#   2555    2564#
KWAIT   002360          1033    1365    1394#
KWAITP  002306          1034    1370    1384#
LOOP    004516          1768    1773#   1782    1787
LOOPX   014504          2762#   2778
```

```
LEGCHR  001060          1130#  1405*  1408*  1416   1998*  2001*  2020   2086*  2090*  2098
LFT     007032          2130#
LFTTR   007014          1051   2126#  2164
LFTO    007040          2131#  2161
LFT1    007064          2134#  2137
LFT2    007100          2135   2138#
LFT3    007122          2141#  2153   2156
LFT4    007144          2142   2147#
LFT5    007174          2151   2154#
LFT6    007212          2149   2157#  2162
LINCNT  001042          1123#  1371*  1384*  1394*  1415   1427*  1454   1456*  1462   1464*  1469   1498*  1512
                        1525*  1526   1528   1804*  1837*  1854*  1882*  1884   1968*  1969*  1970*  1974*  2034*
                        2030*  2050*  2052*  2068*  2085*  2089*  2097   2115*  2116   2130*  2131   2160*  2169*
                        2171   2174   2205*  2206   2218*  2236*
LKS     001026          1089#  1362   1398   1399*
LKSRV   002624          1004   1444#
LOAD    013232          2483#  2491   2502   2535
LOGICA  007620           997   2248#
LOGICF  014606          1057*  1062*  2776   2785#
LP8     001002          1075#  1172*  1173*  1236*  1420*  1428*  1521*  1592*  1631*  1638*  1721*  1724*  1751*
                        1763*  1773*  1788*  1817*  1822*  1832*  1862*  1876*  1891*  1919*  1926*  1965*  1971*
                        2008   2014*  2027*  2061*  2064*  2107*  2112*  2147*  2157*  2182*  2194*  2202*  2230*
                        2233*  2271*  2293   2390*  2406*  2421*  2493*  2517*  2526*  2771*  2779*
LPS     001000          1070#  1156   1162   1174   1184   1190   1200   1215   1226   1237   1243   1249   1265
                        1271   1281*  1283*  1290*  1292*  1300*  1302*  1310*  1312*  1327   1333   1340*  1350*
                        1429   1515   1522   1585   1596   1599   1624   1635   1642   1705   1725   1745   1764
                        1767   1789   1808   1823   1833   1863   1878   1913   1927   1959   1972   2028   2055
                        2065   2101   2113   2141   2158   2176   2198   2203   2220   2227   2234   2265   2267
                        2272   2277   2286   2292   2383   2394   2400   2407   2415   2422   2485   2494   2496
                        2518   2520   2527   2529   2763   2765   2780
LPSCOP  014534          2766   2771#
LPS7    006526          2071#
LP1     001506          1238   1243#  1252
LP2     001530          1244   1249#
LP2B    004172          1706   1711#
LP2E    004400          1746   1751#
LP2H    004470          1742   1766#
LP3     001616          1266   1271#
LP3X    001640          1272   1277#
LP4     002064          1328   1333#
LP5     002106          1334   1339#
LSCA    014562          1057   2777#  2785
LSCO    014556          2773   2776#
.       = 000015        1094#  1698   1701#  1738   1740#  1801   1803#  1851   1853#  1902   1904#  1952   1954#
                        1993   1995#  2045   2047#  2080   2082#  2127   2129#  2215   2217#
MESA    010315          1607   1657   2367#
MESB    010362          1653   2367#
MESC    010436          1375   2367#
MESCD   010611          2367#  2377
MES1    010650          1149   2367#
MES10   011277          1501   2367#
MES11   011412          1473   2367#
MES11A  011410          1474   2367#
MES12   011450          1453   2367#
MES13   011477          1514   2367#
MES14   011706          2285   2295   2367#
```

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MES15   011724          1699*  1738*  1801*  1851*  1902*  1952*  1993*  2045*  2080*  2127*  2215*  2367*  2380*
                        2435*  2475*
MES16   011732          2367*  2398
MES17   011767          2367*  2409
MES18   012072          2367*  2411   2542
MES19   012164          2367*  2375*  2424*  2474*  2536*  2539*  2541*  2557*
MES2    010701          1151   2367*
MES20   012300          2367*  2524
MES20A  012354          2367*  2523*
MES3    010726          1153   2367*
MES4    010757          1169   2367*
MES5    011023          1197   2367*
MES6    011070          1181   1207   2367*
MES7    011130          1510   2367*
MES7A   011126          1534   2367*
MES8    011164          1500   1532*  2367*
MES9    011202          1530   2367*
MINCNT  002616          1387   1397   1435*
MLP     005656          1047   1951*  1986
MLPA    005702          1956*  1977
MLPD    005720          1959*  1967
MLPE    005742          1960   1965*
MLPF2   005776          1971*  1975
MLPF4   006044          1958   1985*
MLPAB   014436          2477   2552   2745*
MLPABF  013720          2477*  2536   2546*  2552*  2566*
.       =  000001       1093*  1158   1159*  1164   1165*  1176   1177*  1186   1137*  1192   1193*  1202   1203*
                        1218   1219*  1229   1229*  1239   1240*  1245   1246*  1253   1254*  1267   1268*  1273
                        1274*  1277   1279*  1287   1288*  1297   1298*  1307   1308*  1329   1330*  1335   1336*
                        1342   1343*  1494   1495*  1517   1519*  1587   1588*  1601   1602*  1626   1627*  1644
                        1645*  1694   1695*  1707   1708*  1747   1748*  1769   1770*  1810   1811*  1865   1866*
                        1915   1916*  1961   1962*  2010   2011*  2057   2058*  2103   2104*  2143   2144*  2179
                        2189*  2190   2191*  2222   2223*  2288   2289*  2385   2386*  2402   2403*  2417   2418*
                        2487   2488*  2498   2499*  2531   2532*  2767   2768*
NODAT   003600          1624   1610   1621*  1630
NODATA  003702          1634   1638*
NODATO  003644          1625   1631*
NODATI  003750          1643   1649*
NODAT2  003774          1651   1656*
NODAT3  004006          1623   1662*
NODAT4  004064          1633   1685*
NODO    003620          1624*  1637
NODOA   003612          1623*  1648   1655
NOP     =  000240       1092*
NTRDY   007750          2273   2276*
NUMCHR  001062          1131*  1406*  1409*  1418   1999*  2002*  2022   2087*  2091*  2100
OVR     005140          1855*  1885
OVREXT  005364          1883   1893*
OVRPRT  005114          1045   1850*  1894
OVRO    005146          1856*  1881
OVR1    005206          1862*  1870   1875
OVR2    005214          1860   1863*  1850
OVR3    005236          1864   1869*
OVR4    005200          1861*  1871
OVR5    005254          1874*
OVR6    005270          1877*  1892
```
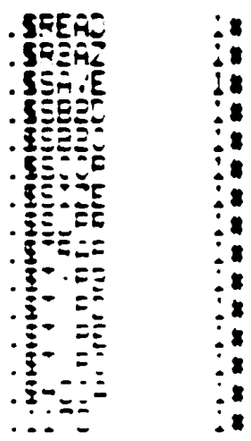

```
OVRB    005352          1873    1891#
PRTTB   003014          1412    1480#
PC    =%000007           831#   2249*
PLKS    001024          1088#   1367    1388    1389*
PRINT   007760          1700    1739    1802    1852    1903    1953    1994    2046    2081    2128    2216    2285#   2381
                        2436    2476
PRTA    005610          1922    1937#
PRTCTL  005374          1046    1901#   1944
PRTINT  007704          1492    1692    2265#
PRTINC  007720          2266    2269#
PRTMSG  010026          1474*   1514*   1530*   2285*   2295#   2398*   2409*   2411*   2524*   2542*
PRTO    005420          1906#   1936    1940    1942
PRT1    005440          1907    1910#
PRT2    005446          1909    1911#
PRT3    005462          1913#   1921    1925    1938
PRT4    005504          1914    1919#
PRT6    005622          1930    1939#
PRT7    005634          1932    1941#
PRTB    005646          1934    1943#
PSW     000010          1082#   1280*   1289*   1299*   1309*   1339*   1351*
PTRPSW  001032          1091#   1264*   1326*   1353*
PTR.EC  001030          1090#   1263*   1325*   1352*
RCHRSW  004220          1712    1717#
RDYCK   007726          2268    2271#
RINT    010010          1475    1524    2287    2292#   2399    2410    2425    2525    2543
ROTATE  006536          1050    2079#   2119
ROT0    006610          2084    2089#
ROT1    006632          2088    2092#   2117
ROT2    006636          2093#   2111
ROT3    006646          2095#   2109
ROT4    006704          2099    2101#
ROT5    006726          2102    2107#
RTTR    007246          2169#   2209
RT1     007254          2170#   2207
RT2     007314          2176#   2187
RT2A    007336          2177    2182#
RT2AA   007360          2184    2186#
RT3     007366          2175    2188#   2201
RT3A    007410          2189    2194#
RT3B    007444          2197    2200#
R0    =%000000           822#   2245*   2249
R1    =%000001           823#
R2    =%000002           824#
R3    =%000003           825#
R4    =%000004           826#
R5    =%000005           827#
R6    =%000006           828#    830
R7    =%000007           829#    831
SAVE    001050          1126#   1713*   1720*   1721    1816*   1817    1827*   2759*   2761*   2771
SCHPSW  004216          1704    1716#   1719
SCOPE   014456          1058    1062    1063    2758#   2775    2782
SEGCNT  001034          1120#   1908*   1910*   1924*
SETUP   001064          1017    1135#
SLEWCK  003034          1035    1476    1491#
SLW     003062          1493    1498#
SLWC    003074          1500#   1529
```

```
SLW1    003104          1502*   1507
SLW1A   003144          1513    1515*
SLW11   003130          1512*   1531
SLW2    003166          1516    1521*
SNGCHR  006360          1049    2044*   2072
SP    =%000006           830*   1137*   1138*   1145    1146    1147
SPSP    014454          2375    2474    2541    2557    2752*
STAER   010244          1160    1166    1178    1188    1194    1204    1220    1230    1241    1247    1255    1269    1275
                        1319    1331    1337    1344    1496    1519    1589    1603    1628    1646    1696    1739    1749
                        1771    1812    1867    1917    1963    2012    2059    2105    2145    2180    2192    2224    2290
                        2356*   2387    2404    2419    2489    2500    2533    2769
STARA   002464          1413*   1426
STARED  002562          1422    1427*
STARO   002406          1379    1390    1403*   1433
STAROA  002434          1404    1408*
STAROB  002450          1407    1410*
STAR1   002526          1417    1420*   1424
STP1    001162          1156*   1161
STP2    001204          1157    1162*   1167
STP3    001226          1163    1168*
STP4    001234          1171*   1179
STP5    001272          1175    1180*
STPSA   001300          1184*   1189
STPSB   001322          1185    1190*   1195
STPSC   001344          1191    1196*
STP6    001352          1200*   1205
STP7    001374          1201    1206*
STRCHR  001054          1128*   1412*   1414    1425*   1622*   1638    1649*   1650    1704*   1711    1712*   1719*   1805*
                        1814    1815*   1826*   1905*   1912    1929    1931    1933    1935*   1939*   1941*   1955*   1957
                        1968    1976*   2003*   2007    2024    2032*   2033    2035*   2096*   2097*   2098    2100*   2107
                        2140*   2154    2413*   2424    2429*   2479*   2517    2526    2555*
STRCNT  001056          1129*   1857*   1858*   1869*   1888*   2172*   2183*   2185*   2196*   2199*   2482*   2544*   2553*
SWR     001004          1080*   1140    1143*   1377    1403    1431    1536    1730    1755    1783    1793    1839    1893
                        1906    1943    1985    1996    2037    2048    2071    2083    2118    2163    2208    2238    2241
                        2362    2440    2558    2759    2772
SWREG   000176          1012*   1143
SWTIME  002244          1032    1368    1371*
S1      006440          2055*   2063
S2      006416          2049    2052*
S2A     006432          2054*   2069
S4X2    006476          2064*   2070
TABSTR  006026          1955    1979*
TEST1   001402          1215*   1221
TEST1A  001426          1217    1225*   1231
TEST1B  001452          1227    1235*   1242    1248    1256
TEST1C  001560          1250    1263*   1270    1276    1320
TEST1D  002026          1313    1325*   1332    1338    1345
TEST2   004066          1042    1539    1659    1691*   1731    2254    2561
TEST3   004312          1043    1737*   1794
TKB     001014          1084*
TKS     001020          1086*
TNOAV1  012360          2367*   2380
TNOAV2  012362          2367*   2435
TNOAV3  012364          2367*   2475
TNO1    012366          2367*   2413    2480
TNO10   012404          1993    2367*
```

```
TN01    012406          2045    2367#
TN012   012410          2080    2367#
TN013   012412          1532    2127    2367#
TN014   012414          2215    2367#
TN015   012416          2367#
TN016   012420          2367#
TN017   012422          2367#
TN02    012370          1699    2367#
TN03    012372          1738    2367#
TN04    012374          1801    2367#
TN05    012376          1851    2367#
TN06    012400          1902    2367#
TN07    012402          1952    2367#
TPB     001C12          1083#   2293*   2297*   2314*
TPS     001016          1085#   2292*   2296*   2315
TST2AX  004114          1693    1698#
TYP     010046           988    2302#
TYPA    010056          2305#   2313    2322
TYPC    010066          2306    2308#
TYPD    010114          2312    2314#   2319    2321
TYPDAT  010160          1452*   1457*   1459*   1460    1461*   1465*   1467*   1468    1469*   1470*   1471    2305*   2308
                        2310    2314    2318*   2320*   2323#
TYPDO   010122          2315#
TYPF    010132          2309    2318#
TYPG    010144          2311    2320#
TYPINT  010030          1135    1372    1385    1395    1491    1583    1621    1691    1737    1800    1850    1901    1951
                        1992    2044    2079    2126    2214    2296#   2374    2473    2758
T1A     004222          1717    1719#
T2A     004176          1712#   1716
T2B0    004342          1743#   1792
T2B0A   004350          1744#   1758    1761
T2B1    004356          1745#   1759    1762
T2B2    004454          1753    1763#
T2B2B   004442          1756    1760#
T2B3    004474          1767#
T2B4    004524          1774#   1776    1778    1780
T2B5    004616          1784    1788#
T3A     004150          1705#   1723
T5A     004236          1714    1721#   1729
WORK    001046          1125#   1235*   1251*
XHAM1   007566          2221    2226#
XHAM1X  007576          2230#
XS1X    006462          2056    2061#
.       = 014610         854#    856     858     860     862     864     866     868     870     872     874     876     878
                         880     882     884     886     888     890     892     894     896     898     900     902     904
                         906     908     910     912     914     916     918     920     922     924     926     928     930
                         932     934     936     938     940     942     944     946     948     950     952     954     956
                         958     960     962     964     966     968     970     972     974     976     978     980     992
                         986#    992#    996#    998#   1002#   1010#   1014#   1020#   1029#   1039#   1055#   1060#   1066#
                        1430    1523    1597    1636    1726    1765    1790    1824    1834    1879    1928    1973    1983#
                        2026    2051    2066    2114    2159    2204    2228    2229    2235    2278    2316    2363    2367#
                        2395    2408    2423    2495    2519    2521    2528    2764    2781
```

```
COMMEN          1#
ENDCOM          1#
ESCAPE          1#
GETPRI          1#
GETSWR          1#
MULT            1#
NEWTST          1#
POP             1#
PUSH            1#
REPORT          1#
SETPRI          1#
SETUP           1#
SKIP            1#
SLASH           1#
STARS           1#
SWRST           1#
TYPBIN          1#
TYPDEC          1#
TYPNAM          1#
TYPNUM          1#
TYPOCS          1#
TYPOCT          1#
TYPTXT          1#
$ERROR    1100#  1156  1164  1176  1186  1192  1202  1218  1228  1239  1245  1253  1267  1273  1277
          1287   1297  1307  1329  1335  1342  1494  1517  1587  1601  1626  1644  1694  1707  1747
          1769   1810  1865  1915  1961  2010  2057  2103  2143  2178  2190  2222  2288  2385  2402
          2417   2487  2498  2531  2767
$PRINT    1106#  1698  1738  1801  1851  1902  1952  1993  2045  2080  2127  2215
$WAIT     1112#  1429  1522  1596  1635  1725  1764  1789  1823  1833  1877  1927  1972  2028  2065
          2113   2158  2203  2226  2234  2276  2394  2407  2422  2494  2518  2527  2762  2780
$$ESCA          1#
$$NEWT          1#
$$SKIP          1#
.EGLAT          1#
.HEADE          1#
.KTI1           1#
.SETUP          1#
.SWPHI          1#
.$ACTI          1#
.$APTB          1#
.$APTH          1#
.$APTY          1#
.$ASTA          1#
.$CATC          1#
.$CMTA          1#
.$CODC          1#
.$CODS          1#
.$CTCC          1#
.$ECOP          1#
.$ERRC          1#
.$ERRT          1#
.$MUL           1#
.$POKE          1#
.$PRAC          1#
.$PUSE          1#
.$PUSH          1#
```



B06

MAINDEC-11-DZLPA-E-0 MACY11 27(732) 27-SEP-76 10:57 PAGE 105
DZLPA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ADD	1415	1425	1459	1467	1470	1525	1593	1632	1858	2035	2097	2139	2259	227[illegible]	[illegible]
	2331	2341	2391	2429	2433	2434	2509	2546	2547	2548	2554				
BIS	1363	1368													
BEQ	[illegible]	[illegible]	1432	1445	1527	1529	1595	1634	1651	1753	1756	1758	1761	1776	1778
	[illegible]	[illegible]	1821	1871	1873	1893	1885	1907	1922	1930	1932	1934	1958	2016	[illegible]
	2049	[illegible]	2149	2151	2162	2175	2242	2246	2309	2311	2393	2427	2432	2504	[illegible]
	2559	[illegible]													
[illegible]	[illegible]	1455	1463	1870	2117	2135	2161	2207							
[illegible]	[illegible]	[illegible]	1302	1312	1350	1451	1969	2339	2761						
[illegible]	[illegible]	[illegible]	1300	1310	1340	1795									
[illegible]	[illegible]	1403	1431	1536	1730	1755	1783	1766	1793	1839	1884	1893	1906	1943	1985
	1996	2037	2048	2071	2083	2118	2163	2208	2238	2241	2440	2558	2772		
[illegible]	2034														
[illegible]	[illegible]	1921	2031	2069	2099										
[illegible]	[illegible]	[illegible]	1191	1201	1227	1250	1272	1234	1600	1643	2266	2268	2363		
[illegible]	[illegible]	1424	1424	1507	1513	1537	1641	1723	1729	1731	1784	1792	1794	1819	1838
	1940	1875	1861	1894	1925	1944	1967	1975	1996	1997	2021	2038	2063	2072	2094
	2109	[illegible]	2119	2164	2184	2187	2197	2201	2209	2232	2237	2239	2306	2349	2441
	2508	[illegible]	2538	2545	2550	2556	2778								
BPL	[illegible]	1185	1217	1238	1244	1266	1328	1430	1516	1523	1586	1597	1625	1636	1706
	[illegible]	1746	1765	1769	1790	1809	1824	1834	1864	1879	1914	1928	1960	1973	2009
	[illegible]	2056	2366	2102	2114	2142	2159	2177	2189	2204	2221	2228	2229	2235	2273
	2278	2287	2316	2394	2395	2401	2408	2416	2423	2486	2495	2497	2519	2521	2529
	2530	2764	2766	2781											
BR	[illegible]	1161	1167	1179	1189	1195	1205	1221	1231	1242	1248	1256	1270	1276	1332
	1336	1345	1407	1419	1458	1466	1493	1630	1655	1693	1759	1762	1860	1909	1977
	[illegible]	2023	2026	2036	2051	2088	2137	2153	2156	2313	2322	2491	2540	2775	2792
	2342	2344	2346												
CLR	[illegible]	1351	1364	1369	1371	1373	1384	1394	1452	1461	1639	1766	1888	1989	2092
	2094														
CMP	[illegible]	1318	1349	1416	1454	1462	1526	1633	1650	1757	1760	1775	1777	1779	1781
	[illegible]	1931	1933	2020	2033	2098	2108	2110	2116	2134	2206	2503	2505	2511	2537
CMPB	[illegible]	2308	2310												
DEC	1421	1423	1444	1869	1974	2030	2115	2148	2160	2186	2200	2348	2426	2431	2507
	2544														
EMT	1148	1150	1152	1168	1180	1196	1206	1374	1472	1509	1533	1606	1652	1656	2294
	2360	[illegible]													
HALT	857	859	861	863	865	867	869	871	873	875	877	879	881	883	885
	887	889	891	893	895	897	899	901	903	905	907	909	911	913	915
	917	919	921	923	925	927	929	931	933	935	937	939	941	943	945
	947	949	951	953	955	957	959	961	963	965	967	969	971	973	975
	977	979	981	983	1154	1170	1182	1198	1208	1497	1511	1520	1535	1538	1590
	[illegible]	1608	1629	1647	1654	1658	1697	1710	1750	1772	1813	1868	1918	1964	2013
	[illegible]	2106	2146	2181	2193	2225	2291	2364	2389	2405	2420	2490	2501	2534	2770
	2774														
INC	1251	1427	1457	1465	1508	1640	1649	1722	1728	1752	1754	1774	1791	1818	1920
	1837	1872	1874	1882	1920	1923	1924	1935	1966	1970	1976	2015	2017	2018	2062
	2067	2068	2093	2095	2150	2152	2183	2195	2196	2205	2231	2236	2428	2777	
JMP	[illegible]	1023	1024	1025	1026	1032	1033	1034	1035	1042	1043	1044	1045	1046	1047
	1048	1049	1050	1051	1052	1058	1063	1313	1320	1365	1370	1379	1390	1426	1433
	1476	1531	1539	1591	1598	1605	1610	1637	1648	1659	1711	1714	1742	1814	1925
	1828	1890	1892	1936	1938	1940	1942	2243	2254	2389	2396	2430	2437	2442	2443
	2502	2535	2560	2561	2776										
JSR	1135	1160	1166	1178	1188	1194	1204	1220	1230	1241	1247	1255	1269	1275	1319
	1331	1337	1344	1372	1385	1395	1475	1491	1492	1496	1519	1524	1583	1589	1603
	1621	1628	1646	1691	1692	1696	1700	1709	1737	1739	1749	1771	1800	1802	1812

CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
                1853    1867    1901    1903    1917    1951    1953    1963    1992    1994    2012    2044    2046    2059
                2066    2126    2128    2145    2180    2192    2214    2216    2224    2249    2290    2338    2389    2399
                2404    2410    2419    2425    2436    2473    2476    2489    2500
                2543    2558    2769
                1062    1137    1138    1139    1143    1144    1146    1147    1158    1164    1172    1173
                1202    1218    1228    1236    1239    1245    1253    1263    1264    1267    1273    1278
                1299    1299    1307    1309    1325    1326    1329    1335    1339    1342    1352    1353
                1386    1387    1388    1389    1396    1397    1398    1399    1405    1406    1408    1409
                1414    1420    1428    1453    1469    1474    1494    1498    1499    1500    1501    1514
                1532    1584    1587    1592    1601    1622    1623    1626    1631    1638    1644    1694
                1703    1707    1712    1713    1719    1720    1721    1724    1727    1738    1741    1743
                1751    1763    1769    1773    1788    1801    1804    1805    1806    1807    1810    1815    1816
                1826    1827    1832    1835    1836    1851    1854    1855    1856    1857    1859    1861    1862
                1886    1887    1891    1902    1905    1908    1910    1911    1912    1915    1919    1926    1932
                1952    1955    1956    1961    1965    1971    1993    1998    1999    2001    2002    2003    2004
                2006    2007    2010    2014    2024    2026    2027    2045    2050    2052    2053    2054    2057    2061
                2083    2086    2086    2087    2089    2090    2091    2096    2103    2107    2112    2127    2130    2131
                2133    2140    2143    2147    2154    2155    2157    2169    2170    2171    2172    2173    2178    2182
                2190    2194    2198    2202    2215    2218    2219    2222    2230    2233    2245    2271    2285    2288
                2293    2296    2297    2302    2304    2334    2335    2336    2338    2375    2378    2379    2380    2382
                2392    2399    2399    2402    2406    2409    2411    2412    2413    2414    2417    2421    2424    2436
                2438    2474    2475    2477    2478    2479    2480    2481    2482    2483    2484    2487    2492    2493
                2510    2517    2523    2524    2526    2531    2536    2539    2541    2542    2551    2552    2553    2555
                2559    2560    2567    2771    2779
1468    1471    1502    1503    1957    1968    2305    2314    2318    2320    2341
2138
1280    1291    1301    1311    1341    2250    2251    2252
1136    1215    1225    2247
2343    2345    2347
1359    1446    2307
2270    2275    2279    2298    2317    2350    2365
1361    1366
1418    1456    1464    2022    2032    2100    2136    2174    2199
1148    1156    1174    1184    1200    1216    1243    1265    1327    1512    1515    1528    1585    1594    1599
1620    1642    1705    1745    1767    1808    1863    1880    1913    1959    2008    2055    2101    2141    2176
2188    2220    2265    2286    2362    2383    2392    2400    2415    2485    2496    2529    2549    2765
1162    1190    1226    1237    1249    1271    1333    1362    1367    1429    1505    1506    1522    1536    1635
1725    1764    1789    1823    1833    1878    1927    1972    2028    2065    2113    2158    2203    2227    2234
2267    2272    2277    2315    2394    2407    2422    2494    2518    2520    2527    2763    2780
2367    2745    2746    2747    2748    2749    2750    2751    2752
1566    1567    1568    1569    1570    1571    1572    1573    1574    1575    1576    1979    2367
   1     850     851
2785
1579    1983    1987    2367
   1    1098    1104    1110    2367
1102    1106    1112
   1
   1    2367
 803
   1
 656
 803
1090    1091
```

D06


```
ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

*DZLPKE,DZLPKE.SEQ/SOL/CRF:SYM=DDXCZ:SML:MAC.SML/ML,DZLPKE.P11
RUN-TIME: 27 37 4 SECONDS
RUN-TIME RATIO: 196/69=2.8
CORE USED:  33K  (65 PAGES)
```

E06

Spooler runtime 11 Seconds, 48 KCS, 270 disk reads, 4 disk writes, 69 recs

[redacted] Date 01-Dec-76 17:37:43 Monitor IPC-D 602 [680] **END**

0000000001111111112222222223333333334444444445555555556666666667777777