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 AT ANY OTHER TEST USE THE START ADDRESS FROM THE FOLLOWING TABLE:

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

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                                        600         TEST 2  INTERFACE & DATA PATHS TEST
                                                    (ALSO GENERAL PRINT TEST STARTING ADDRESS)

                                        610         TEST 3  CHAR COMPARATOR TEST
                                        614         TEST 4  OVER PRINT TEST
                                        620         TEST 5  SHUTTLE POSITIONING TEST
                                        624         TEST 6  PRINT CONTROL TEST
                                        630         TEST 7  MULTIPLE LINE ADVANCE TEST
                                        634         TEST 8  HIGH SPEED PRINT TEST
                                        640         TEST 9  SINGLE CHAR, ALL COLUMNS
                                        644         TEST 10  DRUM PATTERN CHAR TEST
                                        650         TEST 11  SPURIOUS HAMMER FIRING TESTS
                                                             (LEFT & RIGHT WEDGES)
                                        654         TEST 12  HAMMER ALIGNMENT

                                        700         SCOPE DRIVER ROUTINE
                                        720         SCOPE DRIVER WITHOUT LINE FEEDS

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


4.3  PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF  THE  LINE  PRINTER  DIAGNOSTIC  TEST,  THE
HEADER  MESSAGE  "LP05  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.
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5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

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

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 2) WILL OCCUR IF THE PRINTER READY LINE REMAINS HIGH AT THE INTERFACE ELECTRONICS.

5. READY - AFTER SUCCESSFUL COMPLETION OF STEPS 3 AND 4 THE MESSAGE "ERROR SET OK - TURN ON LINE" WILL BE TYPED. RESTORE PAPER TO THE TRACTORS, CLOSE THE DRUM GATE AND PLACE THE PRINTER IN THE READY-ON LINE STATE. OBSERVE THAT BOTH THE ON-LINE AND READY LIGHTS COME ON ON THE PRINTER CONTROL PANEL.

6. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 4) WILL OCCUR IF THE PRINTER READY LINE DOES NOT GO HIGH AT THE INTERFACE ELECTRONICS.

7. DRUM GATE - AFTER SUCCESSFUL COMPLETION OF STEPS 5 & 6 THE MESSAGE "READY SET OK-TRY, DRUM GATE SWITCH" WILL BE TYPED. OPEN THE PRINTER DRUM GATE AND OBSERVE THAT THE ON-LINE AND READY LIGHTS GO OUT AND THE DRUM GATE ERROR LIGHT GOES ON ON THE PRINTER CONTROL PANEL.

8. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 5) WILL OCCUR IF THE PRINTER READY LINE APPEARS TO REMAIN HIGH AT THE INTERFACE ELECTRONICS.

9. READY - AFTER SUCCESSFUL COMPLETION OF STEPS 7 & 8 THE MESSAGE "ERROR SET OK - TURN ON LINE" WILL BE TYPED.

10. DEPRESS CONTINUE TO COMPLETE THE COMMAND AND REGISTER TESTING ALONG WITH THE INTERRUPT TESTING. IF ANY ERROR CONDITIONS EXIST, ERROR TYPE-OUTS GIVING THE ERROR COUNT WILL BE PRINTED. CHECK THE LISTING FOR DESCRIPTIONS OF THESE ERRORS.

11. SECTION 2 OF TEST 1 WILL BE ENTERED DIRECTLY UPON COMPLETION OF SECTION 1.

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

7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

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

7.2.3 TEST 4 - OVER PRINT TEST

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

```
 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
 928  000220  000222                    .+2
 929  000222  000000                    HALT
 930  000224  000226                    .+2
 931  000226  000000                    HALT
 932  000230  000232                    .+2
 933  000232  000000                    HALT
 934  000234  000236                    .+2
 935  000236  000000                    HALT
 936  000240  000242                    .+2
 937  000242  000000                    HALT
 938  000244  000246                    .+2
 939  000246  000000                    HALT
 940  000250  000252                    .+2
 941  000252  000000                    HALT
 942  000254  000256                    .+2
 943  000256  000000                    HALT
 944  000260  000262                    .+2
 945  000262  000000                    HALT
 946  000264  000266                    .+2
 947  000266  000000                    HALT
 948  000270  000272                    .+2
 949  000272  000000                    HALT
 950  000274  000276                    .+2
 951  000276  000000                    HALT
 952  000300  000302                    .+2
 953  000302  000000                    HALT
 954  000304  000306                    .+2
 955  000306  000000                    HALT
 956  000310  000312                    .+2
 957  000312  000000                    HALT
 958  000314  000316                    .+2
 959  000316  000000                    HALT
 960  000320  000322                    .+2
 961  000322  000000                    HALT
 962  000324  000326                    .+2
 963  000326  000000                    HALT
 964  000330  000332                    .+2
 965  000332  000000                    HALT
 966  000334  000336                    .+2
 967  000336  000000                    HALT
 968  000340  000342                    .+2
 969  000342  000000                    HALT
 970  000344  000346                    .+2
```

```
                                                HALT
                                                .+2
                                                HALT
                                                .+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     DAV2            ;CHANNEL SLEW TEST
```

```
                                                                                ;1 MINUTE PRINT SPEED CHECK
1032  000400  000137  002244                 JMP     SWTIME                   ;START FOR USING SWITCH REG FOR TIMING
1033  000404  000137  002360                 JMP     KW11L                    ;START FOR KW11-L LINE CLOCK
1034  000410  000137  002306                 JMP     KW11P                    ;START FOR KW11-P LINE CLOCK
1035  000414  000137  003034                 JMP     SLEWCK                   ;CHECK TOP OF FORM SWITCH
1036
1037
1038
1039          000600                         .=600
1040
1041  000600  012706  001000                 MOV     #1000,%6                 ;START OF PRINTING TESTS SEQUENCE
1042  000604  000137  004066                 JMP     TEST2                    ;TEST 2
1043  000610  000137  004312                 JMP     TEST3                    ;TEST 3
1044  000614  000137  004650                 JMP     CHRCHK                   ;TEST 4
1045  000620  000137  005114                 JMP     OVRPRT                   ;TEST 5
1046  000624  000137  005374                 JMP     PRTCTL                   ;TEST 6
1047  000630  000137  005656                 JMP     MLF                      ;TEST 7
1048  000634  000137  006054                 JMP     HSPRT                    ;TEST 8
1049  000640  000137  006360                 JMP     SNGCHR                   ;TEST 9
1050  000644  000137  006536                 JMP     ROTATE                   ;TEST 10
1051  000650  000137  007014                 JMP     LFTTR                    ;TEST 11
1052  000654  000137  007512                 JMP     HAMALN                   ;TEST 12
1053
1054
1055          000700                         .=700
1056
1057  000700  012737  014562  014606          MOV     #LSCA,LOSCOP             ;SEND LF AFTER 132 CHARS
1058  000706  000137  014456                 JMP     SCOPE
1059
1060          000720                         .=720
1061
1062  000720  012737  014456  014606          MOV     #SCOPE,LOSCOP            ;NO LF'S SENT IN SCOPE ROUTINE
1063  000726  000137  014456                 JMP     SCOPE                    ;DO SCOPE ROUTINE
1064
1065
1066          001000                         .=1000
1067
1068                                 ;LINE PRINTER HARDWARE REGISTERS
1069
1070  001000  177514                 LPS:    177514                           ;STATUS REGISTER
1071                                                                          ;BIT 15=ERROR
1072                                                                          ;BIT 7=READY
1073                                                                          ;BIT 6=INTERRUPT ENABLE
1074
1075  001002  177516                 LPB:    177516                           ;DATA BUFFER REGISTER
1076                                                                          ;BITS 0-6=7 BIT ASCII CHARACTER BUFFER
1077                                                                          ;BITS 7-15=NOT USED
1078
1079
1080  001004  177570                 SWR:    177570
1081  001006  177570                 DISPLAY:177570
1082  001010  177776                 PSW:    177776
```

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

                                                        ;MACRO FOR SETTING UP ERROR COUNT

                                                        .LIST ME


                                                        ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST

                                                        .LIST ME


                                                        ;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW

                                                        .LIST ME


                                                ;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

001034  000000                                  SEGCNT: 0
001036  000000                                  CHRCNT: 0
001040  000000                                  CHRGEN: 0
001042  000000                                  LINCNT: 0
001044  000000                                  CYCCNT: 0
001046  000000                                  WORK:   0
001050  000000                                  SAVE:   0
001052  000000                                  ERCOUNT:0
001054  000000                                  STRCHR: 0
001056  000000                                  STRCNT: 0
001060  000000                                  LEGCHR: 0
001062  000000                                  NUMCHR: 0


                                                ;ROUTINE TO TEST THE MECH. OPERATION OF THE LP05

001064  004437  010030                          SETUP:  JSR     %4,TYPINT
001070  000005                                          RESET                   ;CLEAR WORLD
001072  013746  000004                                  MOV     4,-(SP)         ;SAVE CURRENT VECTORS
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 2$
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 UP ERROR COUNT 17
1298          000020                          N=N+1
1299  001732  012777  000240  177050          MOV     #240,@PSW       ;SET UP PROCESSOR TO LEVEL 5
1300  001740  052777  000100  177032          BIS     #100,@LPS       ;SET PRINTER INT ENABLE
1301  001746  000240                          NOP                     ;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
```

```
1307  001756  012737  000020  001052  ERR20:  MOV     #20,    ERCOUNT         ;SET UP ERROR COUNT 20
1308          000021                          N=N+1
1309  001764  012777  000200  177016          MOV     #200,@PSW       ;SET PROCESSOR TO LEVEL 4
1310  001772  052777  000100  177000          BIS     #100,@LPS       ;SET PRINTER INT. ENABLE
1311  002000  000240                          NOP                     ;WAIT
1312  002002  042777  000100  176770          BIC     #100,@LPS       ;CLEAR PRINTER INT ENABLE
1313  002010  000137  002026                  JMP     TEST1D          ;PRINTER OK CONTINUE
1314
1315                                  ;INTERRUPT HANDLE FOR TEST1C
1316                                  ;RESTORE STACK AND REPORT ERROR
1317
1318  002014  022626                  INT1C:  CMP     (6)+,(6)+       ;RESTORE STACK
1319  002016  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
1320  002022  000137  001560                  JMP     TEST1C          ;RE-ENTER TEST1C
1321
1322                                  ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
1323                                  ;AT PRIORITY LEVEL 4
1324
1325  002026  012777  002140  176774  TEST1D: MOV     #INT1D,@PTRVEC  ;SET UP INTERRUPT VECTOR
1326  002034  012777  000340  176770          MOV     #340,@PTRPSW    ;LOCK UP PRIORITIES
1327  002042  005777  176732                  TST     @LPS            ;IS THERE A PRINTER ERROR
1328  002046  100006                          BPL     LP4             ;NO! CONTINUE
1329  002050  012737  000021  001052  ERR21:  MOV     #21,    ERCOUNT         ;SET UP ERROR COUNT 21
1330          000022                          N=N+1
1331  002056  004537  010244                  JSR     %5,STAER        ;REPORT PRINTER ERROR
1332  002062  000761                          BR      TEST1D          ;LOOP ON ERROR
1333  002064  105777  176710          LP4:    TSTB    @LPS            ;IS READY SET
1334  002070  100406                          BMI     LP5             ;YES - PRINTER READY
1335  002072  012737  000022  001052  ERR22:  MOV     #22,    ERCOUNT         ;SET UP ERROR COUNT 22
1336          000023                          N=N+1
1337  002100  004537  010244                  JSR     %5,STAER        ;REPORT READY NOT SET
1338  002104  000750                          BR      TEST1D          ;LOOP ON ERROR
1339  002106  012777  000140  176674  LP5:    MOV     #140,@PSW       ;SET PRIORITY TO LEVEL 3
1340  002114  052777  000100  176656          BIS     #100,@LPS       ;SET PRINTER INTERRUPT ENABLE
1341  002122  000240                          NOP                     ;WAIT
1342  002124  012737  000023  001052  ERR23:  MOV     #23,    ERCOUNT         ;SET UP ERROR COUNT 23
1343          000024                          N=N+1
1344  002132  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
1345  002136  000733                          BR      TEST1D          ;LOOP ON ERROR
1346
1347                                  ;INTERRUPT HANDLER FOR TEST1D
1348
1349  002140  022626                  INT1D:  CMP     (6)+,(6)+       ;RESET STACK
1350  002142  042777  000100  176630          BIC     #100,@LPS       ;CLEAR INT.  ENABLE FOR PRINTER
1351  002150  005077  176634                  CLR     @PSW            ;CLEAR PROCESSOR STATUS
1352  002154  012777  012706  176646          MOV     #12706,@PTRVEC  ;RESET INSTRUCTION AT 200
1353  002162  012777  001000  176642          MOV     #1000,@PTRPSW   ;RESET INSTRUCTION AT 202
1354
1355                                  ;1 MINUTE PRINT SPEED CHECK
1356                                  ;IF A KW11-L OR KW11-P ARE NOT AVAILABLE,  THE SR BIT0 IS USED
1357                                  ;FOR MANUAL TIMING OF THE PRINTER.
1358
1359  002170  012737  000002  000006  CLOKAV: MOV     #RTI,@#6        ;SET TRAP TO RETURN
1360  002176  012737  000006  000004          MOV     #6,@#4
1361  002204  000261                          SEC
1362  002206  105777  176614                  TSTB    @LKS            ;KW11-L AVAILABLE?
```

```
1363  002212  103404                          BCS     1$              ;NO,  BRANCH
1364  002214  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1365  002220  000137  002350                  JMP     KW11L           ;USE KW11L FOR TIMING
1366  002224  000261                  1$:     SEC
1367  002226  105777  176572                  TSTB    @PLKS           ;KW11-P AVAILABLE?
1368  002232  103404                          BCS     SWTIME          ;NO,  USE SWITCH REG FOR TIMING
1369  002234  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1370  002240  000137  002306                  JMP     KW11P           ;USE KW11-P FOR TIMING
1371  002244  005037  001042          SWTIME: CLR     LINCNT          ;CLEAR LINE COUNT
1372  002250  004437  010030                  JSR     %4,TYPINT
1373  002254  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1374  002260  104000                          EMT     +0              ;TYPE MESSAGE
1375  002262  010435                          MESC                    ;PRINT SPEED CHECK USING MANUAL TIMING
1376  002264  012737  000002  002622          MOV     #2,DIA          ;SET DUMMY ADDRESS
1377  002272  032777  000001  176504  1$:     BIT     #BIT0,@SWR      ;START?
1378  002300  001774                          BEQ     1$              ;WAIT FOR START
1379  002302  000137  002406                  JMP     STARD           ;START PRINTING
1380
1381
1382                                  ;START FOR KW11-P.....
1383
1384  002306  005037  001042          KW11P:  CLR     LINCNT          ;CLEAR LINE COUNT
1385  002312  004437  010030                  JSR     %4,TYPINT
1386  002316  012706  001000                  MOV     #1000,%6        ;RESET STACK
1387  002322  013777  002616  176472          MOV     MINCNT,@CSBR    ;SET CLOCK COUNT
1388  002330  013737  001024  002622          MOV     PLKS,DIA        ;STORE PLKS ADDRESS
1389  002336  012777  000105  176460          MOV     #105,@PLKS      ;START CLOCK
1390  002344  000137  002406                  JMP     STARD           ;START PRINTING
1391
1392                                  ;START FOR KW11-L.....
1393
1394  002350  005037  001042          KW11L:  CLR     LINCNT          ;CLEAR LINE COUNT
1395  002354  004437  010030                  JSR     %4,TYPINT
1396  002360  012706  001000                  MOV     #1000,%6        ;RESET STACK
1397  002364  013737  002616  002620          MOV     MINCNT,CNTR     ;SET CLOCK COUNT
1398  002372  013737  001026  002622          MOV     LKS,DIA         ;STORE LKS ADDRESS
1399  002400  012777  000100  176420          MOV     #100,@LKS       ;ENABLE CLOCK INTERRUPT
1400
1401                                  ;PRINTING ROUTINE.....
1402
1403  002406  032777  020000  176370  STARD:  BIT     #BIT13,@SWR     ;CHECK CHAR SET
1404  002414  001007                          BNE     STARDA          ;BRANCH IF 96
1405  002416  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHECK
1406  002424  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
1407  002432  000406                          BR      STARDB          ;CONTINUE
1408  002434  012737  000200  001060  STARDA: MOV     #200,LEGCHR     ;LEGAL CHECK
1409  002442  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
1410  002450                          STARDB:
1411  002450  012737  000204  001036          MOV     #132.,CHRCNT    ;SET CHAR COUNT
1412  002456  012737  003014  001054          MOV     #PATTB,STRCHR   ;INITIALIZE TABLE POINTER
1413  002464  012737  000021  001044  STARA:  MOV     #17.,CYCCNT     ;SET GROUP COUNT
1414  002472  017737  176356  001040          MOV     @STRCHR,CHRGEN  ;GET CHAR FROM TABLE
1415  002500  063737  001042  001040          ADD     LINCNT,CHRGEN   ;ADD LINE COUNT
1416  002506  023737  001060  001040  1$:     CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
1417  002514  003004                          BGT     STAR1           ;YES,  BRANCH
1418  002516  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;NO,  MAKE LEGAL
```

```
1419  002524  000770                          BR      1$                      ;RECHECK CHAR
1420  002526  013777  001040  176246  STAR1:  MOV     CHRGEN,@LPB             ;LOAD BUFFER
1421  002534  005337  001036                  DEC     CHRCNT                  ;DECREMENT CHAR COUNT
1422  002540  001410                          BEQ     STARED                  ;BRANCH IF DONE LINE
1423  002542  005337  001044                  DEC     CYCCNT                  ;DECREMENT CYCCLE COUNT
1424  002546  001367                          BNE     STAR1                   ;CONTINUE IF NOT DONE GROUP
1425  002550  062737  000002  001054          ADD     #2,STRCHR               ;ADD 2 TO TABLE POINTER
1426  002556  000137  002464                  JMP     STARA                   ;CONTINUE
1427  002562  005237  001042  STARED: INC     LINCNT                  ;INCREMENT LINE COUNT
1428  002566  012777  000012  176206          MOV     #12,@LPB                ;SEND LF
1429  002574  105777  176200                  TSTB    @LPS                    ;TEST READY
1430  002600  100375                          BPL     .-4                     ;WAIT FOR READY
1431  002602  032777  000001  176174          BIT     #BIT0,@SWR              ;STOP PRINT?
1432  002610  001411                          BEQ     CONVRT                  ;YES,  BRANCH
1433  002612  000137  002406                  JMP     STAR0                   ;CONTINUE
1434
1435  002616  007020          MINCNT: 7020
1436  002620  000000          CNTR:   0
1437  002622  000002          DIA:    2
1438
1439
1440                          ;NOTE -- PLACE 5670 (8)   IN MINCNT FOR 50 HZ. LINE FREQUENCY !!!
1441
1442
1443
1444  002624  005337  002620  LKSRV:  DEC     CNTR                    ;DECREMENT COUNTER
1445  002630  001401                  BEQ     CONVRT                  ;EXIT IF 1 MINUTE
1446  002632  000002                  RTI                             ;RETURN
1447
1448
1449                          ;ROUNTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE
1450
1451  002634  042777  000100  177760  CONVRT: BIC     #100,@DIA               ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
1452  002642  005037  010160          CLR     TYPDAT          ;CLEAR DIGIT COUNT
1453  002646  012703  011450          MOV     #MES12,%3               ;SET MESSAGE POINTER
1454  002652  022737  000144  001042  1$:     CMP     #100.,LINCNT            ;GREATER THAN 100?
1455  002660  003006                  BGT     2$                      ;NO,  PRINT HUNDRED'S DIGIT
1456  002662  162737  000144  001042          SUB     #100.,LINCNT            ;YES,  SUBTRACT 100
1457  002670  005237  010160                  INC     TYPDAT                  ;INCREMENT HUNDRED'S DIGIT
1458  002674  000766                          BR      1$                      ;CONTINUE CONVERSION
1459  002676  062737  000060  010160  2$:     ADD     #60,TYPDAT              ;MAKE ASCII
1460  002704  113723  010160                  MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1461  002710  005037  010160                  CLR     TYPDAT                  ;CLEAR DIGIT COUNTER
1462  002714  022737  000012  001042  3$:     CMP     #10.,LINCNT             ;GREATER THEN 10?
1463  002722  003006                  BGT     4$                      ;NO,  PRINT DIGIT
1464  002724  162737  000012  001042          SUB     #10.,LINCNT             ;YES,  SUBTRACT 10
1465  002732  005237  010160                  INC     TYPDAT                  ;INCREMENT TEN'S DIGIT
1466  002736  000766                          BR      3$                      ;CONTINUE CONVERSION
1467  002740  062737  000060  010160  4$:     ADD     #60,TYPDAT              ;MAKE ASCII
1468  002746  113723  010160                  MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1469  002752  013737  001042  010160          MOV     LINCNT,TYPDAT           ;GET ONE'S DIGIT
1470  002760  062737  000060  010160          ADD     #60,TYPDAT              ;MAKE ASCII
1471  002766  113723  010160                  MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1472  002772  104000                          EMT     +0                      ;TYPE MESSAGE
1473  002774  011412                          MES11
1474  002776  012737  011410  010026          MOV     #MES11A,PRTMSG          ;SET PRINTER MESSAGE ADDRESS
```

```
 1475  003004  004437  010010                  JSR     %4,RINT         ;PRINT PRINTER SPEED ON LINE PRINTER
 1476  003010  000137  003034                  JMP     SLEWCK          ;NEXT TEST
 1477
 1478
 1479
 1480  003014  000040                  PATTB:  40
 1481  003016  000117                          117
 1482  003020  000076                          76
 1483  003022  000055                          55
 1484  003024  000134                          134
 1485  003026  000113                          113
 1486  003030  000072                          72
 1487  003032  000051                          51
 1488
 1489                                  ;CHECK TOP OF FORM SWITCH
 1490
 1491  003034  004437  010030          SLEWCK: JSR     %4,TYPINT
 1492  003040  004537  007704                  JSR     %5,PRTINT       ;INITIALIZE PRINTER
 1493  003044  000406                          BR      SLW             ;BRANCH IF OK
 1494  003046  012737  000024  001052  ERR24:  MOV     #24,    ERCOUNT         ;SET UP ERROR COUNT 24
 1495          000025                          N=N+1
 1496  003054  004537  010244                  JSR     %5,STAER        ;REPORT PRINTER NOT READY
 1497  003060  000000                          HALT                    ;HALT ON ERROR
 1498  003062  012737  003276  001042  SLW:    MOV     #FFTAB,LINCNT   ;LINE COUNT FOR SWITCH SETTING
 1499  003070  012704  003354                  MOV     #FFSET,%4       ;INIT SWITCH SETTING TABLE POINTER
 1500  003074  012703  011164          SLWO:   MOV     #MES8,%3        ;INIT MESSAGE POINTER
 1501  003100  012702  011277                  MOV     #MES10,%2       ;  "       "       "
 1502  003104  111413                  SLW1:   MOVB    (%4),(%3)       ;PUT SWITCH SETTINGS INTO MESSAGES
 1503  003106  111412                          MOVB    (%4),(%2)       ;  "       "       "    "    "
 1504  003110  122423                          CMPB    (%4)+,(%3)+     ;INCREMENT POINTERS
 1505  003112  105722                          TSTB    (%2)+
 1506  003114  105714                          TSTB    (%4)            ;DONE MOVING SWITCH SETTINGS TO MSG'S?
 1507  003116  001372                          BNE     SLW1            ;BRANCH IF NOT DONE
 1508  003120  005204                          INC     %4              ;TABLE POINTER SET FOR NEXT SWITCH SETTING
 1509  003122  104000                          EMT     +0              ;TYPE MESSAGE
 1510  003124  011130                          MES7                    ;SET TOP OF FORM SWITCH TO ---
 1511  003126  000000                          HALT                    ;WAIT FOR OPERATOR TO SET SWITCH
 1512  003130  005777  175706          SLW11:  TST     @LINCNT         ;CHECK LINE COUNT
 1513  003134  001003                          BNE     SLW1A           ;BRANCH IF NOT ZERO
 1514  003136  012737  011477  010026          MOV     #MES13,PRTMSG   ;CHANGE PRINTER MESSAGE
 1515  003144  005777  175630          SLW1A:  TST     @LPS            ;TEST FOR ERRORS
 1516  003150  100006                          BPL     SLW2            ;BRANCH IF NO ERROR
 1517  003152  012737  000025  001052  ERR25:  MOV     #25,    ERCOUNT         ;SET UP ERROR COUNT 25
 1518          000026                          N=N+1
 1519  003160  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
 1520  003164  000000                          HALT                    ;HALT ON ERROR
 1521  003166  012777  000014  175606  SLW2:   MOV     #14,@LPB        ;SEND FF
 1522  003174  105777  175600                  TSTB    @LPS            ;TEST READY
 1523  003200  100375                          BPL     .-4             ;WAIT FOR READY
 1524  003202  004437  010010                  JSR     %4,RINT         ;PRINT MESSAGE ON LINE PRINTER
 1525  003206  062737  000002  001042          ADD     #2,LINCNT       ;NEXT LINE COUNT
 1526  003214  022737  003352  001042          CMP     #FTABE,LINCNT   ;DONE TEST?
 1527  003222  001410                          BEQ     DAVAV           ;YES,  EXIT
 1528  003224  005777  175612                  TST     @LINCNT         ;DONE CHECK OF THIS SWITCH SETTING?
 1529  003230  001721                          BEQ     SLWO            ;YES,  NEXT SWITCH SETTING
 1530  003232  012737  011202  010026          MOV     #MES9,PRTMSG    ;NO,  CHECK THIS SETTING
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1531   003240   000137   003130                      JMP     SLW11           ;CONTINUE
1532   003244   013737   012412   011164  DAVAV:     MOV     TNO13,MES8      ;SET MESSAGE
1533   003252   104000                               EMT     +0              ;TYPE MESSAGE
1534   003254   011126                               MES7A                   ;RESET TOP OF FORM SWITCH
1535   003256   000000                               HALT                    ;WAIT FOR OPERATOR
1536   003260   032777   040000   175516             BIT     #BIT14,@SWR     ;DAVFU AVAILABLE?
1537   003266   001060                               BNE     INDAT           ;YES,  DO DAVFU TESTS
1538   003270   000000                               HALT                    ;DONE OPERATOR TESTS  -  HALT
1539   003272   000137   004066                      JMP     TEST2           ;DEPRESS CONTINUE TO START PRINTING TESTS
1540
1541   003276   000000                     FFTAB:    0                       ;LOOP COUNTS FOR SLEW CHECKS
1542   003300   000022                               18.
1543   003302   000000                               0
1544   003304   000025                               21.
1545   003306   000000                               0
1546   003310   000030                               24.
1547   003312   000000                               0
1548   003314   000041                               33.
1549   003316   000000                               0
1550   003320   000044                               36.
1551   003322   000000                               0
1552   003324   000052                               42.
1553   003326   000000                               0
1554   003330   000060                               48.
1555   003332   000000                               0
1556   003334   000063                               51.
1557   003336   000000                               0
1558   003340   000102                               66.
1559   003342   000000                               0
1560   003344   000110                               72.
1561   003346   000000                               0
1562   003350   000124                               84.
1563   003352   000000                     FTABE:    0
1564
1565
1566   003354   020063   000040            FFSET:    .ASCIZ  /3   /          ;SWITCH SETTINGS FOR MESSAGES
1567   003360   027063   000065                      .ASCIZ  /3.5/
1568   003364   020064   000040                      .ASCIZ  /4   /
1569   003370   027065   000065                      .ASCIZ  /5.5/
1570   003374   020066   000040                      .ASCIZ  /6   /
1571   003400   020067   000040                      .ASCIZ  /7   /
1572   003404   020070   000040                      .ASCIZ  /8   /
1573   003410   027070   000065                      .ASCIZ  /8.5/
1574   003414   030461   000040                      .ASCIZ  /11  /
1575   003420   031061   000040                      .ASCIZ  /12  /
1576   003424   032061   000040                      .ASCIZ  /14  /
1577
1578
1579                                                 .EVEN
1580
1581                                     ;CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1582
1583   003430   004437   010030            INDAT:    JSR     %4,TYPINT
1584   003434   012737   003564   001040             MOV     #INDATT,CHRGEN  ;SET TABLE POINTER
1585   003442   005777   175332            INDO:     TST     @LPS            ;TEST FOR ERROR
1586   003446   100010                               BPL     INDATO          ;BRANCH IF NO ERROR
```

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1587  003450  012737  000026  001052  ERR26:  MOV     #26,    ERCOUNT         ;SET UP ERROR COUNT 26
1588          000027                  N=N+1
1589  003456  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1590  003462  000000                  HALT                    ;HALT ON ERROR
1591  003464  000137  003430                  JMP     INDAT           ;RESTART TEST
1592  003470  017777  175344  175304  INDATO: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1593  003476  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
1594  003504  005777  175330                  TST     @CHRGEN         ;TEST CHAR
1595  003510  001405                  BEQ     IND1            ;CONTINUE IF DONE
1596  003512  105777  175262                  TSTB    @LPS            ;TEST READY
1597  003516  100375                  BPL     .-4             ;WAIT FOR READY
1598  003520  000137  003442                  JMP     INDO
1599  003524  005777  175250          IND1:   TST     @LPS            ;TEST FOR ERROR SET.
1600  003530  100410                  BMI     INDAT1          ;BRANCH IF ERROR SET
1601  003532  012737  000027  001052  ERR27:  MOV     #27,    ERCOUNT         ;SET UP ERROR COUNT 27
1602          000030                  N=N+1
1603  003540  004537  010244                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1604  003544  000000                  HALT                    ;HALT ON ERROR
1605  003546  000137  003430                  JMP     INDAT           ;RESTART TEST
1606  003552  104000          INDAT1: EMT     +0              ;TYPE MESSAGE
1607  003554  010315                  MESA                    ;ERROR SET OK - CLEAR & TURN ON LINE
1608  003556  000000                  HALT                    ;WAIT FOR OPERATOR
1609                                                          ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1610  003560  000137  003600                  JMP     NODAT           ;NEXT TEST
1611
1612  003564  000356          INDATT: 356                     ;DATA TABLE FOR ABOVE TEST
1613  003566  000001                  1
1614  003570  000002                  2
1615  003572  000003                  3
1616  003574  000357                  357
1617  003576  000000                  0
1618
1619                          ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
1620
1621  003600  004437  010030  NODAT:  JSR     %4,TYPINT
1622  003604  012737  000200  001054          MOV     #200,STRCHR     ;SET PAPER INSTRUCTION
1623  003612  012737  004006  001040  NODOA:  MOV     #NODAT3,CHRGEN  ;SET TABLE POINTER FOR LOAD
1624  003620  005777  175154          NODO:   TST     @LPS            ;TEST FOR ERROR
1625  003624  100007                  BPL     NODATO          ;BRANCH IF NO ERROR
1626  003626  012737  000030  001052  ERR30:  MOV     #30,    ERCOUNT         ;SET UP ERROR COUNT 30
1627          000031                  N=N+1
1628  003634  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
1629  003640  000000                  HALT                    ;HALT ON ERROR
1630  003642  000756                  BR      NODAT           ;RESTART TEST
1631  003644  017777  175170  175130  NODATO: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1632  003652  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
1633  003660  022737  004066  001040          CMP     #NODAT4+2,CHRGEN        ;DONE LOAD?
1634  003666  001405                  BEQ     NODATA          ;BRANCH IF DONE
1635  003670  105777  175104                  TSTB    @LPS            ;TEST READY
1636  003674  100375                  BPL     .-4             ;WAIT FOR READY
1637  003676  000137  003620                  JMP     NODO
1638  003702  013777  001054  175072  NODATA: MOV     STRCHR,@LPB     ;SEND DATA
1639  003710  005037  001036                  CLR     CHRCNT          ;DELAY
1640  003714  005237  001036          1$:     INC     CHRCNT
1641  003720  001375                  BNE     1$
1642  003722  005777  175052                  TST     @LPS            ;TEST FOR ERROR SET
```

```
                                                BMI     NODAT1          ;BRANCH IF ERROR SET
003726  100410
003730  012737  000031  001052  ERR31:        MOV     #31,    ERCOUNT ;SET UP ERROR COUNT 31
        000032                                N=N+1
003736  004537  010244                        JSR     %5,STAER        ;REPORT ERROR NOT SET
003742  000000                                HALT                    ;HALT ON ERROR
003744  000137  003612                        JMP     NODOA           ;RETEST
003750  005237  001054          NODAT1:       INC     STRCHR          ;NEXT PAPER INSTRUCTION
003754  022737  000214  001054                CMP     #214,STRCHR     ;DONE TEST?
003762  001404                                BEQ     NODAT2          ;CONTINUE IF NOT DONE
003764  104000                                EMT     +0              ;TYPE MESSAGE
003766  010362                                MESB                    ;ERROR SET OK - CLEAR & TRY NEXT CHANNEL
003770  000000                                HALT                    ;WAIT FOR OPERATOR
003772  000707                                BR      NODOA           ;RELOAD & TEST NEXT CHANNEL
003774  104000          NODAT2:               EMT     +0              ;TYPE MESSAGE
003776  010315                                MESA                    ;ERROR SET OK - TURN ON LINE
004000  000000                                HALT
004002  000137  004066                        JMP     TEST2           ;JUMP

004006  000356          NODAT3:               356                     ;START LOAD
004010  000000                                0
004012  000000                                0
004014  000000                                0
004016  000000                                0
004020  000000                                0
004022  000000                                0
004024  000000                                0
004026  000000                                0
004030  000000                                0
004032  000000                                0
004034  000000                                0
004036  000000                                0
004040  000000                                0
004042  000000                                0
004044  000000                                0
004046  000000                                0
004050  000000                                0
004052  000000                                0
004054  000000                                0
004056  000000                                0
004060  000000                                0
004062  000000                                0
004064  000357          NODAT4:               357                     ;STOP LOAD


                        ;TEST 2
                        ;TESTS INTERFACE AND PRINTER DATA PATHS
                        ;WITH ALTERNATING ONES AND ZEROS

004066  004437  010030  TEST2:                JSR     %4,TYPINT
004072  004537  007704                        JSR     %5,PRTINT       ;INITIALIZE PRINTER
004076  000406                                BR      TST2AX          ;BRANCH IF OK
004100  012737  000032  001052  ERR32:        MOV     #32,    ERCOUNT ;SET UP ERROR COUNT 32
        000033                                N=N+1
004106  004537  010244                        JSR     %5,STAER        ;REPORT PRINTER NOT READY
004112  000000                                HALT                    ;HALT ON ERROR
004114                          TST2AX:
```

```
1699  004114  013737  012370  011724          MOV     TNO2,MES15              ;SET TEST NUMBER FOR MESSAGE
1700  004122  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1701          000003                          M=M+1
1702  004126  012737  177740  001044          MOV     #-32.,CYCCNT    ;SET UP LINE COUNT FOR 32 LINES
1703  004134  012737  177574  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT TO 132
1704  004142  013737  004216  001054          MOV     SCHRSW,STRCHR   ;SET CHAR. SWITCH TO U
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 U
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
```

```
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  000741                          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
```

```
1811                000037                                  N=N+1
1812    004732      004537  010244                          JSR     %5,STAER        ;REPORT ERROR SET
1813    004736      000000                                  HALT                    ;HALT ON ERROR
1814    004740      000177  174110          CR1:            JMP     @STRCHR         ;OPPOSITE CHAR
1815    004744      013737  005044  001054  CR2:            MOV     CHRE,STRCHR     ;SET CHAR SWITCH TO SPACE
1816    004752      012737  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                                        ;TEST 5
1845                                        ;SHUTTLE POSITIONING TEST
1846                                        ;SENDS PAIRS OF E'S.  THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER
1847                                        ;PAIR OF E'S TO THE LINE ---  THIS IS REPEATED UNTIL A FULL LINE OF E'S
1848                                        ;HAVE BEEN PRINTED,  THEN A FULL LINE OF M'S ARE PRINTED.
1849
1850    005114      004437  010030          OVRPRT:         JSR     %4,TYPINT
1851    005120      013737  012376  011724                  MOV     TN05,MES15              ;SET TEST NUMBER FOR MESSAGE
1852    005126      004437  007760                          JSR     %4,PRNNT                ;PRINT TEST NUMBER
1853                000006                                  M=M+1
1854    005132      012737  177760  001042                  MOV     #-16.,LINCNT    ;SET LINE COUNT FOR 16 LINES
1855    005140      012737  177574  001036  OVR:            MOV     #-132.,CHRCNT   ;SET CHAR COUNT
1856    005146      012737  177776  001044  OVR0:           MOV     #-2,CYCCNT      ;SET CYCLE COUNT FOR A PAIR OF E'S
1857    005154      013737  001036  001056                  MOV     CHRCNT,STRCNT   ;NO.  CHARS LEFT TO PRINT
1858    005162      062737  000205  001056                  ADD     #133.,STRCNT    ;NO.  SPACES +1
1859    005170      012737  000040  001040                  MOV     #40,CHRGEN      ;SEND SPACE
1860    005176      000406                                  BR      OVR2            ;BRANCH
1861    005200      012737  000105  001040  OVR4:           MOV     #105,CHRGEN     ;SEND E
1862    005206      013777  001040  173566  OVR1:           MOV     CHRGEN,@LPB     ;LOAD BUFFER
1863    005214      005777  173560          OVR2:           TST     @LPS            ;TEST FOR ERROR
1864    005220      100006                                  BPL     OVR3            ;BRANCH IF NO ERROR
1865    005222      012737  000037  001052  ERR37:          MOV     #37,    ERCOUNT         ;SET UP ERROR COUNT 37
1866                000040                                  N=N+1
```

```
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     PRTD            ;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     PRTD            ;CONTINUE
 1941  005634  012737  000040  001054  PRT7:     MOV     #40,STRCHR      ;SET START CHAR TO SPACE
 1942  005642  000137  005420                    JMP     PRTD            ;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     TN07,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          MLFD:   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     MLFD            ;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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1977  006024  000726                          BR      MLFA            ;CONTINUE
1978
1979  006026  033462  033062  033463  TABSTR: .ASCIZ  /27263746354C/
1980  006034  033064  032463  030064
1981  006042      000
1982
1983          006044                          .EVEN
1984
1985  006044  032777  010000  172732  MLF4:   BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
1986  006052  001301                          BNE     MLF             ;LOOP
1987                                          .EVEN
1988
1989                                  ;TEST 8
1990                                  ;HIGH SPEED PRINT TEST
1991
1992  006054  004437  010030          HSPRT:  JSR     %4,TYPINT
1993  006060  013737  012404  011724          MOV     TN010,MES15             ;SET TEST NUMBER FOR MESSAGE
1994  006066  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1995          000011                          M=M+1
1996  006072  032777  020000  172704          BIT     #BIT13,@SWR     ;CHECK CHAR SET
1997  006100  001007                          BNE     HS00A           ;BRANCH IF 96 CHAR SET
1998  006102  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHK
1999  006110  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
2000  006116  000406                          BR      HS00            ;CONTINUE
2001  006120  012737  000200  001060  HS00A:  MOV     #200,LEGCHR     ;LEGAL CHECK
2002  006126  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
2003  006134  012737  000040  001054  HS00:   MOV     #40,STRCHR      ;SET UP FIRST LINE
2004  006142  012737  000177  001042          MOV     #127.,LINCNT    ;SET LINE COUNT FOR 2 PAGES
2005  006150  012737  177574  001036  HS0:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2006  006156  012737  177757  001044          MOV     #-17.,CYCCNT    ;SET GROUP COUNT
2007  006164  013737  001054  001040          MOV     STRCHR,CHRGEN   ;STORE START CHAR
2008  006172  005777  172604          HS1:    TST     @LPB            ;TEST FOR ERROR
2009  006176  100006                          BPL     HS2             ;BRANCH IF NO ERROR
2010  006200  012737  000042  001052  ERR42:  MOV     #42,    ERCOUNT         ;SET UP ERROR COUNT 42
2011          000043                          N=N+1
2012  006206  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
2013  006212  000000                          HALT                    ;HALT ON ERROR
2014  006214  013777  001040  172560  HS2:    MOV     CHRGEN,@LPB     ;LOAD BUFFER
2015  006222  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
2016  006226  001424                          BEQ     HS4             ;BRANCH IF DONE LINE
2017  006230  005237  001040                  INC     CHRGEN          ;NEXT CHAR
2018  006234  005237  001044                  INC     CYCCNT          ;INCREMENT GROUP COUNT
2019  006240  001410                          BEQ     HS3             ;BRANCH IF DONE GROUP
2020  006242  023737  001060  001040          CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
2021  006250  001350                          BNE     HS1             ;BRANCH AND.CONTINUE IF LEGAL CHAR
2022  006252  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;MAKE LEGAL
2023  006260  000744                          BR      HS1             ;CONTINUE
2024  006262  013737  001054  001040  HS3:    MOV     STRCHR,CHRGEN   ;GET FIRST CHAR IN GROUP
2025  006270  012737  177757  001044          MOV     #-17.,CYCCNT    ;RESET CYCLE COUNT
2026  006276  000735                          BR      HS1             ;CONTINUE
2027  006300  012777  000012  172474  HS4:    MOV     #12,@LPB        ;SEND LF
2028  006306  105777  172466                  TSTB    @LPS            ;TEST READY
2029  006312  100375                          BPL     .-4             ;WAIT FOR READY
2030  006314  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
2031  006320  002413                          BLT     HS6             ;EXIT TEST IF DONE
2032  006322  162737  000004  001054          SUB     #4,STRCHR       ;SKIP 4 LINES ON DRUM, FIND START CHAR
```

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2033  006330  022737  000040  001054          CMP     #40,STRCHR      ;START CHAR A LEGAL CHAR?
2034  006336  003704                          BLE     HS0             ;CONTINUE IF LEGAL START CHAR
2035  006340  062737  000100  001054          ADD     #100,STRCHR     ;MAKE LEGAL AND CONTINUE
2036  006346  000700                          BR      HS0             ;CONTINUE
2037  006350  032777  010000  172426  HS6:    BIT     #BIT12,@SWR     ;LOOP ON TEST?
2038  006356  001236                          BNE     HSPRT           ;LOOP
2039
2040                                  ;TEST 9
2041                                  ;WORST CASE NOISE TEST
2042                                  ;SINGLE CHAR. ACROSS ALL COLS.
2043
2044  006360  004437  010030          SNGCHR: JSR     %4,TYPINT
2045  006364  013737  012406  011724          MOV     TNO11,MES15             ;SET TEST NUMBER FOR MESSAGE
2046  006372  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
2047          000012                          M=M+1
2048  006376  032777  020000  172400          BIT     #BIT13,@SWR     ;TEST CHAR SET
2049  006404  001404                          BEQ     S2              ;BRANCH IF 64
2050  006406  012737  177640  001042          MOV     #-96.,LINCNT    ;96 CHAR.
2051  006414  000403                          BR      .+10            ;BRANCH
2052  006416  012737  177700  001042  S2:     MOV     #-64.,LINCNT    ;64 CHAR.
2053  006424  012737  000040  001040          MOV     #40,CHRGEN      ;SET UP SPACE
2054  006432  012737  177574  001036  S2A:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT FOR 132
2055  006440  005777  172334          S1:     TST     @LPS            ;TEST FOR ERRORS
2056  006444  100006                          BPL     XS1X            ;BRANCH IF NO ERRORS
2057  006446  012737  000043  001052  ERR43:  MOV     #43,    ERCOUNT         ;SET UP ERROR COUNT 43
2058          000044                          N=N+1
2059  006454  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
2060  006460  000000                          HALT                    ;HALT ON ERROR
2061  006462  013777  001040  172312  XS1X:   MOV     CHRGEN,@LPB     ;LOAD PRINTER BUFFER
2062  006470  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
2063  006474  001361                          BNE     S1              ;CONTINUE IF NOT DONE LINE
2064  006476  012777  000012  172276  S4X2:   MOV     #12,@LPB        ;ISSUE LINE FEED
2065  006504  105777  172270                  TSTB    @LPS            ;TEST READY
2066  006510  100375                          BPL     .-4             ;WAIT FOR READY
2067  006512  005237  001040                  INC     CHRGEN          ;+1 CHAR.
2068  006516  005237  001042                  INC     LINCNT          ;+1 LINE COUNT
2069  006522  002743                          BLT     S2A             ;CONTINUE IF NOT DONE
2070  006524  001764                          BEQ     S4X2            ;SEND BLANK LINE AT END OF TEST
2071  006526  032777  010000  172250  LPS7:   BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
2072  006534  001311                          BNE     SNGCHR          ;LOOP ON TEST
2073
2074
2075
2076                                  ;TEST 10
2077                                  ;DRUM PATTERN CHARACTER TEST
2078
2079  006536  004437  010030          ROTATE: JSR     %4,TYPINT
2080  006542  013737  012410  011724          MOV     TNO12,MES15             ;SET TEST NUMBER FOR MESSAGE
2081  006550  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
2082          000013                          M=M+1
2083  006554  032777  020000  172222          BIT     #BIT13,@SWR     ;TEST CHAR SET
2084  006562  001012                          BNE     ROT0            ;SKIP IF 96 CHAR
2085  006564  012737  000137  001042          MOV     #137,LINCNT     ;LAST CHAR
2086  006572  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHK
2087  006600  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
2088  006606  000411                          BR      ROT1            ;CONTINUE
```

```
2089  006610  012737  000177  001042  ROT0:   MOV     #177,LINCNT     ;LAST CHAR
2090  006616  012737  000200  001060          MOV     #200,LEGCHR     ;LEGAL CHK
2091  006624  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
2092  006632  005037  001044          ROT1:   CLR     CYCCNT          ;CLEAR CYCLE COUNT
2093  006636  005237  001044          ROT2:   INC     CYCCNT          ;INC CYCLE COUNT
2094  006642  005037  001040                  CLR     CHRGEN          ;CLEAR POINTER
2095  006646  005237  001040          ROT3:   INC     CHRGEN          ;INC POINTER
2096  006652  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE POINTER
2097  006660  063737  001042  001054          ADD     LINCNT,STRCHR   ;FIND CHAR
2098  006666  023737  001054  001060          CMP     STRCHR,LEGCHR   ;LEGAL?
2099  006674  002403                          BLT     ROT4            ;BRANCH IF LEGAL
2100  006676  163737  001062  001054          SUB     NUMCHR,STRCHR   ;MAKE LEGAL
2101  006704  005777  172070          ROT4:   TST     @LPS            ;TEST FOR ERRORS
2102  006710  100006                          BPL     ROT5            ;BRANCH IF NO ERRORS
2103  006712  012737  000044  001052  ERR44:  MOV     #44,    ERCOUNT         ;SET UP ERROR COUNT 44
2104          000045                  N=N+1
2105  006720  004537  010244                  JSR     %5,STAER        ;REPORT ERROR
2106  006724  000000                          HALT                    ;HALT ON ERROR
2107  006726  013777  001054  172046  ROT5:   MOV     STRCHR,@LPB     ;LOAD BUFFER
2108  006734  023727  001040  000021          CMP     CHRGEN,#17.     ;DONE GROUP?
2109  006742  001341                          BNE     ROT3            ;NO GET NEXT CHAR
2110  006744  023727  001044  000010          CMP     CYCCNT,#8.      ;DONE LINE?
2111  006752  001331                          BNE     ROT2            ;NO, NEXT GROUP
2112  006754  012777  000012  172020          MOV     #12,@LPB        ;YES, SEND LF
2113  006762  105777  172012                  TSTB    @LPS            ;TEST READY
2114  006766  100375                          BPL     .-4             ;WAIT FOR READY
2115  006770  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
2116  006774  023727  001042  000037          CMP     LINCNT,#37      ;DONE?
2117  007002  003313                          BGT     ROT1            ;NO, NEXT LINE
2118  007004  032777  010000  171772          BIT     #BIT12,@SWR     ;LOOP ON TEST?
2119  007012  001251                          BNE     ROTATE          ;LOOP
2120
2121                                  ;TEST 11 ----- SPURIOUS HAMMER FIRING TEST
2122                                  ;LEFT AND RIGHT TRIANGLES
2123
2124                                  ; STARTING WITH A LEFT TRIANGLE
2125
2126  007014  004437  010030          LFTTR:  JSR     %4,TYPINT
2127  007020  013737  012412  011724          MOV     TNO13,MES15             ;SET TEST NUMBER FOR MESSAGE
2128  007026  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
2129          000014                  M=M+1
2130  007032  012737  000204  001042  LFT:    MOV     #132.,LINCNT    ;SET LINE COUNT
2131  007040  013737  001042  001036  LFT0:   MOV     LINCNT,CHRCNT   ;STORE CHAR COUNT
2132  007046  012737  177757  001044          MOV     #-17.,CYCCNT    ;SET GROUP COUNT
2133  007054  013737  001036  001040          MOV     CHRCNT,CHRGEN   ;FIND FIRST CHAR ON LINE...
2134  007062  022737  000022  001040  LFT1:   CMP     #18.,CHRGEN     ;MORE THAN 17 CHARS?
2135  007070  003004                          BGT     LFT2            ;BRANCH IF LESS THAN 17
2136  007072  162737  000021  001040          SUB     #17.,CHRGEN     ;SUBTRACT 17, IF > 17
2137  007100  000770                          BR      LFT1            ;CONTINUE
2138  007102  005437  001040          LFT2:   NEG     CHRGEN          ;NEGATE CHRGEN
2139  007106  062737  000100  001040          ADD     #100,CHRGEN     ;START CHAR IN CHRGEN
2140  007114  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE STARTING CHAR
2141  007122  005777  171652          LFT3:   TST     @LPS            ;TEST FOR ERROR
2142  007126  100006                          BPL     LFT4            ;CONTINUE IF NO ERROR
2143  007130  012737  000045  001052  ERR45:  MOV     #45,    ERCOUNT         ;SET UP ERROR COUNT 45
2144          000046                  N=N+1
```

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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                                  ;TEST 12
2212                                  ;HAMMER ALIGMENT
2213
2214  007512  004437  010030          HAMALN: JSR     %4,TYPINT
2215  007516  013737  012414  011724          MOV     TN014,MES15             ;SET TEST NUMBER FOR MESSAGE
2216  007524  004437  007760                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
2217          000015                          M=M+1
2218  007530  012737  177701  001042          MOV     #-63.,LINCNT    ;SET UP FOR 63 LINES
2219  007536  012737  177574  001036  HAM1X:  MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2220  007544  005777  171230          HAM2:   TST     @LPS            ;CHECK FOR ERROR
2221  007550  100006                          BPL     XHAM1           ;BRANCH IF NO ERROR
2222  007552  012737  000050  001052  ERR50:  MOV     #50,    ERCOUNT         ;SET UP ERROR COUNT 50
2223          000051                          N=N+1
2224  007560  004537  010244                  JSR     %5,STAER        ;REPORT ERROR OCCURRED
2225  007564  000000                          HALT                    ;HALT ON ERROR
2226  007566                          XHAM1:
2227  007566  105777  171206                  TSTB    @LPS            ;TEST READY
2228  007572  100375                          BPL     .-4             ;WAIT FOR READY
2229  007574  100375                          BPL     .-4             ;WAIT FOR READY
2230  007576  012777  000105  171176  XHAM1X: MOV     #105,@LPB       ;TRANSMIT E TO PRINTER
2231  007604  005237  001036                  INC     CHRCNT          ;+1 CHAR COUNT
2232  007610  001355                          BNE     HAM2            ;TRANSMIT ANOTHER CHAR.
2233  007612  012777  000012  171162          MOV     #12,@LPB        ;TRANSMIT LINE FEED
2234  007620  105777  171154                  TSTB    @LPS            ;TEST READY
2235  007624  100375                          BPL     .-4             ;WAIT FOR READY
2236  007626  005237  001042                  INC     LINCNT          ;+1 TO COUNT
2237  007632  001341                          BNE     HAM1X           ;GO DO NEXT LINE
2238  007634  032777  010000  171142          BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
2239  007642  001323                          BNE     HAMALN          ;LOOP ON TEST
2240
2241  007644  032777  040000  171132          BIT     #BIT14,@SWR     ;DAVFU AVAILABLE?
2242  007652  001402                          BEQ     HAMX            ;NO,  RECYCLE PRINTING TESTS
2243  007654  000137  012424                  JMP     DAVFU           ;YES,  DO DAVFU PRINTING TESTS
2244  007660                          HAMX:
2245  007660  013700  000042                  MOV     @#42,R0
2246  007664  001405                          BEQ     DOAGN
2247  007666  000005                          RESET
2248  007670                          LOGICAL:
2249  007670  004710                          JSR     PC,(R0)
2250  007672  000240                          NOP
2251  007674  000240                          NOP
2252  007676  000240                          NOP
2253  007700                          DOAGN:
2254  007700  000137  004066                  JMP     TEST2           ;RESTART
2255
2256                                  ;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

007760  012737  011706  010026  PRNNT:  MOV     #MES14,PRTMSG   ;PRINT TEST NUMBER
007766  005777  171006                  TST     @LPS            ;TEST FOR ERROR
007772  100006                          BPL     RINT            ;BRANCH IF OK
007774  012737  000051  001052  ERR51:  MOV     #51,    ERCOUNT         ;SET UP ERROR COUNT 51
        000052                          N=N+1
010002  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
010006  000000                          HALT                    ;HALT ON ERROR
010010  013737  001000  001016  RINT:   MOV     LPS,TPS ;SET VECTORS -
010016  013737  001002  001012          MOV     LPB,TPB ;TO PRINT ON LINE PRINTER
010024  104000                          EMT     +0              ;PRINT
010026  011706                  PRTMSG: MES14                   ;MESSAGE
010030  012737  177564  001016  TYPINT: MOV     #177564,TPS     ;RESET VECTORS
010036  012737  177566  001012          MOV     #177566,TPB     ;FOR TTY
010044  000204                          RTS     %4              ;RETURN


                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER

010046  011600                  TYP:    MOV     @%6,%0          ;GET ADDR. THAT CONTAINS MESS.
010050  062716  000002                  ADD     #2,@%6          ;SET UP EXIT
010054  011000                          MOV     @%0,%0          ;ADDRESS OF MESSAGE IN R0
010056  112037  010160          TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
010062  001001                          BNE     TYPC            ;BRANCH IF NOT DONE
010064  000002                          RTI                     ;EXIT
010066  122737  000045  010160  TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR "%"
010074  001416                          BEQ     TYPF            ;BRANCH IF "%"
010076  122737  000043  010160          CMPB    #43,TYPDAT      ;CHECK FOR "#"
010104  001417                          BEQ     TYPG            ;BRANCH IF "#"
010106  004737  010114                  JSR     %7,TYPD         ;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          TYPDD: 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  MESA:   .ASCIZ  /ERROR SET OK - CLEAR & TURN ON LINE%/
010362  051105  047522  020122  MESB:   .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 0 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     #TNO1,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                  TSTB    @LPS            ;TEST READY
 2423  012734  100375                          BPL     .-4             ;WAIT FOR READY
 2424  012736  017737  166112  012164          MOV     @STRCHR,MES19   ;SET PRINTER MESSAGE
 2425  012744  004437  010010                  JSR     %4,RINT         ;PRINT MESSAGE
 2426  012750  005337  001036                  DEC     CHRCNT          ;DEC TABLE COUNT
 2427  012754  001407                          BEQ     D4              ;EXIT TEST IF DONE
 2428  012756  005237  001040                  INC     CHRGEN          ;NEXT DAVFU INSTR.
 2429  012762  062737  000002  001054          ADD     #2,STRCHR       ;INC TABLE POINTER
 2430  012770  000137  012700-                 JMP     D2              ;CONTINUE
 2431  012774  005337  001044          D4:     DEC     CYCCNT          ;DEC CYCLE COUNT
 2432  013000  001415                          BEQ     DEXD            ;EXIT IF DONE
 2433  013002  062737  000140  013136          ADD     #140,DAVI1      ;CHANGE DAVFU INSTR.
 2434  013010  062737  000140  013140          ADD     #140,DAVI2      ;CHANGE DAVFU INSTR.
 2435  013016  013737  012362  011724          MOV     TNDAV2,MES15    ;SET TEST NUMBER FOR MESSAGE
 2436  013024  004437  007760                  JSR     %4,PRNNT        ;PRINT TEST NUMBER
 2437  013030  000137  012566                  JMP     D0              ;RETEST LINE COUNT SLEWING
 2438  013034  012737  000220  013136  DEXD:   MOV     #220,DAVI1      ;RESET DAVFU INSRT.
 2439  013042  012737  000221  013140          MOV     #221,DAVI2      ;RESET DAVFU INSTR.
 2440  013050  032777  010000  165726          BIT     #BIT12,@SWR     ;LOOP ON TEST?
 2441  013056  001002                          BNE     1$              ;LOOP
 2442  013060  000137  013142                  JMP     DAV2            ;NEXT TEST
 2443  013064  000137  012424          1$:     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     #TN01,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  DL1C:     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
```

BOOT

```
2701  014330  000002                          2
2702  014332  000001                          1
2703  014334  000000                          0
2704  014336  000007                          7
2705  014340  000010                          10
2706  014342  000001                          1
2707  014344  000002                          2
2708  014346  000005                          5
2709  014350  000000                          0
2710  014352  000003                          3
2711  014354  000000                          0
2712  014356  000001                          1
2713  014360  000000                          0
2714  014362  000357                          357             ;STOP LOAD
2715  014364  077777                          77777           ;STOP !!!!!
2716
2717                          ;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS
2718
2719  014366  000105          ICTAB:  105
2720  014370  000056                  56
2721  014372  000042                  42
2722  014374  000023                  23
2723  014376  000005                  5
2724  014400  000001                  1
2725  014402  000000                  0                       ;END OF TABLE
2726
2727                          ;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS
2728
2729  014404  000200          ITAB:   200                     ;CHANNEL 1
2730  014406  000201                  201                     ;CHANNEL 2
2731  014410  000202                  202                     ;CHANNEL 3
2732  014412  000203                  203                     ;CHANNEL 4
2733  014414  000204                  204                     ;CHANNEL 5
2734  014416  000205                  205                     ;CHANNEL 6
2735  014420  000206                  206                     ;CHANNEL 7
2736  014422  000207                  207                     ;CHANNEL 8
2737  014424  000210                  210                     ;CHANNEL 9
2738  014426  000211                  211                     ;CHANNEL 10
2739  014430  000212                  212                     ;CHANNEL 11
2740  014432  000213                  213                     ;CHANNEL 12
2741  014434  000000                  0                       ;END OF TABLE
2742
2743                          ;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE
2744
2745  014436  030440          MTAB:   .ASCII  / 1/
2746  014440  031040                  .ASCII  / 2/
2747  014442  031440                  .ASCII  / 3/
2748  014444  033040                  .ASCII  / 6/
2749  014446  032062                  .ASCII  /24/
2750  014450  032061                  .ASCII  /14/
2751  014452  020063          FS:     .ASCII  /3 /
2752  014454  020040          SPSP:   .ASCII  /  /
2753
2754                          ;SCOPE LOOP ROUTINE
2755
2756                          ;SET CHARACTER IN SWITCH REGISTER -0.
```

```
2757
2758  014456  004437  010030          SCOPE:  JSR     %4,TYPINT
2759  014462  017737  164316  001050          MOV     @SWR,SAVE       ;FETCH SWITCHES
2760  014470  012737  177574  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2761  014476  042737  177400  001050          BIC     #177400,SAVE    ;MASK CHARACTER
2762  014504                          LDLPX:
2763  014504  105777  164270                  TSTB    @LPS            ;TEST READY
2764  014510  100375                          BPL     .-4             ;WAIT FOR READY
2765  014512  005777  164262                  TST     @LPS            ;TEST FOR ERROR
2766  014516  100006                          BPL     LPSCOPE         ;BRANCH IF NO ERROR
2767  014520  012737  000060  001052  ERR60:  MOV     #60,    ERCOUNT         ;SET UP ERROR COUNT 60
2768          000061                          N=N+1
2769  014526  004537  010244                  JSR     %5,STAER        ;REPORT ERROR SET
2770  014532  000000                          HALT                    ;HALT ON ERROR
2771  014534  013777  001050  164240  LPSCOPE:MOV     SAVE,@LPB       ;LOAD PRINTER BUFFER
2772  014542  032777  004000  164234          BIT     #BIT11,@SWR     ;SEND ONLY ONE CHAR?
2773  014550  001402                          BEQ     LSCO            ;NO,  BRANCH
2774  014552  000000                          HALT                    ;HALT - WAIT FOR OPERATOR
2775  014554  000740                          BR      SCOPE           ;NEXT CHAR
2776  014556  000177  000024          LSCO:   JMP     @LOSCOP         ;SEND LF?
2777  014562  005237  001036          LSCA:   INC     CHRCNT          ;INCREMENT CHAR COUNT
2778  014566  001346                          BNE     LDLPX           ;CONTINUE IF NOT DONE LINE
2779  014570  012777  000012  164204          MOV     #12,@LPB        ;SEND LF
2780  014576  105777  164176                  TSTB    @LPS            ;TEST READY
2781  014602  100375                          BPL     .-4             ;WAIT FOR READY
2782  014604  000724                          BR      SCOPE           ;CONTINUE
2783
2784
2785  014606  014562                  LOSCOP: LSCA
2786
2787
2788
2789          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#
CLCKAV  002170          1359#
CNTR    002620          1397*   1436#   1444*
CONV    010162          2334#   2356
CONVRT  002634          1007    1432    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*   1856*   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#
DAVTAB  013070          2382    2446#
DAVO    012470          2382#   2389
DAVOO   012476          2383#   2396
DAVI    012524          2384    2390#
DAVZ    013142          1026    2442    2473#   2560
DEXO    013034          2432    2438#
```

```
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
DOAGN   007700          2246    2253#
DTAB    013724          2483    2571#
DTABP   013712          2483*   2484    2509*   2510    2563#
D0      012566          2398#   2437
D1      012622          2401    2406#
D2      012700          2415#   2430
D3      012722          2416    2421#
D4      012774          2427    2431#
D5      012560          2393    2397#
ERCOUN  001052          1127#   1158*   1164*   1176*   1186*   1192*   1202*   1218*   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*   1961*   2010*   2057*   2103*   2143*
                        2178*   2190*   2222*   2288*   2357    2385*   2402*   2417*   2487*   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   007552          2222#
ERR51   007774          2288#
ERR52   012504          2385#
ERR53   012606          2402#
ERR54   012706          2417#
ERR55   013254          2487#
ERR56   013322          2498#
ERR57   013500          2531#
ERR6    001412          1218#
ERR60   014520          2767#
ERR7    001436          1228#
FFSET   003354          1499    1566#
FFTAB   003276          1498    1541#
FS      014452          2539    2751#
FTABE   003352          1526    1563#
HAMALN  007512          1052    2214#   2239
HAMX    007660          2242    2244#
HAM1X   007536          2215#   2237
HAM2    007544          2220#   2232
HED1    010274          2358    2361    2367#
HSPRT   006054          1048    1992#   2038
HSO     006150          2005#   2034    2036
HSOO    006134          2000    2003#
HSOOA   006120          1997    2001#
HS1     006172          2008#   2021    2023    2026
HS2     006214          2009    2014#
HS3     006262          2019    2024#
HS4     006300          2016    2027#
HS6     006350          2031    2037#
HTABP   013722          2480*   2523    2547*   2567#
ICTAB   014366          2481    2551    2719#
ICTABP  013716          2481*   2482    2537    2548*   2549    2551*   2553    2565#
INDAT   003430          1023    1537    1583#   1591    1605
INDATT  003564          1584    1612#
INDATO  003470          1586    1592#
INDAT1  003552          1600    1606#
IND0    003442          1585#   1598
IND1    003524          1595    1599#
INT1C   002014          1263    1318#
INT1D   002140          1325    1349#
ITAB    014404          2478    2729#
ITABP   013714          2478*   2479    2554*   2555    2564#
KW11L   002350          1033    1365    1394#
KW11P   002306          1034    1370    1384#
LDCH    004516          1768    1773#   1782    1787
LDLPX   014504          2762#   2778
```

```
LEGCHR  001060          1130#   1405*   1408*   1416    1998*   2001*   2020    2086*   2090*   2098
LFT     007032          2130#
LFTTR   007014          1051    2126#   2164
LFT0    007040          2131#   2161
LFT1    007062          2134#   2137
LFT2    007102          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*   2004*
                        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  007670           997    2248#
LOSCOP  014606          1057*   1062*   2776    2785#
LPB     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    1216    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    2188    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#
M       =  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#
MESDD   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#
```

```
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*
MLF     005656          1047   1951*  1986
MLFA    005702          1956*  1977
MLFO    005720          1959*  1967
MLF1    005742          1960   1965*
MLF2    005776          1971*  1975
MLF4    006044          1958   1985*
MTAB    014436          2477   2552   2745*
MTABP   013720          2477*  2536   2546*  2552*  2566*
N       =  000061       1093*  1158   1159*  1164   1165*  1176   1177*  1186   1187*  1192   1193*  1202   1203*
                        1218   1219*  1228   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*  2178
                        2179*  2190   2191*  2222   2223*  2288   2289*  2385   2386*  2402   2403*  2417   2418*
                        2487   2488*  2498   2499*  2531   2532*  2767   2768*
NODAT   003600          1024   1610   1621*  1630
NODATA  003702          1634   1638*
NODATO  003644          1625   1631*
NODAT1  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*  1890
OVR3    005236          1864   1869*
OVR4    005200          1861*  1871
OVR5    005254          1874*
OVR6    005270          1877*  1892
```

```
OVRB    005352          1873    1891#
PATTB   003014          1412    1480#
PC    =%000007           831#   2249*
PLKS    001024          1088#   1367    1388    1389*
PRNNT   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#
PRTIND  007720          2266    2269#
PRTMSG  010026          1474*   1514*   1530*   2285*   2295#   2398*   2409*   2411*   2524*   2542*
PRT0    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#
PRT8    005646          1934    1943#
PSW     001010          1082#   1280*   1289*   1299*   1309*   1339*   1351*
PTRPSW  001032          1091#   1264*   1326*   1353*
PTRVEC  001030          1090#   1263*   1325*   1352*
RCHRSW  004220          1712    1717#
RDYOK   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
SCHRSW  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#
SLWD    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    1709    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#
STP5A    001300          1184#   1189
STP5B    001322          1185    1190#   1195
STP5C    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*   1806*
                         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*   2198*   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#
TNDAV1   012360          2367#   2380
TNDAV2   012362          2367#   2435
TNDAV3   012364          2367#   2475
TNO1     012366          2367#   2413    2480
TNO10    012404          1993    2367#
```

DZLPKE.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
TN011   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     001012          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
T2BO    004342          1743#   1792
T2BOA   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     982
                         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#
                        2029    2051    2066    2114    2159    2204    2228    2229    2235    2278    2315    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#
SWRSU           1#
TYPBIN          1#
TYPDEC          1#
TYPNAM          1#
TYPNUM          1#
TYPOCS          1#
TYPOCT          1#
TYPTXT          1#
$ERROR    1100#  1158   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#
.EQUAT          1#
.HEADE          1#
.KT11           1#
.SETUP          1#
.SWRHI          1#
.$ACTI          1#
.$APTB          1#
.$APTH          1#
.$APTY          1#
.$ASTA          1#
.$CATC          1#
.$CMTA          1#
.$DB2D          1#
.$DB2O          1#
.$DIV           1#
.$EOP           1#
.$ERRO          1#
.$ERRT          1#
.$MULT          1#
.$POWE          1#
.$RAND          1#
.$RDDE          1#
.$RDOC          1#
```

```
.$READ      1#
.$R2AZ      1#
.$SAVE      1#
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#
.$TYPB      1#
.$TYPD      1#
.$TYPE      1#
.$TYPO      1#
.$40CA      1#
.1170       1#
```

```
                1850    1852    1867    1901    1903    1917    1951    1953    1963    1992    1994    2012    2044    2046    2059
                2079    2081    2105    2126    2128    2145    2180    2192    2214    2216    2224    2249    2290    2312    2319
                2321    2356    2374    2381    2387    2399    2404    2410    2419    2425    2436    2473    2476    2489    2500
                2525    2533    2543    2758    2769
MOV             1016    1041    1057    1062    1137    1138    1139    1143    1144    1146    1147    1158    1164    1172    1173
                1176    1186    1192    1202    1218    1228    1236    1239    1245    1253    1263    1264    1267    1273    1278
                1280    1287    1289    1297    1299    1307    1309    1325    1326    1329    1335    1339    1342    1352    1353
                1359    1360    1376    1386    1387    1388    1389    1396    1397    1398    1399    1405    1406    1408    1409
                1411    1412    1413    1414    1420    1428    1453    1469    1474    1494    1498    1499    1500    1501    1514
                1517    1521    1530    1532    1584    1587    1592    1601    1622    1623    1626    1631    1638    1644    1694
                1699    1702    1703    1704    1707    1712    1713    1719    1720    1721    1724    1727    1738    1741    1743
                1744    1747    1751    1763    1769    1773    1788    1801    1804    1805    1806    1807    1810    1815    1816
                1817    1822    1826    1827    1832    1835    1836    1851    1854    1855    1856    1857    1859    1861    1862
                1865    1876    1886    1887    1891    1902    1905    1908    1910    1911    1912    1915    1919    1926    1937
                1939    1941    1952    1955    1956    1961    1965    1971    1993    1998    1999    2001    2002    2003    2004
                2005    2006    2007    2010    2014    2024    2025    2027    2045    2050    2062    2053    2054    2057    2061
                2064    2080    2085    2086    2087    2089    2090    2091    2096    2103    2107    2112    2127    2130    2131
                2132    2133    2140    2143    2147    2154    2155    2157    2169    2170    2171    2172    2173    2178    2182
                2186    2190    2194    2198    2202    2215    2218    2219    2222    2230    2233    2245    2271    2285    2288
                2292    2293    2296    2297    2302    2304    2334    2335    2336    2338    2375    2378    2379    2380    2382
                2385    2390    2397    2398    2402    2406    2409    2411    2412    2413    2414    2417    2421    2424    2435
                2438    2439    2474    2475    2477    2478    2479    2480    2481    2482    2483    2484    2487    2492    2493
                2498    2510    2517    2523    2524    2526    2531    2536    2539    2541    2542    2551    2552    2553    2565
                2557    2759    2760    2767    2771    2779
MOVB            1460    1468    1471    1502    1503    1957    1968    2305    2314    2318    2320    2341
NEG             2138
NOP             1282    1291    1301    1311    1341    2250    2251    2252
RESET           1136    1215    1225    2247
ROR             2343    2345    2347
RTI             1359    1446    2307
RTS             2270    2275    2279    2298    2317    2350    2365
SEC             1361    1366
SUB             1418    1456    1464    2022    2032    2100    2136    2174    2199
TST             1140    1156    1174    1184    1200    1216    1243    1265    1327    1512    1515    1528    1585    1594    1599
                1624    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
TSTB            1162    1190    1226    1237    1249    1271    1333    1362    1367    1429    1505    1506    1522    1596    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
.ASCII          2367    2745    2746    2747    2748    2749    2750    2751    2752
.ASCIZ          1566    1567    1568    1569    1570    1571    1572    1573    1574    1575    1576    1979    2367
.ENABL             1     850     851
.END            2789
.EVEN           1579    1983    1987    2367
.LIST              1    1098    1104    1110    2367
.MACR           1100    1106    1112
.MACRO             1
.NLIST             1    2367
.PAGE            803
.REM               1
.REPT            856
.TITLE           803
.WORD           1090    1091
```

```
MAINDEC-11-DZLPK-E-D    MACY11 27(732)  27-SEP-76  10:57  PAGE 107
DZLPKE.P11      CROSS REFERENCE TABLE -- PERMANENT SYMBOLS


 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *DZLPKE,DZLPKE.SEQ/SOL/CRF/PAGNUM=SYSMAC.SML[400,1066],DZLPKE[400,4571]
 RUN-TIME:  27 37 4 SECONDS
 RUN-TIME RATIO: 196/69=2.6
 CORE USED:  33K  (65 PAGES)
```

Spooler runtime 11 Seconds, 48 KCS, 270 disk reads, 4 disk writes, 68 pages
[redacted] Date 01-Dec-76 17:37:43 Monitor IPC-D 602 [680] **END**