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IDENTIFICATION

PRODUCT CODE MAINDEC-11-DZLPK-H-D

PRODUCT NAME LP14/LP11/LP05 LINE PRINTER TEST

PPODUCT DATE 25-NOVEMBER-1977

MA NTAINER DIAGNOSTIC ENGINEERING

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1 0 ABSTRACT

THE LINE PRINTER DIAGNOSTIC PROGRAM IS DIVIDED INTO THREE SECTIONS INTERNALLY DETECTED ERROR CONDITIONS ARE D'SPLAYED 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 HAV NG LINE PR NTER CONTROLS, LINE PRINTERS, AND TELETYPES COMPATIBLE W TH THE FCLLCWING

LPC11	LINE PRINTER INTERFACE
LP05	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER L NE PRINTER
LP11	DATAPRODUCTS 132 COLUMN 64 OP 96 CHARACTER LINE PRINTER
LP14	DATAPRODUCTS 132 COLUMN 64 CR 96 CHARACTER LINE PRINTER
TELETYPE	MODEL 33 OR EQUIVALENT CONSOLE UN T

2 2 STORAGE

MEMORY LOCATIONS 0 - TO - 17200 APE USED BY TH S D AGNOSTIC

2 3 PRELIMINARY PROGRAMS

ALL APPLICABLE PDP-11 DIAGNOSTICS SHOULD PUN 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 LP14/LP11/LP05 DIAGNOSTIC IS LOCATION 200(8). TO SKIP THE OPERATOR INTERVENTION TESTS AND START WITH THE PRINTING TESTS, START AT LOCATION 600(8). TO RUN THE SPECIAL SCOPE DRIVER ROUTINE USE START ADDRESS 700(8) OR 720(8). TO START AT ANY OTHER TEST USE THE START ADDRESS FROM THE FOLLOWING TABLE

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

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

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

                    700         SCOPE DRIVER ROUTINE
                    720         SCOPE DRIVER WITHOUT LINE FEEDS

THE PROGRAM WILL START THROUGH THE TEST SEQUENCE  BEGINNING  WITH  THE
SELECTED  TEST  UNLESS  SWITCH  12 IS SET TO LOOP ON TEST (SEE SECTION
5 1)



4 3  PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF  THE  LINE  PRINTER  DIAGNOSTIC  TEST,  THE
HEADER  MESSAGE  "LP05/LP11/LP14  LINE  PRINTER  TEST"  WILL BE TYPED OUT ON THE
TELEPRINTER FOLLOWED BY EXECUTION OF THE PRINTER READY PORTION OF TEST
1    PRINTING  OF  THE MESSAGE "POWER-UP" ON THE TELEPRINTER FOLLOWING
THE TEST HEADER PRINT-OUT INDICATES START OF THIS TEST SEQUENCE   THIS
TEST  IS  CARRIED  OUT BY AN INTERACTIVE EXCHANGE BETWEEN THE OPERATOR
AND THE TEST  PROGRAM    THE  OPERATIONAL  DESCRIPTION  OF  THIS  TEST
APPEARS  AS  PART  OF  THE  TEST DESCRIPTION FOR TEST 1 (SEE SECTION
7 1 1)   AFTER SUCCESSFUL COMPLETION OF THIS SECTION OF  TEST  1,  THE
PRINT  SPEED  AND TOP OF FORM SWITCH SETTINGS TESTS WILL BE PERFORMED
(SEE SECTIONS 7 1 2 AND 7 1 3 RESPECTIVELY ) IF THE DAVFU IS AVAILABLE
AND  SWITCH  14 IS SET. THE DAVFU TESTS WILL ALSO BE PERFORMED   AFTER
COMPLETION OF ALL OF TEST 1  PRESS  CONTINUE  TO  ENTER  THE  PRINTING
TESTS DIRECTLY   NO OTHER OPERATOR ACTION WILL BE REQUIRED
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5 0 OPERATING PROCEDURE

5 1 OPERATIONAL SWITCH SETTINGS

THE USE OF THIS PROGRAM ON PROCESSORS NOT HAVING A HARDWARE SWITCH REGISTER NECESSITATES OPERATOR INTERACTION. THE OPERATOR MUST SET UP LOCATION 174 WITH THE SOFTWARE DISPLAY VALUES AND LOCATION 176 WITH THE SOFTWARE SWITCH VALUES (SEE SECTION 5 2)

SWITCH	FUNCTION IN "UP" POSITION
15	LOOP ON ERROR (IN TEST 1 ONLY)
14	OPTIONAL DAVFU AVAILABLE
13	DOWN - 64 CHARACTER SET UP - 96 CHARACTER SET
12	LOOP ON TEST
11	SEND ONLY ONE CHARACTER TO LINE PRINTER IN SCOPE DRIVER - THEN HALT
10	UP LP14 DOWN - LP05/LP11
9	INHIBIT ERROR REPORTS
0	USED FOR PRINT SPEED MANUAL TIMING IF NO CLOCK AVAILABLE

1 SWITCH - 0

TO START PRINTING IN THE MANUAL PRINT SPEED TEST, PLACE SWITCH 0 IN THE UP POSITION AT THE END OF ONE MINUTE PUT SWITCH 0 DOWN THE 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 - 9

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

3 SWITCH - 10

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

LINE PRINTER SWITCH 10 SHOULD BE SET DOWN FOR TESTING THE LP05/LP11 LINE PRINTER

4 SWITCH - 11

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

4 SWITCH - 12

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

6 SWITCH - 13

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

7 SWITCH - 14

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

8 SWITCH - 15

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

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

5.2 ABSENCE OF HARDWARE SWITCH REGISTER

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

THE DIAGNOSTIC WILL PROMPT THE OPERATOR WITH THE MESSAGE

    SWR = XXXXXX   NEW SWR =

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

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

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

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

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


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

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

     SWR =  XXXXXX    NEW SWR =

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

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

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

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

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



5 3  IOT CHANGES

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

FOR OTHER THAN THESE, PLACE THE CORRECT STATUS  LOCATION  IN  LOCATION
1000(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)
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443
444
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6.0 ERRORS

6.1 COMPUTER DETECTED ERRORS

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

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

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

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

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

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

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 NTERFACE 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 COND TIONS WITH'N 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 ENTEPED 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 TOF 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 TWICE TO ENTER DIRECTLY INTO THE PRINTING TEST SEQUENCE
STARTING WITH TEST 2 IF THE DAVFU IS NOT AVAILABLE (SWITCH 14 DOWN)
IF THE DAVFU IS AVAILABLE (SWITCH 14 UP) SECTION 4 OF TEST 1 WILL BE
ENTERED DIRECTLY AFTER DEPRESSING CONTINUE

7 1 4 TEST 1 - SECTION 4 - DAVFU ERROR TESTS

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

7 2 LINE PRINTER PRINTING TESTS

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

7 2 1 TEST 2 - DATA TRANSFER PATHS TEST
THIS TEST IS DESIGNED TO TEST THE DATA TRANSFER PATHS (WITH
ALTERNATING ONES AND ZEROS), FROM THE PROCESSOR INTERFACE, THRU THE
LINE PRINTER INPUT REGISTER, AND INTO THE PRINTER'S BUFFER AN
ALTERNATING STRING OF "*" AND "U" CHARACTERS ARE TRANSMITTED TO THE
PRINTER ON A FULL 132 COLUMN BASIS SINCE THESE CHARACTERS ARE
COMPLIMENTARY BITWISE, THEY PROVIDE BOTH A ONES AND ZEROES CHECK OF
ALL TRANSMISSION LINES END OF LINE IS SENSED WITHIN THE PROCESSOR
AND A LINE FEED CHARACTER IS TRANSMITTED TO PRINT EACH LINE PRINTING
OF THE TEST LINE IS REPEATED 32 TIMES, ALTERNATING THE COLUMN
POSITIONS OF THE "*" AND "U" CHARACTERS TO PRODUCE A CHECKER-BOARD
PATTERN

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

TH S 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 W TH THE FIRST E'S PRINTED

7 2 4 TEST 5 - SHUTTLE POSITIONING TEST

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

7 2 5 TEST 6 - PRINT CONTROL TEST

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

7 2 6 TEST 7 - MULTIPLE LINE ADVANCE TEST

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

7 2 7 TEST 8 - HIGH SPEED PRINT TEST

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

7 2 8 TEST 9 - SINGLE CHAR, ALL COLUMNS TEST

THIS TEST IS DESIGNED AS AN ENDURANCE TEST OF THE LINE PR NTER 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

```
??????--- ------??????
@@@@@@----------@@@@@@
AAAAAA----------AAAAAA
BBBBBB--  ------ BBBBBB
      ----------
      ----------
ZZZZZZ----------ZZZZZZ
```

7 2 9 TEST 10 - DRUM PATTERN TEST

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

7 2 10 TEST 11 - SPURIOUS HAMMER FIRING TEST

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

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

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

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

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 PEPEATED (TEST D2), CHANGING THE TWO (2) UNUSED BITS IN THE PAPER NSTRUCTION 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 PR NTED GIVING THE CORRECT NUMBER OF BLANK LINES FROM THE LAST PRINTED LINE TO THAT L NE UPON COMPLETION OF TH S TEST THE DIAGNOSTIC WILL RESTART THE PRINTING TESTS W TH TEST 2

7 3 SCOPE DRIVE ROUTINE

THE PRUFOSE 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, DEPPESS 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 DEPPESS CONTINUE TO STOP SEND NG CONTINUOUSLY PLACE SWITCH 11 UP

.ENDP

```
                        TITLE MAINDEC-11-DZLPK-H-D
                        NLIST  MC
                        ;COPYRIGHT (C) 1977,1974 DIGITAL EQUIPMENT CORP . MAYNARD. MASS

                        ;******   LP14/LP11/LP05 LINE PRINTER TEST   ******



                        ;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
                        ;       10      DOWN - LP05/LP11, UP - LP14
                        ;       9       "UP" - INHIBIT ERROR REPORTS
                        ;       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


000300                          -0
```

```
                000030                          .=30

        000030  011524                          TYP
        000032  000340                          340


                000042                          .=42

        000042  000000                          0

                000046                          .=46
        000046  011316                          LOGICAL
                000052                          .=52
        000052  040000                          BIT14


                000060                          .=60                    ;KEYBOARD INTERRUPT ROUTINE
        000060  012002                          TKINT
        000062  000300                          300


                000100                          .=100

        000100  003254                          LKSRV                   ;LINE CLOCK SERVICE ROUTINE
        000102  000340                          340

        000104  003264                          CONVRT
        000106  000340                          340

                000174                          .=174
        000174  000000                          DISPREG 0
        000176  000000                          SWREG   0

                000200                          .=200

        000200  012706  001000                  MOV     #1000,%6
        000204  000137  001102                  JMP     SETUP


                000300                          .=300

                                                                        ;START FOR DAVFU TESTS
        000300  000137  004074                  JMP     INDAT           ;ILLEGAL LOAD TEST
        000304  000137  004260                  JMP     NODAT           ;NO STOP BIT - CHANNEL SLEW TEST
        000310  000137  014616                  JMP     DAVFU           ;LINE COUNT SLEW TEST
        000314  000137  015350                  JMP     DAV2            ;CHANNEL SLEW TEST


                000400                          .=400

                                                                        ;1 MINUTE PRINT SPEED CHECK
        000400  000137  002514                  JMP     SWTIME          ;START FOR USING SWITCH REG FOR TIMING
        000404  000137  002650                  JMP     KW11L           ;START FOR KW11-L LINE CLOCK
        000410  000137  002572                  JMP     KW11P           ;START FOR KW11-P LINE CLOCK
        000414  000137  003464                  JMP     SLEWCK          ;CHECK TOP OF FORM SWITCH
```

```
1002
1003
1004
1005                    000600                          =600
1006
1007  000600  012706  001000                  MOV     #1000,%6        ;START OF PRINTING TESTS SEQUENCE
1008  000604  000137  004562                  JMP     TEST2           ;TEST 2
1009  000610  000137  005022                  JMP     TEST3           ;TEST 3
1010  000614  000137  005374                  JMP     CHRCHK          ;TEST 4
1011  000620  000137  005654                  JMP     OVRPRT          ;TEST 5
1012  000624  000137  006150                  JMP     PRTCTL          ;TEST 6
1013  000630  000137  006446                  JMP     MLF             ;TEST 7
1014  000634  000137  006660                  JMP     HSPRT           ;TEST 8
1015  000640  000137  007460                  JMP     SNGCHR          ;TEST 9
1016  000644  000137  007652                  JMP     ROTATE          ;TEST 10
1017  000650  000137  010412                  JMP     LFTTR           ;TEST 11
1018  000654  000137  011124                  JMP     HAMALN          ;TEST 12
1019
1020
1021                    000700                          =700
1022
1023  000700  012737  017020  017044          MOV     #LSCA,LOSCOP    ;SEND LF AFTER 132 CHARS
1024  000706  000137  016700                  JMP     SCOPE
1025
1026                    000720                          =720
1027
1028  000720  012737  016700  017044          MOV     #SCOPE,LOSCOP    NO LF'S SENT IN SCOPE ROUTINE
1029  000726  000137  016700                  JMP     SCOPE           ;DO SCOPE ROUTINE
1030
1031
1032                    001000                          =1000
1033
1034                                    LINE PRINTER HARDWARE REGISTERS
1035
1036  001000  177514                  LPS     177514          ;STATUS REGISTER
1037                                                          ;BIT 15=ERROR
1038                                                          ;BIT 7=READY
1039                                                           BIT 6-INTERRUPT ENABLE
1040
1041  001002  177516                  LPB     177516           DATA BUFFER REGISTER
1042                                                           BITS 0-6=7 BIT ASCII CHARACTER BUFFER
1043                                                          ;BITS 7-15=NOT USED
1044
1045
1046  001004  177570                  SWR     177570
1047  001006  177570                  DISPLAY 177570
1048  001010  177776                  PSW     177776
1049  001012  177566                  TPB     177566
1050  001014  177562                  TKB     177562
1051  001016  177564                  TPS     177564
1052  001020  177560                  TKS     177560
1053  001022  172542                  CSBR    172542
1054  001024  172540                  PLKS    172540
1055  001026  177546                  LKS     177546
1056  001030  000200                  PTRVEC  WORD    200
1057  001032  000202                  PTRPSW  WORD    202
```

```
1058          000240                  NOP     =240
1059          000000                  N       =0
1060          000002                  M       =2
1061
1062                                  ;MACRO FOR SETTING UP ERROR COUNT
1063
1064                                   LIST ME
1065
1066                                   MACR    $ERROR X
1067                                ERR'X': MOV     #X,     ERCOUNT         ;SET UP ERROR COUNT X
1068                                N=N+1
1069                                   ENDM    $ERROR
1070
1071
1072                                  ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1073
1074                                   LIST ME
1075
1076                                   MACR    $PRINT Y
1077                                MOV     TNO'Y',MES15            ;SET TEST NUMBER FOR MESSAGE
1078                                JSR     %4,PRNNT                ;PRINT TEST NUMBER
1079                                M=M+1
1080                                   ENDM    $PRINT
1081
1082
1083                                  ;MACRO FOR WAITING FOR PRINTER TO PRINT OP SLEW
1084
1085                                   LIST ME
1086
1087                                   MACR    $WAIT
1088                                TSTB    @LPS            ;TEST READY
1089                                BPL      -4             ;WAIT FOR READY
1090                                   ENDM    $WAIT
1091
1092
1093
1094                                   MACRO FOR ENABLING KEYBOARD INTERUPT IF THERE IS NO
1095                                ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1096
1097
1098                                   LIST ME
1099
1100
1101                                   MACR    $ENABLE
1102                                CMP     #176,SWR                ;S/W SWR ?
1103                                BNE     1$                      ;NO- CONTINUE
1104                                JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
1105                             1$:
1106                                   ENDM    $ENABLE
1107
1108
1109
1110                                  ;MACRO USED TO LOAD THE PSW WITH THE
1111                                   CORRECT PROCESSOR PRIORITY LEVEL
1112
1113
```

```
1114                                    LIST ME
1115
1116
1117                                    .MACR   $SETPSW
1118                                    MOV     PC,-(SP)            ;MOVE PRESENT LOCATION TO STACK
1119                                    ADD     #6.(SP)             ;SET UP FOR NEXT INSTRUCTION
1120                                    RTI                         ;LOAD PSW
1121                                    .ENDM   $SETPSW
1122
1123
1124
1125
1126
1127
1128                                ;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS
1129
1130  001034  000000                SEGCNT  0
1131  001036  000000                CHRCNT  0
1132  001040  000000                CHRGEN  0
1133  001042  000000                LINCNT  0
1134  001044  000000                CYCCNT  0
1135  001046  000000                WORK    0
1136  001050  000000                SAVE    0
1137  001052  000000                ERCOUNT 0
1138  001054  000000                STRCHR  0
1139  001056  000000                STRCNT  0
1140  001060  000000                LEGCHR  0
1141  001062  000000                NUMCHR  0
1142  001064  000000                OFFSET  0
1143  001066  000000                DIGITS  0
1144  001070  000000                SIGNAL  0
1145  001072  000000                SET     0
1146  001074  000000                CHAR    0
1147  001076  000000                OCT     0
1148  001100  000000                TEMP    0
1149
1150
1151                                ;ROUTINE TO TEST THE MECH  OPERATION OF THE LP05
1152
1153  001102  004437  011472        SETUP   JSR     %4,TYPINT
1154  001106  000005                        RESET                       ;CLEAR WORLD
1155  001110  013746  000004                MOV     4,-(SP)             ;SAVE CURRENT VECTORS
1156  001114  013746  000006                MOV     6,-(SP)             ;
1157  001120  012737  001134  000004        MOV     #1$,4               ;SET UP TIMEOUT VECTOR
1158  001126  005777  177652                TST     @SWR                ;TRY TO ACCESS HARDWARE SWR
1159  001132  000407                        BR      2$                  ;IF THERE, GO TO 2$
1160  001134                        1$
1161  001134  012737  000176  001004        MOV     #SWREG,SWR          ;POINT TO SOFTWARE SWR
1162  001142  012737  000174  001006        MOV     #DISPREG,DISPLAY    ;POINT TO SOFTWARE DISPLAY
1163  001150  022626                        CMP     (SP)+,(SP)+         ;RESTORE STACK
1164  001152  012637  000006        2$      MOV     (SP)+,6             ;RESTORE TIMEOUT VECTORS
1165  001156  012637  000004                MOV     (SP)+,4             ;
1166
1167  001162  104000                        EMT     +0
1168  001164  012761                        MES1                        ;TYPE DIAGNOSTIC TITLE
1169  001166  104000                        EMT     +0
```

```
1170  001170  013024                        MES2                    ;TYPE RESTART ADDRESS INFO
1171
1172
1173
1174                                  ;LOWER PROCESSOR PRIORITY
1175
1176
1177  001172  005046                  3$    CLR     -(SP)             ;NEW PSW
1178  001174  012746  001202                MOV     #4$,-(SP)         ;NEW PC
1179  001200  000002                        RTI                       ;LOAD NEW PSW
1180  001202                          4$
1181
1182
1183
1184
1185
1186
1187                                  ; GET INITIAL SWR VALUE
1188                                  ; IF THERE IS NO H/W  SWR
1189
1190
1191  001202  022737  000176  001004        CMP     #176,SWR          ;S/W SWR ?
1192  001210  001044                        BNE     SKIP              ;NO- CONTINUE
1193  001212  005037  001070                CLR     SIGNAL            ;INITIALIZE INTERRUPT ROUTINE
1194  001216  005037  001066                CLR     DIGITS            ;
1195  001222  005037  001072                CLR     SET               ;
1196  001226  005037  001074                CLR     CHAR              ;
1197  001232  013746  000034                MOV     34,-(SP)          ;SAVE VECTOR
1198  001236  013746  000036                MOV     36,-(SP)          ;SAVE VECTOR
1199  001242  012737  012002  000034        MOV     #TKINT,34         ;SET UP NEW VECTOR
1200  001250  012737  000300  000036        MOV     #300,36           ;SET UP NEW VECTOR
1201  001256  005237  001072                INC     SET               ;SET HEADER FLAG
1202  001262  104400                        TRAP    +0                ;ENTER INTERRUPT ROUTINE
1203  001264  005037  001072                CLR     SET               ;CLEAR HEADER FLAG
1204  001270  012637  000036                MOV     (SP)+,36           RESTORE VECTOR
1205  001274  012637  000034                MOV     (SP)+,34          ;RESTORE VECTOR
1206  001300  012777  000100  177512        MOV     #100,@TKS         ;ENABLE KEYBOARD INTERRUPT
1207  001306  000001                  WT    WAIT
1208  001310  000240                        NOP
1209  001312  022737  000001  001070        CMP     #1 SIGNAL          SWR VALUE ENTERED ?
1210  001320  001772                        BEQ     WT                 NO  WA T
1211  001322  000240                  SKIP  NOP
1212
1213
1214
1215  001324  000005                        RESET
1216
1217
1218
1219  001326  104000                        EMT     +0                ;TYPE MESSAGE
1220  001330  013051                        MESS                      ;POWER UP
1221  001332  000000                        HALT                      ;DEPRESS CONTINUE WHEN READY TO START TEST
1222
1223
1224
1225
```

```
1228
1229  001334  005777  177440          STP1    TST     @LPS            ;TEST FOR ERROR
1230  001340  100006                          BPL     STP2            ;NO ERROR TEST FOR READY
1231  001342  012737  000000  001052  ERR0    MOV     #0,     ERCOUNT         ;SET UP ERROR COUNT 0
1232          000001                          N=N+1
1233  001350  004537  011722                  JSR     %5,STAER        ;REPORT ERROR BIT SET
1234  001354  000767                          BR      STP1            ;GO TEST FOR ERROR
1235  001356  105777  177416          STP2    TSTB    @LPS            ;TEST FOR READY
1236  001362  100406                          BMI     STP3            ; READY SET OK
1237  001364  012737  000001  001052  ERR1    MOV     #1,     ERCOUNT         ;SET UP ERROR COUNT 1
1238          000002                          N=N+1
1239  001372  004537  011722                  JSR     %5,STAER        ;REPORT READY NOT SET
1240  001376  000767                          BR      STP2            ;GO TEST FOR READY
1241  001400  104000                  STP3    EMT     +0              ;TYPE MESSAGE
1242  001402  013103                          MES4                    ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1243  001404  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1244  001406                          STP4
1245  001406  012777  000014  177306          MOV     #14,@LPB        ;SEND A "FF" TO THE PRINTER
1246  001414  012737  000100  001100          MOV     #100,TEMP       ;DELAY COUNT
1247  001422  005337  001100          1$      DEC     TEMP            ;DECREMENT COUNTER
1248  001426  001375                          BNE     1$              ;CONTINUE WAIT LOOP
1249  001430  012777  000015  177344          MOV     #15,@LPB        ;ATTEMPT "FF" BY SENDING A "CR"
1250  001436  012737  000100  001100          MOV     #100,TEMP       ;DELAY COUNT
1251  001444  005337  001100          2$      DEC     TEMP            ;DECREMENT COUNTER
1252  001450  001375                          BNE     2$              ;CONTINUE WAIT LOOP
1253  001452  005777  177322                  TST     @LPS            ;TEST FOR ERROR
1254  001456  100406                          BMI     STP5            ;BRANCH IF ERROR SET
1255  001460  012737  000002  001052  ERR2    MOV     #2,     ERCOUNT         ;SET UP ERROR COUNT 2
1256          000003                          N=N+1
1257  001466  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1258  001472  000745                          BR      STP4            ;LOOP ON ERROR
1259  001474  104000                  STP5    EMT     +0              ;TYPE MESSAGE
1260  001476  013214                          MES6                    ;ERROR SET OK - TURN ON LINE
1261  001500  000000                          HALT                    ;WAIT FOR OPERATOR
1262
1263  001502  005777  177272          STP5A   TST     @LPS            ;TEST FOR ERROR
1264  001506  100006                          BPL     STP5B           ;NO ERROR CONTINUE
1265  001510  012737  000003  001052  ERR3    MOV     #3,     ERCOUNT         ;SET UP ERROR COUNT 3
1266          000004                          N=N+1
1267  001516  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1268  001522  000767                          BR      STP5A           ;LOOP ON ERROR
1269  001524  105777  177250          STP5B   TSTB    @LPS            ;TEST READY
1270  001530  100406                          BMI     STP5C           ;READY SET OK
1271  001532  012737  000004  001052  ERR4    MOV     #4      ERCOUNT         ;SET UP ERROR COUNT 4
1272          000005                          N=N+1
1273  001540  004537  011722                  JSR     %5 STAER        ;REPORT ERROR NOT SET
1274  001544  000767                          BR      STP5B           ;LOOP ON ERROR
1275  001546  104000                  STP5C   EMT     +0              ;TYPE MESSAGE
1276  001550  013147                          MES5                    ;READY SET OK - TRY DRUM GATE SWITCH
1277  001552  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1278
1279  001554  005777  177220          STP6    TST     @LPS            ;TEST FOR ERROR
1280  001560  100406                          BMI     STP7            ;BRANCH IF ERROR SET
1281  001562  012737  000005  001052  ERR5    MOV     #5,     ERCOUNT         ;SET UP ERROR COUNT 5
1282          000006                          N=N+1
1283  001570  004537  011722                  JSR     %5 STAER        ;REPORT ERROR NOT SET
```

SEQ 0028

```
1282  001574  000767                          BR      STP6            ;LOOP ON ERROR
1283  001576  104000                  STP7    EMT     +0              ;TYPE MESSAGE
1284  001600  013214                          MES6                    ;ERROR SET OK - TURN ON LINE
1285  001602  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1286
1287                                  ;TEST 1
1288                                  ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING
1289
1290                                  ;IS THE PRINTER FREE OF ERRORS
1291
1292  001604  000005                  TEST1   RESET                   ;CLEAR THE WORLD
1293  001606  005777  177166                  TST     @LPS            ;IS ERROR FLAG CLEAR
1294  001612  100006                          BPL     TEST1A          ;ERROR IS CLEAR OK
1295  001614  012737  000006  001052  ERR6    MOV     #6,     ERCOUNT         ;SET UP ERROR COUNT 6
1296           000007                          N=N+1
1297  001622  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1298  001626  000766                          BR      TEST1           ;LOOP ON ERROR
1299
1300                                  ;IS READY SET (NO ERRORS EXIST)
1301
1302  001630  000005                  TEST1A  RESET                   ;CLEAR THE WORLD
1303  001632  105777  177142                  TSTB    @LPS            ;IS READY SET
1304  001636  100406                          BMI     TEST1B          ;READY SET! PRINTER OK
1305  001640  012737  000007  001052  ERR7    MOV     #7      ERCOUNT         ;SET UP ERROR COUNT 7
1306           000010                          N=N+1
1307  001646  004537  011722                  JSR     %5,STAER        ;REPORT READY NOT SET
1308  001652  000766                          BR      TEST1A          ;LOOP ON ERROR
1309
1310                                  ;DOES LOADING THE BUFFER RESET READY
1311
1312  001654  005037  001046          TEST1B  CLR     WORK            ;CLEAR COUNTER
1313  001660  012777  000012  177114          MOV     #12,@LPB        ;LOAD LINE FEED INTO BUFFER
1314  001666  105777  177106                  TSTB    @LPS            ;IS READY CLEAR
1315  001672  100006                          BPL     LP1             ;READY IS CLEAR OK!
1316  001674  012737  000010  001052  ERR10   MOV     #10,    ERCOUNT         ;SET UP ERROR COUNT 10
1317           000011                          N=N+1
1318  001702  004537  011722                  JSR     %5,STAER        ;REPORT READY STILL SET
1319  001706  000762                          BR      TEST1B          ;LOOP ON ERROR
1320  001710  005777  177064          LP1     TST     @LPS            ;IS THERE AN ERROR
1321  001714  100006                          BPL     LP2              NO ERROR CONTINUE
1322  001716  012737  000011  001052  ERR11   MOV     #11,    ERCOUNT         ;SET UP ERROR COUNT 11
1323           000012                          N=N+1
1324  001724  004537  011722                  JSR     %5,STAER        ;REPORT ERROR OCCURRED '
1325  001730  000751                          BR      TEST1B          ;LOOP ON ERROR
1326  001732  105777  177042          LP2     TSTB    @LPS            ;IS THE PRINTER STILL BUSY
1327  001736  100411                          BMI     TEST1C          ;NO! GO TO NEXT TEST
1328  001740  005237  001046                  INC     WORK             YES! GO CHECK FLAGS
1329  001744  001361                          BNE     LP1             ;PRINTER STILL BUSY WAIT
1330  001746  012737  000012  001052  ERR12   MOV     #12,    ERCOUNT         ;SET UP ERROR COUNT 12
1331           000013                          N=N+1
1332  001754  004537  011722                  JSR     %5 STAER        ;ERROR REPORT TIME OUT
1333  001760  000735                          BR      TEST1B          ;LOOP ON ERROR
1334
1335                                   CHECK INTERRUPT LEVEL OF PRINTER
1336                                   THE PRINTER SHOULD BE AT LEVEL 4
1337
```

```
                                        ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
001762  012777  002246  177040  TEST1C  MOV     #INT1C,@PTRVEC  ;SET UP INT VECTOR
001770  012777  000340  177034          MOV     #340,@PTRPSW    ;SET PRIORITY
001776  005777  176776                  TST     @LPS            ;TEST FOR ERROR
002002  100006                        BPL     LP3             ;NO ERROR CONTINUE
002004  012737  000013  001052  ERR13   MOV     #13.    ERCOUNT         ;SET UP ERROR COUNT 13
        000014                  N=N+1
002012  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
002016  000761                        BR      TEST1C          ;LOOP ON ERROR
002020  105777  176754          LP3     TSTB    @LPS            ;TST FOR READY
002024  100406                        BMI     LP3X            ;READY SET OK
002026  012737  000014  001052  ERR14   MOV     #14.    ERCOUNT         ;SET UP ERROR COUNT 14
        000015                  N=N+1
002034  004537  011722                  JSR     %5,STAER        ;REPORT READY NOT SET
002040  000750                        BR      TEST1C          ;LOOP ON ERROR
002042                          LP3X
002042  012737  000015  001052  ERR15   MOV     #15.    ERCOUNT         ;SET UP ERROR COUNT 15
        000016                  N=N+1
002050  012746  000340                  MOV     #340,-(SP)      ;LOCKUP PROCESSOR, NEW PRIORITY
002054  010746                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
002056  062716  000006                ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
002062  000002                        RTI                             ;LOAD PSW
002064  052777  000100  176706          BIS     #100,@LPS       ;SET PRINTER INTO ENABLE
002072  000240                        NOP                     ;WAIT
002074  042777  000100  176676          BIC     #100,@LPS       ;CLEAR PRINTER INT  ENABLE

                                        ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6

002102  012737  000016  001052  ERR16   MOV     #16.    ERCOUNT         ;SET UP ERROR COUNT 16
        000017                  N=N+1
002110  012746  000300                  MOV     #300,-(SP)      ;SET PROCESSOR PRIORITY LEVEL 6
002114  010746                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
002116  062716  000006                ADD     #6 (SP)                 ;SET UP FOR NEXT INSTRUCTION
002122  000002                        RTI                             ;LOAD PSW
002124  052777  000100  176646          BIS     #100,@LPS       ;SET PRINTER INT ENABLE
002132  000240                        NOP                     ;WAIT
002134  042777  000100  176636          BIC     #100,@LPS       ;CLEAR PRINTER INT  ENABLE

                                        ;TEST THAT THE PRINTER WILL NOT INT  AT
                                        ;PROCESSOR LEVEL 5

002142  012737  000017  001052  ERR17   MOV     #17.    ERCOUNT         ;SET UP ERROR COUNT 17
        000020                  N=N+1
002150  012746  000240                  MOV     #240,-(SP)      ;SET UP PROCESSOR TO LEVEL 5
002154  010746                        MOV     PC -(SP)                ;MOVE PRESENT LOCATION TO STACK
002156  062716  000006                ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
002162  000002                        RTI                             ;LOAD PSW
002164  052777  000100  176606          BIS     #100,@LPS       ;SET PRINTER INT ENABLE
002172  000240                        NOP                     ;WAIT
002174  042777  000100  176576          BIC     #100,@LPS       ;CLEAR INT ENABLE PRINTER OF

                                        ;TEST THAT THE PRINTER WILL NOT INTERRUPT
                                        ;WHEN THE PROCESSOR IS AT LEVEL 4

002202  012737  000020  001052  ERR20   MOV     #20.    ERCOUNT         ;SET UP ERROR COUNT 20
```

```
1394            000021                          N=N+1
1395  002210    012746  000200                    MOV     #200,-(SP)      ;SET PROCESSOR TO LEVEL 4
1396  002214    010746                            MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
1397  002216    062716  000006                    ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
1398  002222    000002                            RTI                             ;LOAD PSW
1399  002224    052777  000100  176546            BIS     #100,@LPS       ;SET PRINTER INT  ENABLE
1400  002232    000240                            NOP                     ;WAIT
1401  002234    042777  000100  176536            BIC     #100,@LPS       ;CLEAR PRINTER INT ENABLE
1402  002242    000137  002260                    JMP     TEST1D          ;PRINTER OK CONTINUE
1403
1404                                      ;INTERRUPT HANDLE FOR TEST1C
1405                                      ;RESTORE STACK AND REPORT ERROR
1406
1407  002246    022626                    INT1C   CMP     (6)+,(6)+       ;RESTORE STACK
1408  002250    004537  011722                    JSR     %5,STAER        ;REPORT ERROR
1409  002254    000137  001762                    JMP     TEST1C          ;RE-ENTER TEST1C
1410
1411                                      ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
1412                                      ;AT PRIORITY LEVEL 4
1413
1414  002260    012777  002400  176542    TEST1D  MOV     #INT1D,@PTRVEC  ;SET UP INTERRUPT VECTOR
1415  002266    012777  000340  176536            MOV     #340,@PTRPSW    ;LOCK UP PRIORITIES
1416  002274    005777  176500                    TST     @LPS            ;IS THERE A PRINTER ERROR
1417  002300    100006                            BPL     LP4             ;NO! CONTINUE
1418  002302    012737  000021  001052    ERR21   MOV     #21,    ERCOUNT         ;SET UP ERROR COUNT 21
1419            000022                            N=N+1
1420  002310    004537  011722                    JSR     %5,STAER        ;REPORT PRINTER ERROR
1421  002314    000761                            BR      TEST1D          ;LOOP ON ERROR
1422  002316    105777  176456            LP4     TSTB    @LPS            ;IS READY SET
1423  002322    100406                            BMI     LP5             ;YES - PRINTER READY
1424  002324    012737  000022  001052    ERR22   MOV     #22,    ERCOUNT         ;SET UP ERROR COUNT 22
1425            000023                            N=N+1
1426  002332    004537  011722                    JSR     %5,STAER        ;REPORT READY NOT SET
1427  002336    000750                            BR      TEST1D          ;LOOP ON ERROR
1428  002340    012746  000140            LP5     MOV     #140,-(SP)      ;SET PRIORITY TO LEVEL 3
1429  002344    010746                            MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
1430  002346    062716  000006                    ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
1431  002352    000002                            RTI                             ;LOAD PSW
1432  002354    052777  000100  176416            BIS     #100,@LPS       ;SET PRINTER INTERRUPT ENABLE
1433  002362    000240                            NOP                     ;WAIT
1434  002364    012737  000023  001052    ERR23   MOV     #23,    ERCOUNT         ;SET UP ERROR COUNT 23
1435            000024                            N=N+1
1436  002372    004537  011722                    JSR     %5,STAER        ;REPORT ERROR
1437  002376    000730                            BR      TEST1D          ;LOOP ON ERROR
1438
1439                                        INTERRUPT HANDLER FOR TEST1D
1440
1441  002400    022626                    INT1D   CMP     (6)+,(6)+       ;RESET STACK
1442  002402    042777  000100  176370            BIC     #100,@LPS       ;CLEAR INT.  ENABLE FOR PRINTER
1443  002410    012746  000000                    MOV     #0,-(SP)        ;CLEAR PROCESSOR STATUS
1444  002414    010746                            MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
1445  002416    062716  000006                    ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
1446  002422    000002                            RTI                             ;LOAD PSW
1447  002424    012777  012706  176376            MOV     #12706,@PTRVEC  ;RESET INSTRUCTION AT 200
1448  002432    012777  001000  176372            MOV     #1000,@PTRPSW   ;RESET INSTRUCTION AT 202
1449
```

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1450
1451
1452
1453
1454
1455
1456
1457                                    ;1 MINUTE PRINT SPEED CHECK
1458                                    ;IF A KW11-L OR KW11-P ARE NOT AVAILABLE,  THE SR BIT0 IS USED
1459                                    ;FOR MANUAL TIMING OF THE PRINTER
1460
1461  002440  012737  000002  000006  CLCKAV  MOV     #RTI,@#6        ;SET TRAP TO RETURN
1462  002446  012737  000006  000004          MOV     #6,@#4
1463  002454  000261                         SEC
1464  002456  105777  176344                TSTB    @LKS            ;KW11-L AVAILABLE?
1465  002462  103404                         BCS     1$              ;NO,  BRANCH
1466  002464  005037  000004                CLR     @#4             ;RESET TRAP VECTOR TO HALT
1467  002470  000137  002650                JMP     KW11L           ;USE KW11L FOR TIMING
1468  002474  000261                  1$     SEC
1469  002476  105777  176322                TSTB    @PLKS           ;KW11-P AVAILABLE?
1470  002502  103404                         BCS     SWTIME          ;NO,  USE SWITCH REG FOR TIMING
1471  002504  005037  000004                CLR     @#4             ;RESET TRAP VECTOR TO HALT
1472  002510  000137  002572                JMP     KW11P           ;USE KW11-P FOR TIMING
1473  002514                          SWTIME
1474  002514  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
1475  002522  001002                         BNE     1$                      ;NO- CONTINUE
1476  002524  004737  011762                JSR     PC,ENABL                ;ENABLE KEYBOARD  NTERRUPT
1477  002530                          1$
1478  002530  005037  001042                CLR     LINCNT          ;CLEAR LINE COUNT
1479  002534  004437  011472                JSP     %4,TYPINT
1480  002540  005037  000004                CLR     @#4             ;RESET TRAP VECTOR TO HALT
1481  002544  104000                         EMT     +0              ;TYPE MESSAGE
1482  002546  012542                         MESG                    ;PRINT SPEED CHECK USING MANUAL TIMING
1483  002550  012737  000002  003252        MOV     #2,DIA          ;SET DUMMY ADDRESS
1484  002556  032777  000001  176220  2$    BIT     #BIT0,@SWR       START?
1485  002564  001774                         BEQ     2$              ;WAIT FOR START
1486  002566  000137  002722                JMP     STARO           ;START PRINTING
1487
1488
1489                                    ;START FOR KW11-P
1490
1491  002572                          KW11P
1492  002572  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
1493  002600  001002                         BNE     1$                      ;NO- CONTINUE
1494  002602  004737  011762                JSR     PC,ENABL                ;ENABLE KEYBOARD  NTERRUPT
1495  002606                          1$
1496  002606  005037  001042                CLR     LINCNT           CLEAR LINE COUNT
1497  002612  004437  011472                JSR     %4,TYPINT
1498  002616  012706  001000                MOV     #1000,%6        ;RESET STACK
1499  002622  013777  003246  176172        MOV     MINCNT,@CSBR    ;SET CLOCK COUNT
1500  002630  013737  001024  003252        MOV     PLKS,DIA        ;STORE PLKS ADDRESS
1501  002636  012777  000105  176160        MOV     #105,@PLKS      ;START CLOCK
1502  002644  000137  002722                JMP     STARO            START PRINTING
1503
1504                                     START FOR KW11-L
1505
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1506  002650                                  KW11L
1507  002650  022737  000176  001004                CMP     #176,SWR                ;S/W SWR ?
1508  002656  001002                              BNE     1$                      ;NO- CONTINUE
1509  002660  004737  011762                      JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
1510  002664                                  1$
1511  002664  005037  001042                      CLR     LINCNT          ;CLEAR LINE COUNT
1512  002670  004437  011472                      JSR     %4,TYPINT
1513  002674  012706  001000                      MOV     #1000,%6        ;RESET STACK
1514  002700  013737  003246  003250              MOV     MINCNT,CNTR     ;SET CLOCK COUNT
1515  002706  013737  001026  003252              MOV     LKS,DIA         ;STORE LKS ADDRESS
1516  002714  012777  000100  176104              MOV     #100,@LKS       ;ENABLE CLOCK INTERRUPT
1517
1518                                          ;PRINTING ROUTINE
1519
1520  002722  032777  020000  176054  STARO    BIT     #BIT13,@SWR     ;CHECK CHAR SET
1521  002730  001007                            BNE     STAROA          ;BRANCH IF 96
1522  002732  012737  000140  001060            MOV     #140,LEGCHR     ;LEGAL CHECK
1523  002740  012737  000100  001062            MOV     #100,NUMCHR     ;#CHARS
1524  002746  000406                            BR      STAROC          ;CONTINUE
1525  002750  012737  000200  001060  STAROA    MOV     #200,LEGCHR     ;LEGAL CHECK
1526  002756  012737  000140  001062            MOV     #140,NUMCHR     ;#CHARS
1527  002764  013737  001060  001054  STAROC    MOV     LEGCHR,STRCHR   ;SET FIRST CHAR IF LP14
1528  002772  032777  002000  176004  STAROB    BIT     #BIT10,@SWR     ;CHECK FOR NEW DRUM(LP14)/OLD DRUM
1529  003000  001063                            BNE     TIMTST
1530  003002  012737  000204  001036            MOV     #132.,CHRCNT    ;SET CHAR COUNT
1531  003010  012737  003444  001054            MOV     #PATTB,STRCHR   ;INITIALIZE TABLE POINTER
1532  003016  012737  000021  001044  STARA     MOV     #17 ,CYCCNT     ;SET GROUP COUNT
1533  003024  017737  176024  001040            MOV     @STRCHR,CHRGEN  ;GET CHAR FROM TABLE
1534  003032  063737  001042  001040            ADD     LINCNT,CHRGEN   ;ADD LINE COUNT
1535  003040  023737  001060  001040  1$        CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
1536  003046  003004                            BGT     STAR1           ;YES,  BRANCH
1537  003050  163737  001062  001040            SUB     NUMCHR,CHRGEN   ;NO,  MAKE LEGAL
1538  003056  000770                            BP      1$              ;RECHECK CHAR
1539  003060  013777  001040  175714  STAR1     MOV     CHRGEN,@LPB     ;LOAD BUFFER
1540  003066  005337  001036                    DEC     CHRCNT          ;DECREMENT CHAR COUNT
1541  003072  001410                            BEQ     STARED          ;BRANCH IF DONE LINE
1542  003074  005337  001044                    DEC     CYCCNT          ;DECREMENT CYCCLE COUNT
1543  003100  001367                            BNE     STAR1           ;CONTINUE IF NOT DONE GROUP
1544  003102  062737  000002  001054            ADD     #2,STRCHR       ;ADD 2 TO TABLE POINTER
1545  003110  000137  003016                    JMP     STARA           ;CONTINUE
1546  003114  005237  001042          STARED    INC     LINCNT          ;INCREMENT LINE COUNT
1547  003120  012777  000012  175654            MOV     #12,@LPB        ;SEND LF
1548  003126  105777  175646                    TSTB    @LPS            ;TEST READY
1549  003132  100375                            BPL     -4              ;WAIT FOR READY
1550  003134  032777  000001  175642            BIT     #BIT0,@SWR      ;STOP PRINT?
1551  003142  001450                            BEQ     CONVRT          ;YES,  BRANCH
1552  003144  000137  002772                    JMP     STAROB          ;CONTINUE
1553
1554                                          ;LP14 PRINTING ROUTINE
1555
1556  003150  012737  000204  001036  TIMTST   MOV     #132 ,CHRCNT    ;SET CHARACTER COUNT
1557  003156  005337  001054                    DEC     STRCHR          ;GET NEXT STARTING CHARACTER
1558  003162  023727  001054  000040            CMP     STRCHR,#40      ;LEGAL CHARACTER ?
1559  003170  100003                            BPL     3$              ;YES-CONTINUE
1560  003172  063737  001062  001054            ADD     NUMCHR,STRCHR   ;NO-MAKE LEGAL
1561  003200  013737  001054  001040  3$        MOV     STRCHR,CHRGEN   ;GET CHARACTER
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1562  003206  023727  001040  000040  TMTST2  CMP     CHRGEN,#40      ;LEGAL CHARACTER ?
1563  003214  100003                  BPL     1$              ;YES-CONTINUE
1564  003216  063737  001062  001040          ADD     NUMCHR,CHRGEN   ;NO-MAKE LEGAL
1565  003224  013777  001040  175550  1$      MOV     CHRGEN,@LPB     ;SEND CHARACTER
1566  003232  005337  001036                  DEC     CHRCNT          ;DECREMENT CHARACTER COUNT
1567  003236  001726                  BEQ     STARED          ;LINE FINISHED
1568  003240  005237  001040                  DEC     CHRGEN          ;GET NEXT CHARACTER
1569  003244  000760                  TMTST1  BR      TMTST2          ;CONTINUE
1570
1571
1572  003246  007020                  MINCNT  7020
1573  003250  000000                  CNTR    0
1574  003252  000002                  DIA     2
1575
1576
1577
1578                                  ;LINE CLOCK SERVICE ROUTINE FOR KW11-L
1579
1580
1581  003254  005337  003250          LPSRV   DEC     CNTR            ;DECREMENT COUNTER
1582  003260  001401                  BEQ     CONVRT          ;EXIT IF 1 MINUTE
1583  003262  000002                  RTI                     ;RETURN
1584
1585
1586                                   ROUNTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE
1587
1588  003264  042737  000100  177560  CONVRT  BIC     #100,@DIA       ;DISABLE CLOCK INTEPR.PT  F CLOCK AVA LABLE
1589  003272  005037  011636          CLP     TYPDAT          ;CLEAR D GIT COUNT
1590  003276  012703  013575                  MOV     #MES12,%3       ;SET MESSAGE POINTER
1591  003302  022737  000144  001042  1$      CMP     #100  LINCNT    ;GREATER THAN 100?
1592  003310  003006                  BGT     2$              ;NO,  PRINT HUNDRED'S DIG T
1593  003312  162737  000144  001042          SUB     #100  LINCNT    ;YES,  SUBTRACT 100
1594  003320  005237  011636                  INC     TYPDAT          ;INCREMENT HUNDRED'S DIG T
1595  003324  000766                  BR      1$              ;CONTINUE CONVERSION
1596  003326  062737  000060  011636  2$      ADD     #60,TYPDAT      ;MAKE ASCII
1597  003334  113723  011636                  MOVB    TYPDAT (%3)+    ;STORE DIGIT
1598  003340  005037  011636                  CLR     TYPDAT          ;CLEAR DIGIT COUNTER
1599  003344  022737  000012  001042  3$      CMP     #10 ,LINCNT     ;GREATER THEN 10?
1600  003352  003006                  BGT     4$              ;NO,  PRINT DIGIT
1601  003354  162737  000012  001042          SUB     #10 ,LINCNT     ;YES,  SUBTRACT 10
1602  003362  005237  011636                  INC     TYPDAT          ;INCREMENT TEN'S DIG T
1603  003366  000766                  BR      3$              ;CONTINUE CONVERS ON
1604  003370  062737  000060  011636  4$      ADD     #60,TYPDAT      ;MAKE ASCII
1605  003376  113723  011636                  MOVB    TYPDAT,(%3)+    ;STORE DIGIT
1606  003402  013737  001042  011636          MOV     LINCNT,TYPDAT   ;GET ONE'S DIGIT
1607  003410  062737  000060  011636          ADD     #60,TYPDAT      ;MAKE ASCII
1608  003416  113723  011636                  MOVB    TYPDAT,(%3)+    ;STORE DIGIT
1609  003422  104000                  EMT     +0              ;TYPE MESSAGE
1610  003424  013536                  MES11
1611  003426  012737  013534  011470          MOV     #MES11A,PPTMSG  ;SET PRINTER MESSAGE ADDRESS
1612  003434  004437  011452                  JSR     %4 RINT         ;PRINT PRINTER SPEED ON LINE PRINTER
1613  003440  000137  003464                  JMP     SLEWCK          ;NEXT TEST
1614
1615
1616
1617  003444  000040                  FMTTB   40
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1618  003446  000117                          117
1619  003450  000076                          76
1620  003452  000055                          55
1621  003454  000134                          134
1622  003456  000113                          113
1623  003460  000072                          72
1624  003462  000051                          51
1625
1626                                  ;CHECK TOP OF FORM SWITCH
1627
1628  003464                          SLEWCK:
1629  003464  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
1630  003472  001002                          BNE     1$                      ;NO- CONTINUE
1631  003474  004737  011762                  JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
1632  003500                          1$:
1633  003500  004437  011472                  JSR     %4,TYPINT
1634  003504  004537  011332                  JSR     %5,PRTINT               ;INITIALIZE PRINTER
1635  003510  000406                          BR      SLW                     ;BRANCH IF OK
1636  003512  012737  000024  001052  ERR24:  MOV     #24,    ERCOUNT         ;SET UP ERROR COUNT 24
1637            000025                        N=N+1
1638  003520  004537  011722                  JSR     %5,STAEP                ;REPORT PRINTER NOT READY
1639  003524  000000                          HALT                            ;HALT ON ERROR
1640  003526  012737  003742  001042  SLW:    MOV     #FFTAB,LINCNT           ;LINE COUNT FOR SWITCH SETTING
1641  003534  012704  004020                  MOV     #FFSET,%4               ;INIT SWITCH SETTING TABLE POINTER
1642  003540  012703  013310          SLW0:   MOV     #MES8,%3                ;INIT MESSAGE POINTER
1643  003544  012702  013347                  MOV     #MES10,%2               ;  "       "       "
1644  003550  111413                  SLW1:   MOVB    (%4),(%3)               ;PUT SWITCH SETTINGS INTO MESSAGES
1645  003552  111412                          MOVB    (%4),(%2)               ;  "      "       "    "       "
1646  003554  122423                          CMPB    (%4)+,(%3)+             ;INCREMENT POINTERS
1647  003556  105722                          TSTB    (%2)+
1648  003560  105714                          TSTB    (%4)                    ;DONE MOVING SWITCH SETTINGS TO MSG'S?
1649  003562  001372                          BNE     SLW1                    ;BRANCH IF NOT DONE
1650  003564  005204                          INC     %4                      ;TABLE POINTER SET FOR NEXT SWITCH SETTING
1651  003566  104000                          EMT     +0                      ;TYPE MESSAGE
1652  003570  013254                          MES7                            ;SET TOP OF FORM SWITCH TO ---
1653  003572  000000                          HALT                            ;WAIT FOR OPERATOR TO SET SWITCH
1654  003574  005777  175242          SLW11:  TST     @LINCNT                 ;CHECK LINE COUNT
1655  003600  001003                          BNE     SLW1A                   ;BRANCH IF NOT ZERO
1656  003602  012737  013624  011470          MOV     #MES13,PRTMSG           ;CHANGE PRINTER MESSAGE
1657  003610  005777  175164          SLW1A:  TST     @LPS                    ;TEST FOR ERRORS
1658  003614  100006                          BPL     SLW2                    ;BRANCH IF NO ERROR
1659  003616  012737  000025  001052  ERR25:  MOV     #25     ERCOUNT         ;SET UP ERROR COUNT 25
1660            000026                        N=N+1
1661  003624  004537  011722                  JSR     %5,STAER                ;REPORT ERROR SET
1662  003630  000000                          HALT                            ;HALT ON ERROR
1663  003632  012777  000014  175142  SLW2:   MOV     #14,@LPB                ;SEND FF
1664  003640  105777  175134                  TSTB    @LPS                    ;TEST READY
1665  003644  100375                          BPL     -4                      ;WAIT FOR READY
1666  003646  004437  011452                  JSR     %4,PRINT                ;PRINT MESSAGE ON LINE PRINTER
1667  003652  062737  000002  001042          ADD     #2,LINCNT               ;NEXT LINE COUNT
1668  003660  022737  004016  001042          CMP     #FTABE LINCNT           ;DONE TEST?
1669  003666  001410                          BEQ     DAVAV                   ;YES,  EXIT
1670  003670  005777  175146                  TST     @LINCNT                 ;DONE CHECK OF THIS SWITCH SETTING?
1671  003674  001721                          BEQ     SLW0                    ;YES,  NEXT SWITCH SETTING
1672  003676  012737  013326  011470          MOV     #MES9 PRTMSG            ;NO,  CHECK THIS SETTING
1673  003704  000137  003574                  JMP     SLW11                   ;CONTINUE
```

```
1674  003710  013737  014604  013310  DAVAV   MOV     TN013,MES8      ,SET MESSAGE
1675  003716  104000                  EMT     +0              ,TYPE MESSAGE
1676  003720  013252                  MES7A                   ,RESET TOP OF FORM SWITCH
1677  003722  000000                  HALT                    ,WAIT FOR OPERATOR
1678  003724  032777  040000  175052  BIT     #BIT14,@SWR     ,DAVFU AVAILABLE?
1679  003732  001060                  BNE     INDAT           ,YES,  DO DAVFU TESTS
1680  003734  000000                  HALT                    ,DONE OPERATOR TESTS  -  HALT
1681  003736  000137  004562          JMP     TEST2           ,DEPRESS CONTINUE TO START PRINTING TESTS
1682
1683  003742  000000          FFTAB   0                       ,LOOP COUNTS FOR SLEW CHECKS
1684  003744  000022                  18
1685  003746  000000                  0
1686  003750  000025                  21
1687  003752  000000                  0
1688  003754  000030                  24
1689  003756  000000                  0
1690  003760  000041                  33
1691  003762  000000                  0
1692  003764  000044                  36
1693  003766  000000                  0
1694  003770  000052                  42
1695  003772  000000                  0
1696  003774  000060                  48
1697  003776  000000                  0
1698  004000  000063                  51
1699  004002  000000                  0
1700  004004  000102                  66
1701  004006  000000                  0
1702  004010  000110                  72
1703  004012  000000                  0
1704  004014  000124                  84
1705  004016  000000          FTABE   0
1706
1707
1708  004020  020063  000040  FFSET   ASCIZ  /3 /             SWITCH SETTINGS FOR MESSAGES
1709  004024  020063  000065          ASCIZ  /3 5/
1710  004030  020064  000040          ASCIZ  /4 /
1711  004034  020065  000065          ASCIZ  /5 5/
1712  004040  020066  000040          ASCIZ  /6 /
1713  004044  020067  000040          ASCIZ  /7 /
1714  004050  020070  000040          ASCIZ  /8 /
1715  004054  020070  000065          ASCIZ  /8 5/
1716  004060  030061  000040          ASCIZ  /11 /
1717  004064  031061  000040          ASCIZ  /12 /
1718  004070  032061  000040          ASCIZ  /14 /
1719
1720
1721                                  EVEN
1722
1723                          CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1724
1725  004074                  NDAT
1726  004074  022737  000176  001004          CMP     #176,SWR                ,S/W SWR ?
1727  004102  001002                          BNE     1$                      ;NO- CONTINUE
1728  004104  004737  011762                  JSR     PC,ENABL                ,ENABLE KEYBOARD  INTERRUPT
1729  004110                  1$
```

```
1730  004110  004437  011472                    JSR     %4,TYPINT
1731  004114  012737  004244  001040            MOV     #INDATT,CHRGEN  ;SET TABLE POINTER
1732  004122  005777  174652          INDO      TST     @LPS            ;TEST FOR ERROR
1733  004126  100010                            BPL     INDATO          ;BRANCH IF NO ERROR
1734  004130  012737  000026  001052  ERR26     MOV     #26.    ERCOUNT         ;SET UP ERROR COUNT 26
1735          000027                            N=N+1
1736  004136  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
1737  004142  000000                            HALT                    ;HALT ON ERROR
1738  004144  000137  004074                    JMP      NDAT           ;RESTART TEST
1739  004150  017777  174664  174624  INDATO    MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1740  004156  062737  000002  001040            ADD     #2,CHRGEN       ;NEXT DATA
1741  004164  005777  174650                    TST     @CHRGEN         ;TEST CHAR
1742  004170  001405                            BEQ     IND1            ;CONTINUE IF DONE
1743  004172  105777  174602                    TSTB    @LPS            ;TEST READY
1744  004176  100375                            BPL      -4             ;WAIT FOR READY
1745  004200  000137  004122                    JMP     INDO
1746  004204  005777  174570          IND1      TST     @LPS            ;TEST FOR ERROR SET
1747  004210  100410                            BMI     INDAT1          ;BRANCH IF ERROR SET
1748  004212  012737  000027  001052  ERR27     MOV     #27.    ERCOUNT         ;SET UP ERROR COUNT 27
1749          000030                            N=N+1
1750  004220  004537  011722                    JSR     %5,STAER        ;REPORT ERROR NOT SET
1751  004224  000000                            HALT                    ;HALT ON ERROR
1752  004226  000137  004074                    JMP      NDAT           ;RESTART TEST
1753  004232  104000                 NDAT1      EMT     +0              ;TYPE MESSAGE
1754  004234  012422                            MESA                    ;ERROR SET OK - CLEAR & TURN ON LINE
1755  004236  000000                            HALT                    ;WAIT FOR OPERATOR
1756                                                                    ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1757  004240  000137  004260                    JMP     NODAT           ;NEXT TEST
1758
1759  004244  000356                 NDATT      356                     ;DATA TABLE FOR ABOVE TEST
1760  004246  000001                            1
1761  004250  000002                            2
1762  004252  000003                            3
1763  004254  000357                            357
1764  004256  000000                            0
1765
1766                                    ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS  IF CHANNEL SELECTED
1767
1768  004260                          NODAT:
1769  004260  022737  000176  001004            CMP     #176,SWR                ;S/W SWR ?
1770  004266  001002                            BNE     1$                      ;NO- CONTINUE
1771  004270  004737  011762                    JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
1772  004274                          1$:
1773  004274  004437  011472                    JSR     %4,TYPINT
1774  004300  012737  000200  001054            MOV     #200,STRCHR     ;SET PAPER INSTRUCTION
1775  004306  012737  004502  001040  NODOA     MOV     #NODAT3,CHRGEN  ;SET TABLE POINTER FOR LOAD
1776  004314  005777  174460          NODO      TST     @LPS            ;TEST FOR ERROR
1777  004320  100007                            BPL     NODATO          ;BRANCH IF NO ERROR
1778  004322  012737  000030  001052  ERR30     MOV     #30.    ERCOUNT         ;SET UP ERROR COUNT 30
1779          000031                            N=N+1
1780  004330  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
1781  004334  000000                            HALT                    ;HALT ON ERROR
1782  004336  000750                            BR      NODAT           ;RESTART TEST
1783  004340  017777  174474  174434  NODATO    MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1784  004346  062737  000002  001040            ADD     #2,CHRGEN       ;NEXT DATA
1785  004354  022737  004562  001040            CMP     #NODAT4+2,CHRGEN        ;DONE LOAD
```

```
1786  004362  001405                        BEQ     NODATA          ;BRANCH IF DONE
1787  004364  105777  174410                TSTB    @LPS            ;TEST READY
1788  004370  100375                        BPL     -4              ;WAIT FOR READY
1789  004372  000137  004314                JMP     NODO
1790  004376  013777  001054  174376  NODATA MOV     STRCHR,@LPB     ;SEND DATA
1791  004404  005037  001036                CLR     CHRCNT          ;DELAY
1792  004410  005237  001036          1$    INC     CHRCNT
1793  004414  001375                        BNE     1$
1794  004416  005777  174356                TST     @LPS            ;TEST FOR ERROR SET
1795  004422  100410                        BMI     NODAT1          ;BRANCH IF ERROR SET
1796  004424  012737  000031  001052  ERR31 MOV     #31,    ERCOUNT         ;SET UP ERROR COUNT 31
1797          000032                        N=N+1
1798  004432  004537  011722                JSR     %5,STAER        ;REPORT ERROR NOT SET
1799  004436  000000                        HALT                    ;HALT ON ERROR
1800  004440  000137  004306                JMP     NODOA           ;RETEST
1801  004444  005237  001054          NODAT1 INC     STRCHR          ;NEXT PAPER INSTRUCTION
1802  004450  022737  000214  001054        CMP     #214,STRCHR     ;DONE TEST?
1803  004456  001404                        BEQ     NODAT2          ;CONTINUE IF NOT DONE
1804  004460  104000                        EMT     +0              ;TYPE MESSAGE
1805  004462  012467                        MESB                    ;ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1806  004464  000000                        HALT                    ;WAIT FOR OPERATOR
1807  004466  000707                        BR      NODOA           ;RELOAD & TEST NEXT CHANNEL
1808  004470  104000                NODAT2  EMT     +0              ;TYPE MESSAGE
1809  004472  012422                        MESA                    ;ERROR SET OK - TURN ON L NE
1810  004474  000000                        HALT
1811  004476  000137  004562                JMP     TEST2           ;JUMP
1812
1813
1814  004502  000356                NODAT3  356                     ;START LOAD
1815  004504  000000                        0
1816  004506  000000                        0
1817  004510  000000                        0
1818  004512  000000                        0
1819  004514  000000                        0
1820  004516  000000                        0
1821  004520  000000                        0
1822  004522  000000                        0
1823  004524  000000                        0
1824  004526  000000                        0
1825  004530  000000                        0
1826  004532  000000                        0
1827  004534  000000                        0
1828  004536  000000                        0
1829  004540  000000                        0
1830  004542  000000                        0
1831  004544  000000                        0
1832  004546  000000                        0
1833  004550  000000                        0
1834  004552  000000                        0
1835  004554  000000                        0
1836  004556  000000                        0
1837  004560  000357                NODAT4  357                     ;STOP LOAD
1838
1839                                  TEST 2
1840                                  TESTS INTERFACE AND PRINTER DATA PATHS
1841                                  WITH ALTERNATING ONES AND ZEROS
```

```
1842
1843  004562                                  TEST2
1844  004562  022737  000176  001004                CMP     #176,SWR                ;S/W SWR ?
1845  004570  001002                              BNE     1$                      ,NO- CONTINUE
1846  004572  004737  011762                      JSR     PC,ENABL                ,ENABLE KEYBOARD INTERRUPT
1847  004576                                  1$
1848  004576  004437  011472                      JSR     %4,TYPINT
1849  004602  004537  011332                      JSR     %5,PRTINT       ,INITIALIZE PRINTER
1850  004606  000406                              BR      TST2AX          ,BRANCH IF OK
1851  004610  012737  000032  001052  ERR32       MOV     #32,    ERCOUNT         ,SET UP ERROR COUNT 32
1852          000033                              N=N+1
1853  004616  004537  011722                      JSR     %5,STAER        ,REPORT PRINTER NOT READY
1854  004622  000000                              HALT                    ,HALT ON ERROR
1855  004624                                  TST2AX
1856  004624  013737  014562  014050                MOV     TNO2,MES15              ,SET TEST NUMBER FOR MESSAGE
1857  004632  004437  011406                      JSR     %4,PRNNT                ,PRINT TEST NUMBER
1858          000003                              M=M+1
1859  004636  012737  177740  001044              MOV     #-32 ,CYCCNT    ,SET UP LINE COUNT FOR 32 LINES
1860  004644  012737  177574  001036              MOV     #-132 ,CHRCNT   ,SET CHAR COUNT TO 132
1861  004652  013737  004726  001054              MOV     SCHRSW,STRCHR   ,SET CHAR.  SWITCH TO U
1862  004660  005777  174114          T3A         TST     @LPS            ,TEST FOR ERROR
1863  004664  100006                              BPL     LP2B            ,NO ERROR CONTINUE
1864  004666  012737  000033  001052  ERR33       MOV     #33,    ERCOUNT         ,SET UP ERROR COUNT 33
1865          000034                              N=N+1
1866  004674  004537  011722                      JSR     %5,STAER        ,REPORT ERROR SET
1867  004700  000000                              HALT                    ,HALT ON ERROR
1868  004702  000177  174146          LP2B        JMP     @STRCHR         ,LOAD CHAR
1869  004706  013737  004730  001054  T2A         MOV     RCHRSW,STRCHR   ,RESET CHAR  SWITCH
1870  004714  012737  000125  001050              MOV     #125,SAVE       ,STORE CHAR
1871  004722  000137  004746                      JMP     T5A             ,LOAD CHAR
1872
1873  004726  004706                  SCHRSW      T2A
1874  004730  004732                  RCHRSW      T1A
1875
1876  004732  013737  004726  001054  T1A         MOV     SCHRSW,STRCHR   ,SET CHAR  SWITCH TO U
1877  004740  012737  000052  001050              MOV     #52,SAVE        ,STORE CHAR
1878  004746  013777  001050  174026  T5A         MOV     SAVE,@LPB       ,LOAD BUFFER
1879  004754  005237  001036                      INC     CHRCNT          ,INC CHARACTER COUNT
1880  004760  001337                              BNE     T3A             ,CONTINUE
1881  004762  012777  000012  174012              MOV     #12,@LPB        ,SEND LF
1882  004770  105777  174004                      TSTB    @LPS            ,TEST READY
1883  004774  100375                              BPL      -4             ,WAIT FOR READY
1884  004776  012737  177574  001036              MOV     #-132 ,CHRCNT   ,RESET CHAR COUNT
1885  005004  005237  001044                      INC     CYCCNT          ,INC CYCLE COUNT
1886  005010  001356                              BNE     T5A             ,CONTINUE IF NOT DONE
1887  005012  032777  010000  173764              BIT     #BIT12,@SWR     ,LOOP ON TEST?
1888  005020  001260                              BNE     TEST2           ,LOOP
1889
1890                                      ,TEST 3
1891                                      ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1892                                      ,ALL CHARACTERS AND ILLEGAL CHARACTERS
1893
1894  005022                                  TEST3
1895  005022  022737  000176  001004                CMP     #176,SWR                ,S/W SWR ?
1896  005030  001002                              BNE     1$                      ,NO- CONTINUE
1897  005032  004737  011762                      JSR     PC,ENABL                ,ENABLE KEYBOARD INTERRUPT
```

```
1898  005036                                  1$
1899  005036  004437  011472                  JSR     %4,TYPINT
1900  005042  013737  014564  014050          MOV     TN03,MES15              ;SET TEST NUMBER FOR MESSAGE
1901  005050  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
1902          000004                          M=M+1
1903  005054  012737  177765  001044          MOV     #-13.,CYCCNT            ;SET 21 LINES
1904  005062  000137  005214                  JMP     LP2H                    ;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1905  005066  012737  177574  001036  T2B0    MOV     #-132.,CHRCNT           ;SET CHAR COUNT FOR 132
1906  005074  012737  000040  001040  T2B0A   MOV     #40,CHRGEN              ;SET FIRST CHAR
1907  005102  005777  173672          T2B1    TST     @LPS                    ;DOES THE PRINTER HAVE AN ERROR
1908  005106  100006                          BPL     LP2E                    ;BRANCH IF NO ERROR
1909  005110  012737  000034  001052  ERR34   MOV     #34.,   ERCOUNT         ;SET UP EPPOR COUNT 34
1910          000035                          N=N+1
1911  005116  004537  011722                  JSR     %5,STAER                ;REPORT ERROR
1912  005122  000000                          HALT                            ;HALT ON ERROR
1913  005124  013777  001040  173650  LP2E    MOV     CHRGEN,@LPB             ;PRINT CHARACTER
1914  005132  005237  001036                  INC     CHRCNT                  ;INC  CHAR  COUNT
1915  005136  001420                          BEQ     T2B2                    ;BRANCH IF LINE IS FINISHED
1916  005140  005237  001040                  INC     CHRGEN                  ;NEXT CHAR
1917  005144  032777  020000  173632          BIT     #BIT13,@SWR             ;CHECK CHAR SET
1918  005152  001405                          BEQ     T2B2B                   ;BRANCH IF 64 CHARS
1919  005154  022737  000200  001040          CMP     #200,CHRGEN             ;LEGAL CHAR?
1920  005162  001744                          BEQ     T2B0A                   ;MAKE SPACE IF ILLEGAL
1921  005164  000746                          BR      T2B1                    ;CONTINUE IF LEGAL CHAR
1922  005166  022737  000140  001040  T2B2B   CMP     #140,CHRGEN             ;LEGAL CHAR?
1923  005174  001737                          BEQ     T2B0A                   ;MAKE SPACE IF ILLEGAL
1924  005176  000741                          BR      T2B1                    ;CONTINUE IF LEGAL CHAR
1925  005200  012777  000012  173574  T2B2    MOV     #12,@LPB                ;ISSUE LINE FEED
1926  005206  105777  173566                  TSTB    @LPS                    ;TEST READY
1927  005212  100375                          BPL     -4                      ;WAIT FOR READY
1928  005214  005037  001040          LP2H    CLR     CHRGEN                  ;FIRST ILLEGAL CHAR
1929  005220  005777  173554          T2B3    TST     @LPS                    ;TEST FOR ERROR
1930  005224  100006                          BPL     LDCH                    BRANCH IF NO ERROR
1931  005226  012737  000035  001052  ERR35   MOV     #35.,   ERCOUNT         ;SET UP ERROR COUNT 35
1932          000036                          N=N+1
1933  005234  004537  011722                  JSR     %5,STAER                ;REPORT ERROR SET
1934  005240  000000                          HALT                            ;HALT ON ERROR
1935  005242  013777  001040  173532  LDCH    MOV     CHRGEN,@LPB             ;TRANSMIT CHARACTER
1936  005250  005237  001040          T2B4    INC     CHRGEN                  ;NEXT CHAR
1937  005254  022737  000012  001040          CMP     #12,CHRGEN              ;TEST FOR LINE FEED
1938  005262  001774                          BEQ     T2B4                    ;SKIP IF LF
1939  005264  022737  000014  001040          CMP     #14,CHRGEN              ;TEST FOR FORM FEED
1940  005272  001766                          BEQ     T2B4                    ;SKIP IF FF
1941  005274  022737  000015  001040          CMP     #15.CHRGEN              ;TEST FOR CARRIAGE RETURN
1942  005302  001762                          BEQ     T2B4                    ;SKIP IF CR
1943  005304  023727  001040  000040          CMP     CHRGEN,#40              CHECK IF LEGAL CHAR
```

```
1344  005312  002753                        BLT     LDCH            ;CONTINUE IF STILL ILLEGAL CHAR
1345  005314  032777  020000  173462        BIT     #BIT13,@SWR     ;CHECK CHAR SET
1346  005322  001007                        BNE     T285            ;BRANCH IF 96 CHAR SET
1347  005324  052737  000100  001040        BIS     #100,CHRGEN     ;SET BIT 7 IF NOT SET
1348  005332  032737  000200  001040        BIT     #200,CHRGEN     ;DONE ILLEGAL CHARS?
1349  005340  001740                        BEQ     LDCH            ;BRANCH IF NOT DONE
```

```
005342  012777  000012  173432  T2B5:   MOV     #12,@LPB        ;ISSUE LINE FEED
005350  105777  173424                  TSTB    @LPS            ;TEST READY
005354  100375                          BPL     .-4             ;WAIT FOR READY
005356  005237  001044                  INC     CYCCNT          ;INCREMENT LINE COUNT
005362  001241                          BNE     T2B0            ;CONTINUE IF NOT DONE
005364  032777  010000  173412          BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
005372  001213                          BNE     TEST3           ;LOOP

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

```
005374                          CHRCHK:
005374  022737  000176  001004          CMP     #176,SWR        ;S/W SWR ?
005402  001002                          BNE     1$              ;NO- CONTINUE
005404  004737  011762                  JSR     PC,ENABL        ;ENABLE KEYBOARD INTERRUPT
005410                          1$:
```

SEQ 0043

```
[illegible]  005410  004437  011472                JSR     %4.TYPINT
```

```
005414  013737  014566  014050          MOV     TN04,MES15              ;SET TEST NUMBER FOR MESSAGE
005422  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
        000005                          M=M+1
```

```
005426  012737  177750  001042        MOV     #-24 ,LINCNT      SET UP LINE COUNT FOR 24 LINES
005434  012737  177776  001044        MOV     #-2,CYCCNT        ;SET UP CYCLE COUNT
005442  012737  005604  001054        MOV     CHRE,STRCHR       ;SET CHAR TAG TO SPACE
```

SEQ 0046

```
1974  005450  012737  177574  001036  CR      MOV     #-132 ,CHRCNT   ,SET CHAR COUNT
1975  005456  005777  173316          CR0     TST     @LPS            ,TEST FOR ERROR
1976  005462  100006                          BPL     CR1             ,CONTINUE IF NO ERROR
1977  005464  012737  000036  001052  ERR36   MOV     #36.    ERCCUNT         ,SET UP ERROR COUNT 36
1978          000037                          N=N+1
1979  005472  004537  011722                  JSR     %5,STAER        ,REPORT ERROR SET
1980  005476  000000                          HALT                    ,HALT ON ERROR
1981  005500  000177  173350          CR1     JMP     @STRCHR         ,OPPOSITE CHAR
1982  005504  013737  005604  001054  CR2     MOV     CHRE,STRCHR     ,SET CHAR SWITCH TO SPACE
1983  005512  012737  000105  001050          MOV     #105,SAVE       ,SEND E
1984  005520  013777  001050  173254  CR3     MOV     SAVE,@LPB       ,LOAD BUFFER
1985  005526  005237  001036                  INC     CHRCNT          ,INCREMENT CHAR COUNT
1986  005532  001351                          BNE     CR0              BRANCH IF NOT DONE
1987  005534  005237  001044                  INC     CYCCNT          ,INCREMENT CYCLE COUNT
```

SEQ 0047

```
[illegible]  001422                    BEQ     CR5             ;BRANCH IF FINISHED OVERPRINTS
```

```
005542  012777  000015  173232        MOV     #15,@LPB        ;SEND CR
005550  105777  173224                TSTB    @LPS            ;TEST READY
005554  100?75                        BPL     -4              ;WAIT FOR READY
```

SEQ 0049

```
1332  005556  000137  005450                    JMP     CR              ,OVERPRINT LINE
1333  005562  013737  005602  001054  CP7       MOV     CHRS,STRCHR     ,RESET CHAR SWITCH
1334  005570  012737  000040  001050            MOV     #40,SAVE        ,SEND SPACE
```

```
 1995  005576  000137  005520                    JMP     CR3             ,CONTINUE
 1996
 1997  005602  005504                    CHRS    CR2
 1998  005604  005562                    CHRE    CR7
 1999  005606  012777  000012  1,3166    CR5     MOV     #12,@LPB        ,SEND LF
 2000  005614  105777  173160                    TSTB    @LPS            ,TEST READY
 2001  005620  100375                            BPL      -4             ,WAIT FOR READY
 2002  005622  012737  177776  001044            MOV     #-2,CYCCNT      ,RESET CYCLE COUNT
 2003  005630  012737  177574  001036            MOV     #-132 ,CHRCNT   ,RESET CHAR COUNT
 2004  005636  005237  001042                    INC     LINCNT          ,INCREMENT LINE COUNT
 2005  005642  001326                            BNE     CR3             ,BRANCH IF NOT DONE
 2006  005644  032777  010000  173132            BIT     #BIT12,@SWR     ,LOOP ON TEST?
 2007  005652  001250                            BNE     CHRCHK          ,YES,  LOOP
 2008
 2009
 2010
 2011                                    ,TEST 5
 2012                                    ,SHUTTLE POS T ON NG TEST
 2013                                    ,SENDS PAIRS OF E S   THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER
```

SEQ 0051

```
2014                                    ;PAIR OF E'S TO THE LINE ---  THIS IS REPEATED UNTIL A FULL LINE OF E'S
2015                                    ;HAVE BEEN PRINTED,  THEN A FULL LINE OF M'S ARE PRINTED
2016
2017  005654                            OVRPRT
2018  005654  022737  000176  001004            CMP     #176,SWR                ;S/W SWR ?
2019  005662  001002                    BNE     1$                      ;NO- CONTINUE
2020  005664  004737  011762                    JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
2021  005670                            1$
2022  005670  004437  011472                    JSR     %4,TYPINT
2023  005674  013737  014570  014050            MOV     TNOS,MES15              ;SET TEST NUMBER FOR MESSAGE
2024  005702  004437  011406                    JSR     %4,PRNNT                ;PRINT TEST NUMBER
2025          000006                    M=M+1
2026  005706  012737  177760  001042            MOV     #-16 ,LINCNT    ;SET LINE COUNT FOR 16 LINES
2027  005714  012737  177574  001036  OVR       MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2028  005722  012737  177776  001044  OVRO      MOV     #-2,CYCCNT      ;SET CYCLE COUNT FOR A PAIR OF E'S
2029  005730  013737  001036  001056            MOV     CHRCNT,STRCNT   ;NO   CHARS LEFT TO PRINT
2030  005736  062737  000205  001056            ADD     #133 ,STRCNT    ;NO   SPACES +1
2031  005744  012737  000040  001040            MOV     #40,CHRGEN      ;SEND SPACE
2032  005752  000406                    BR      OVR2                    ;BRANCH
2033  005754  012737  000105  001040  OVR4      MOV     #105,CHRGEN     ;SEND E
```

SEQ 0052

```
 2034  005762  013777  001040  173012  OVR1    MOV     CHRGEN,@LPB     ,LOAD BUFFER
 2035  005770  005777  173004          OVR2    TST     @LPS            ,TEST FOR ERROR
 2036  005774  100006                          BPL     OVR3            ,BRANCH IF NO ERROR
 2037  005776  012737  000037  001052  ERR37   MOV     #37,    ERCOUNT         ,SET UP ERROR COUNT 37
 2038          000040                          N=N+1
 2039  006004  004537  011722                  JSR     %5,STAER        ,REPORT ERROR SET
 2040  006010  000000                          HALT
 2041  006012  005337  001056          OVR3    DEC     STRCNT          ,DECREMENT SPACE COUNTER
```

```
2042 006016 003361          BGT     OVR1            ;BRANCH IF NOT DONE SPACES
```

```
006020  001755                         BEQ     OVR4        ;BRANCH IF NOT FIRST E
006022  005237  001036                 INC     CHRCNT      ;INCREMENT CHAR COUNT
006026  001437                         BEQ     OVR8        ;BRANCH IF DONE LINE
006030  005237  001044         OVR5:   INC     CYCCNT      ;INCREMENT CYCLE COUNT
```

```
006034  001352                           BNE   OVR1           ,CONTINUE SENDING E'S IF NOT DONE
006036  012777  000015  172736           MOV   #15,@LPB        SEND CR
006044                           OVR6
006044  105777  172730                   TSTB  @LPS           ,TEST READY
006050  100375                           BPL   -4             ,WAIT FOR READY
006052  005737  001036                   TST   CHRCNT         ,LINE DONE?
006056  001321                           BNE   OVRO           ,NO.  CONTINUE OVER PRINT
006060  005237  001042                   INC   LINCNT         ,YES.  INCREMENT LINE COUNT
006064  001425                           BEQ   OVREXT         ,EXIT IF DONE TEST
006066  032737  000001  001042           BIT   #1,LINCNT      ,WHICH LINE NEXT?
006074  001707                           BEQ   OVR            ,BRANCH TO SEND E'S
006076  012737  000115  001040           MOV   #115,CHRGEN    ,SET UP TO SEND M'S
006104  012737  177573  001036           MOV   #-133 ,CHRCNT  ,SET CHAR COUNT
006112  005037  001056                   CLR   STRCNT         ,CLEAR SPACE COUNT
006116  005037  001044                   CLR   CYCLNT         ,CLEAR CYCLE COUNT
```

```
006122  000137  005770                 JMP     OVR2            ;PRINT LINE OF M'S
006126  012777  000012  172646  OVR8:  MOV     #12,@LPB        ;SEND LF
```

```
[illegible] [illegible]   000137  006044          JMP     OVR6            ;CONTINUE
```

```
        006140  032777  010000  172636  OVREXT  BIT     #BIT12,@SWR     ;LOOP ON TEST?
        006146  001242                          BNE     OVRPRT          ;LOOP

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

        006150                          PPTCTL:
        006150  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
        006156  001002                          BNE     1$                      ;NO- CONTINUE
        006160  004737  011762                  JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
        006164                          1$:
        006164  004437  011472                  JSR     R4,TYPNT
```

```
2079  006170  013737  014572  014050          MOV     TN06,MES15              ;SET TEST NUMBER FOR MESSAGE
2080  006176  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
2081                  000007                  M=M+1
2082  006202  012737  000060  001054          MOV     #60,STRCHR      ;FIRST START CHAR
2083  006210  032777  020000  172566  PRT0    BIT     #BIT13,@SWR     ;TEST FOR CHAR SET
2084  006216  001404                          BEQ     PRT1            ;BRANCH IF 64 CHARS
2085  006220  012737  177641  001034          MOV     #-95 ,SEGCNT    ;SET OVERFLOW COUNT
2086  006226  000403                          BR      PRT2             BRANCH
2087  006230  012737  177701  001034  PRT1    MOV     #-63 ,SEGCNT    ;SET OVERFLOW COUNT
2088  006236  012737  177574  001036  PRT2    MOV     #-132 ,CHRCNT   ;SET CHAR COUNT
2089  006244  013737  001054  001040          MOV     STRCHR,CHRGEN   ;GET START CHAR
2090  006252  005777  172522          PRT3    TST     @LPS            ;TEST FOR ERROR
2091  006256  100006                          BPL     PRT4            ;BRANCH IF NO ERROR
2092  006260  012737  000040  001052  ERR40   MOV     #40,    ERCOUNT         ;SET UP ERROR COUNT 40
2093                  000041                  N=N+1
2094  006266  004537  011722                  JSR     %5,STAEP        ;REPORT ERROR SET
2095  006272  000000                          HALT                    ;HALT ON ERROR
2096  006274  013777  001040  172500  PRT4    MOV     CHRGEN,@LPB     ;LOAD BUFFER
2097  006302  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
2098  006306  002761                          BLT     PRT3            ;BRANCH IF NOT 132 CHARS
2099  006310  001433                          BEQ     PRTA             START OVERFLOW
2100  006312  005237  001040                  INC     CHRGEN           NEXT CHAR
```

```
2101  006316  005237  001034                  INC     SEGCNT          ;INCREMENT OVERFLOW COUNT
2102  006322  001353                          BNE     PRT3            ;CONTINUE IF NOT DONE
2103  006324  012777  000012  172450          MOV     #12,@LPB        ;SEND LF
2104  006332  105777  172442                  TSTB    @LPS            ;TEST READY
2105  006336  100375                          BPL     -4              ;WAIT FOR READY
2106  006340  022737  000040  001054          CMP     #40,STRCHR      ;LAST START CHAR SPACE?
2107  006346  001421                          BEQ     PRT6            ;YES,  BRANCH
2108  006350  022737  000065  001054          CMP     #65,STRCHR      ;LAST START CHAR 5?
2109  006356  001422                          BEQ     PRT7            ;YES,  BRANCH
2110  006360  022737  000071  001054          CMP     #71,STRCHR      ;DONE?
2111  006366  001423                          BEQ     PRT8            ;YES
2112  006370  005237  001054                  INC     STRCHR          ;NO,  GET NEXT START CHAR
2113  006374  000137  006210                  JMP     PRTO            ;CONTINUE
2114  006400  012737  000041  001040  PRTA    MOV     #41,CHRGEN      ;GET FIRST CHAR IN SET
2115  006406  000137  006252                  JMP     PRT3            ;START OVERFLOW
2116  006412  012737  000066  001054  PRT6    MOV     #66,STRCHR      ;SET START CHAR TO 6
2117  006420  000137  006210                  JMP     PRTO            ;CONTINUE
2118  006424  012737  000040  001054  PRT7    MOV     #40,STRCHR      ;SET START CHAR TO SPACE
2119  006432  000137  006210                  JMP     PRTO            ;CONTINUE
2120  006436  032777  010000  172340  PRT8    BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
2121  006444  001241                          BNE     PRTCTL          ;LOOP
2122
2123                                  ;TEST 7
2124                                  ;MULTIPLE LINE ADVANCE TEST
2125                                  ;TESTS MULTIPLE LINE ADVANCES AND TIMINGS
2126                                  ;PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER
2127
2128  006446                          MLF
2129  006446  022737  000176  001004          CMP     #176,SWR        ;S/W SWR ?
2130  006454  001002                          BNE     1$              ;NO- CONTINUE
2131  006456  004737  011762                  JSR     PC,ENABL        ;ENABLE KEYBOARD INTERRUPT
2132  006462                          1$
2133  006462  004437  011472                  JSR     %4,TYPNT
2134  006466  013737  014574  014050          MOV     TNO7,MESS15     ;SET TEST NUMBER FOR MESSAGE
2135  006474  004437  011406                  JSR     %4,PRNNT        ;PRINT TEST NUMBER
2136          000010                          M=M+1
2137  006500  012737  006632  001054          MOV     #TABSTR,STRCHR  ;FIRST CHAR
2138  006506  012737  177574  001036  MLFA    MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2139  006514  117737  172334  001040          MOVB    @STRCHR,CHRGEN  ;GET CHAR
2140  006522  001452                          BEQ     MLF4            ;BRANCH IF DONE
2141  006524  005777  172250          MLF0    TST     @LPS            ;TEST FOR ERROR
2142  006530  100006                          BPL     MLF1            ;CONTINUE IF NO ERROR
2143  006532  012737  000041  001052  ERR41   MOV     #41.    ERCOUNT ;SET UP ERROR COUNT 41
2144          000042                          N=N+1
2145  006540  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
2146  006544  000000                          HALT                    ;HALT ON ERROR
2147  006546  013777  001040  172226  MLF1    MOV     CHRGEN,@LPB     ;LOAD BUFFER
2148  006554  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
2149  006560  001361                          BNE     MLF0            ;CONTINUE
2150  006562  117737  172266  001042          MOVB    @STRCHR,LINCNT  ;GET ASCII LINE COUNT
2151  006570  042737  177770  001042          BIC     #177770,LINCNT  ;MAKE OCTAL
2152  006576  005237  001042                  INC     LINCNT          ;ADD 1
2153  006602  012777  000012  172172  MLF2    MOV     #12,@LPB        ;SEND LF
2154  006610  105777  172164                  TSTB    @LPS            ;TEST READY
2155  006614  100375                          BPL     -4              ;WAIT FOR READY
2156  006616  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
```

```
2157  006622  001367                    BNE     MLF2            ;CONTINUE
2158  006624  005237  001054            INC     STRCHR          ;NEXT CHAR
```

```
2159  006630  000726                          BR      MLFA            ,CONTINUE
2160
2161  006632  033462  033062  033463  TABSTR  ASCIZ   /272637463540/
2162  006640  033C64  032463  030064
2163  006646     000
2164
2165          006650                          EVEN
2166
2167  006650  032777  010000  172126  MLF4    BIT     #BIT12,@SWR     ,CHECK LOOP ON TEST
2168  006656  001273                          BNE     MLF             ,LOOP
2169                                          EVEN
2170
2171                                  TEST 8
2172                                  ,HIGH SPEED PRINT TEST
2173
2174  006660                          HSPRT
2175  006660  022737  000176  001004          CMP     #176,SWR                ,S/W SWR ?
2176  006666  001002                          BNE     1$                      ,NO- CONTINUE
2177  006670  004737  011762                  JSR     PC,ENABL                ,ENABLE KEYBOARD INTERRUPT
2178  006674                          1$
2179  006674  004437  011472                  JSR     %4,TYPINT
2180  006700  013737  014576  014050          MOV     TN010,MES15             ,SET TEST NUMBER FOR MESSAGE
2181  006706  004437  011406                  JSR     %4,PRNNT                ,PRINT TEST NUMBER
2182          000011                          M=M+1
2183  006712  032777  002000  172064          BIT     #BIT10,@SWR     ,CHECK FOR NEW DRUM / OLD DRUM
2184  006720  001135                          BNE     NHSPRT          ,BRANCH IF NEW DRUM
2185  006722  032777  020000  172054          BIT     #BIT13,@SWR     ,CHECK CHAR SET
2186  006730  001007                          BNE     HS00A           ,BRANCH IF 96 CHAR SET
2187  006732  012737  000140  001060          MOV     #140,LEGCHR     ,LEGAL CHK
2188  006740  012737  000100  001062          MOV     #100,NUMCHR     ,#CHARS
2189  006746  000406                          BR      HS00            ,CONTINUE
2190  006750  012737  000200  001060  HS00A   MOV     #200,LEGCHR     ,LEGAL CHECK
2191  006756  012737  000140  001062          MOV     #140,NUMCHR     ,#CHARS
2192  006764  012737  000040  001054  HS00    MOV     #40,STRCHR      ,SET UP FIRST L NE
2193  006772  012737  000177  001042          MOV     #127.,LINCNT    ,SET LINE COUNT FOR 2 PAGES
2194  007000  012737  177574  001036  HS0     MOV     #-132 ,CHRCNT   ,SET CHAR COUNT
2195  007006  012737  177757  001044          MOV     #-17 ,CYCCNT    ,SET GROUP COUNT
2196  007014  013737  001054  001040          MOV     STRCHR,CHRGEN   ,STORE START CHAR
2197  007022  005777  171752          HS1     TST     @LPS            ,TEST FOR ERROR
2198  007026  100006                          BPL     HS2             ,BRANCH IF NO ERROR
2199  007030  012737  000042  001052  ERR42   MOV     #42,    ERCOUNT         ,SET UP ERROR COUNT 42
2200          000043                          N=N+1
2201  007036  004537  011722                  JSR     %5,STAER        ,REPORT ERROR SET
2202  007042  000000                          HALT                    ,HALT ON ERROR
2203  007044  013777  001040  171730  HS2     MOV     CHRGEN,@LPB     ,LOAD BUFFER
2204  007052  005237  001036                  INC     CHRCNT          ,INCREMENT CHAR COUNT
2205  007056  001424                          BEQ     HS4             ,BRANCH IF DONE LINE
2206  007060  005237  001040                  INC     CHRGEN          ,NEXT CHAR
2207  007064  005237  001044                  INC     CYCCNT          ,INCREMENT GROUP COUNT
2208  007070  001410                          BEQ     HS3             ,BRANCH IF DONE GROUP
2209  007072  023737  001060  001040          CMP     LEGCHR,CHRGEN   ,LEGAL CHAR?
2210  007100  001350                          BNE     HS1             ,BRANCH AND CONTINUE IF LEGAL CHAR
2211  007102  163737  001062  001040          SUB     NUMCHR,CHRGEN   ,MAKE LEGAL
2212  007110  000744                          BR      HS1             ,CONTINUE
2213  007112  013737  001054  001040  HS3     MOV     STRCHR,CHRGEN   ,GET FIRST CHAR IN GROUP
2214  007120  012737  177757  001044          MOV     #-17 ,CYCCNT    RESET CYCLE COUNT
```

```
 2215  007126  000735                          BR      HS1             ;CONTINUE
 2216  007130  012777  000012  171644  HS4     MOV     #12,@LPB        ;SEND LF
 2217  007136  105777  171636                  TSTB    @LPS            ;TEST READY
 2218  007142  100375                          BPL      -4             ;WAIT FOR READY
 2219  007144  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 2220  007150  002413                          BLT     HS6             ;EXIT TEST IF DONE
 2221  007152  162737  000004  001054          SUB     #4,STRCHR       ;SKIP 4 LINES ON DRUM, FIND START CHAR
 2222  007160  022737  000040  001054          CMP     #40,STRCHR      ;START CHAR A LEGAL CHAR?
 2223  007166  003704                          BLE     HS0             ;CONTINUE IF LEGAL START CHAR
 2224  007170  063737  001062  001054          ADD     NUMCHR,STRCHR   ;MAKE LEGAL AND CONTINUE
 2225  007176  000700                          BR      HS0             ;CONTINUE
 2226  007200  032777  010000  171576  HS6     BIT     #BIT12,@SWR     ;LOOP ON TEST?
 2227  007206  001224                          BNE     HSPRT           ;LOOP
 2228
 2229
 2230  007210  000137  007460                  JMP     SNGCHR          ;JUMP TO TEST 9 AFTER COMPLETION
 2231
 2232
 2233                                  ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
 2234
 2235  007214  032777  020000  171562  NHSPRT  BIT     #BIT13,@SWR     ;CHECK  CHARACTER SET
 2236  007222  001007                          BNE     NHS00A          ;BRANCH IF 96 CHARACTER SET
 2237
 2238  007224  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHARACTER CHECK
 2239  007232  012737  000100  001062          MOV     #100,NUMCHR     ;# CHARACTERS = 64
 2240  007240  000406                          BR      NHS00           ;CONTINUE
 2241  007242  012737  000200  001060  NHS00A  MOV     #200,LEGCHR     ;LEGAL CHARACTER CHECK
 2242  007250  012737  000140  001062          MOV     #140,NUMCHR     ;# CHARACTERS = 96
 2243  007256  012737  000003  001064  NHS00   MOV     #3,OFFSET       ;COLUM/CHARACTER OFFSET
 2244  007264  012737  000040  001054          MOV     #40,STRCHR      ;SET UP FIRST CHARACTER OF FIRSTL NE
 2245  007272  012737  000177  001042          MOV     #127 ,LINCNT    ;SET LINE COUNT FOR 2 PAGES
 2246  007300  012737  177574  001036  NHS0    MOV     #-132 , CHRCNT  ;SET CHARACTER COUNT = # COLUMNS
 2247  007306  013737  001054  001040          MOV     STRCHR,CHRGEN   ;STORE STARTING CHARACTER
 2248  007314  005777  171460          NHS1    TST     @LPS            ;TEST FOR ERROR
 2249  007320  100006                          BPL     NHS2            ;BRANCH IF NO ERROR
 2250  007322  012737  000043  001052  ERR43   MOV     #43,    ERCOUNT         ;SET UP ERROR COUNT 43
 2251          000044                          N=N+1
 2252  007330  004537  011722                  JSR     %5,STAER        ;PEPORT ERROR SET
 2253  007334  000000                          HALT                    ;HALT ON ERROR
 2254  007336  013777  001040  171436  NHS2    MOV     CHRGEN,@LPB     ;LOAD PRINTER BUFFER
 2255  007344  005237  001036                  INC     CHRCNT          ;INCREMENT CHARACTER COUNT
 2256  007350  001413                          BEQ     NHS4            ;BRANCH IF LINE DONE
 2257  007352  063737  001064  001040          ADD     OFFSET,CHRGEN   ;NEXT CHARACTER
 2258  007360  023737  001060  001040          CMP     LEGCHR,CHRGEN   ;LEGAL CHARACTER
 2259  007366  003352                          BGT     NHS1            ;BRANCH + CONTINUE  F LEGAL CHAPACTEP
 2260  007370  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;MAKE LEGAL
 2261  007376  000746                          BR      NHS1            ;CONTINUE
 2262  007400  012777  000012  171374  NHS4    MOV     #12,@LPB        ;SEND LINE FEED
 2263  007406  105777  171366                  TSTB    @LPS            ;TEST READY
 2264  007412  100375                          BPL      -4             ;WAIT FOR READY
 2265  007414  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 2266  007420  002413                          BLT     NHS6            ;EXIT IF TEST IS DONE
 2267  007422  162737  000004  001054          SUB     #4,STRCHR       ;SKIP 4 LINES DOWN DRUM,FIND STARTING CHARACTER
 2268  007430  022737  000040  001054          CMP     #40,STRCHP      ;START CHARACTER A LEGAL CHAPACTEP
 2269  007436  003720                          BLE     NHSC            ;CONTINUE IF LEGAL START CHPPACTEP
 2270  007440  063737  001062  001054          ADD     NUMCHP, STPCHP   MAKE LEGAL + CONTINUE
```

SEQ 0064

```
 2271  007446  000714                          BR      NHS0            ,CONTINUE
 2272  007450  032777  010000  171326  NHS6    BIT     #BIT12,@SWR     ,LOOP ON TEST
 2273  007456  001256                          BNE     NHSPRT          ,LOOP
 2274
 2275                                  ,TEST 9
 2276                                  ,WORST CASE NOISE TEST
 2277                                  ,SINGLE CHAR  ACROSS ALL COLS
 2278
 2279  007460                          SNGCHR
 2280  007460  022737  000176  001004          CMP     #176,SWR                ,S/W SWR ?
 2281  007466  001002                          BNE     1$                      ,NO- CONTINUE
 2282  007470  004737  011762                  JSR     PC,ENABL                ,ENABLE KEYBOARD INTERRUPT
 2283  007474                          1$
 2284  007474  004437  011472                  JSR     %4,TYPINT
 2285  007500  013737  014600  014050          MOV     TN011,MES15             ,SET TEST NUMBER FOR MESSAGE
 2286  007506  004437  011406                  JSR     %4,PRNNT                ,PRINT TEST NUMBER
 2287          000012                          M=M+1
 2288  007512  032777  020000  171204          BIT     #BIT13,@SWR     ,TEST CHAR SET
 2289  007520  001404                          BEQ     S2              ,BRANCH IF 64
 2290  007522  012737  177640  001042          MOV     #-96 ,LINCNT    ,96 CHAR
 2291  007530  000403                          BR       +10            ,BRANCH
 2292  007532  012737  177700  001042  S2      MOV     #-64 ,LINCNT    ,64 CHAR
 2293  007540  012737  000040  001040          MOV     #40,CHRGEN      ,SET UP SPACE
 2294  007546  012737  177574  001036  S2A     MOV     #-132 ,CHRCNT   ,SET CHAR COUNT FOR 132
 2295  007554  005777  171220          S1      TST     @LPS            ,TEST FOR ERRORS
 2296  007560  100006                          BPL     XS1X             BRANCH IF NO ERRORS
 2297  007562  012737  000044  001052  ERR44   MOV     #44.    ERCOUNT         ,SET UP ERROR COUNT 44
 2298          000045                          N=N+1
 2299  007570  004537  011722                  JSR     %5,STAER        ,REPORT ERROR
 2300  007574  000000                          HALT                    ,HALT ON ERROR
 2301  007576  013777  001040  171176  XS1X    MOV     CHRGEN,@LPB     ,LOAD PRINTER BUFFER
 2302  007604  005237  001036                  INC     CHRCNT          ,INCREMENT CHAR COUNT
 2303  007610  001361                          BNE     S1              ,CONTINUE IF NOT DONE L NE
 2304  007612  012777  000012  171162  S4X2    MOV     #12,@LPB        ,ISSUE LINE FEED
 2305  007620  105777  171154                  TSTB    @LPS            ,TEST READY
 2306  007624  100375                          BPL      -4             ,WAIT FOR READY
 2307  007626  005237  001040                  INC     CHRGEN          ,+1 CHAR.
 2308  007632  005237  001042                  INC     LINCNT          ,+1 LINE COUNT
 2309  007636  002743                          BLT     S2A             ,CONTINUE IF NOT DONE
 2310  007640  001764                          BEQ     S4X2            ,SEND BLANK LINE AT END OF TEST
 2311  007642  032777  010000  171134  LPS?    BIT     #BIT12 @SWR     ,CHECK TO LOOP ON TEST
 2312  007650  001303                          BNE     SNGCHR           LOOP ON TEST
 2313
 2314
 2315
 2316                                  ,TEST 10
 2317                                  ,DRUM PATTERN CHARACTER TEST
 2318
 2319  007652                          ROTATE
 2320  007652  022737  000176  001004          CMP     #176,SWR                ,S/W SWR ?
 2321  007660  001002                          BNE     1$                      ,NO- CONTINUE
 2322  007662  004737  011762                  JSR     PC,ENABL                ,ENABLE KEYBOARD INTERRUPT
 2323  007666                          1$
 2324  007666  004437  011472                  JSR     %4,TYPINT
 2325  007672  013737  014602  014050          MOV     TN012,MES15             ,SET TEST NUMBER FOR MESSAGE
 2326  007700  004437  011406                  JSR     %4,PRNNT                ,PRINT TEST NUMBER
```

```
2327            000013                          M=M+1
2328
2329  007704    032777  002000  171072          BIT     #BIT10,@SWR     ,CHECK FOR NEW DRUM/OLD DRUM
2330  007712    001122                          BNE     NROTAT          ,BRANCH IF NEW DRUM
2331  007714    032777  020000  171062          BIT     #BIT13,@SWR     ,TEST CHAR SET
2332  007722    001012                          BNE     ROT0            ,SKIP IF 96 CHAR
2333  007724    012737  000137  001042          MOV     #137,LINCNT     ;LAST CHAR
2334  007732    012737  000140  001060          MOV     #140,LEGCHR     ,LEGAL CHK
2335  007740    012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
2336  007746    000411                          BR      ROT1            ,CONTINUE
2337  007750    012737  000177  001042  ROT0    MOV     #177,LINCNT     ,LAST CHAR
2338  007756    012737  000200  001060          MOV     #200,LEGCHR     ;LEGAL CHK
2339  007764    012737  000140  001062          MOV     #140,NUMCHR     ,#CHARS
2340  007772    005037  001044          ROT1    CLR     CYCCNT          ,CLEAR CYCLE COUNT
2341  007776    005237  001044          ROT2    INC     CYCCNT          ,INC CYCLE COUNT
2342  010002    005037  001040                  CLR     CHRGEN          ;CLEAR POINTER
2343  010006    005237  001040          ROT3    INC     CHRGEN          ,INC POINTER
2344  010012    013737  001040  001054          MOV     CHRGEN,STRCHR   ,STORE POINTER
2345  010020    063737  001042  001054          ADD     LINCNT,STRCHR   ,FIND CHAR
2346  010026    023737  001054  001060          CMP     STRCHR,LEGCHR   ,LEGAL?
2347  010034    002403                          BLT     ROT4            ,BRANCH IF LEGAL
2348  010036    163737  001062  001054          SUB     NUMCHR,STRCHR   ,MAKE LEGAL
2349  010044    005777  170730          ROT4    TST     @LPS            ,TEST FOR ERRORS
2350  010050    100006                          BPL     ROT5            ,BRANCH IF NO ERRORS
2351  010052    012737  000045  001052  ERP45   MOV     #45,    ERCOUNT         ,SET UP ERROP COUNT 45
2352            000046                          N=N+1
2353  010060    004537  011722                  JSR     %5,STAER        ,REPORT ERROR
2354  010064    000000                          HALT                    ,HALT ON ERROR
2355  010066    013777  001054  170706  ROT5    MOV     STRCHR,@LPB     ,LOAD BUFFER
2356  010074    023727  001040  000021          CMP     CHRGEN,#17      ,DONE GROUP?
2357  010102    001341                          BNE     ROT3            ,NO GET NEXT CHAR
2358  010104    023727  001044  000010          CMP     CYCCNT,#8       ,DONE LINE?
2359  010112    001331                          BNE     ROT2            ,NO, NEXT GROUP
2360  010114    012777  000012  170660          MOV     #12,@LPB        ,YES, SEND LF
2361  010122    105777  170652                  TSTB    @LPS            ,TEST READY
2362  010126    100375                          BPL     -4              ,WAIT FOR READY
2363  010130    005337  001042                  DEC     LINCNT          ,DECREMENT LINE COUNT
2364  010134    023727  001042  000037          CMP     LINCNT,#37      ,DONE?
2365  010142    003313                          BGT     ROT1            ,NO, NEXT LINE
2366  010144    032777  010000  170632          BIT     #BIT12,@SWR     ,LOOP ON TEST?
2367  010152    001237                          BNE     ROTATE          ,LOOP
2368
2369  010154    000137  010412                  JMP     LFTTR           ,JUMP TO TEST 11 AFTER COMPLETION
2370
2371
2372                                    NEW DRUM (LP14) PATTERN CHARACTER TEST
2373
2374  010160    032777  020000  170616  NROTAT  BIT     #BIT13,@SWR     ,TEST CHARACTER SET
2375  010166    001012                          BNE     NROT0           ,SKIP IF 96 CHARACTERS
2376  010170    012737  000137  001042          MOV     #137,LINCNT     ,LAST CHARACTER
2377  010176    012737  000140  001060          MOV     #140,LEGCHR     ,LEGAL CHECK
2378  010204    012737  000100  001062          MOV     #100,NUMCHR     ,# OF CHARACTERS
2379  010212    000411                          BR      NROT1           ,CONTINUE
2380  010214    012737  000177  001042  NROT0   MOV     #177,LINCNT     ,LAST CHARACTER
2381  010222    012737  000200  001060          MOV     #200,LEGCHR     ,LEGAL CHECK
2382  010230    012737  000140  001062          MOV     #140,NUMCHR       # OF CHARACTERS
```

```
2382  010236  012737  000040  001040  NROT1   MOV     #40,CHRGEN      ;GET POINTER
2384  010244  005237  001040          NROT6   INC     CHRGEN          ;SET POINTER
2385  010250  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE POINTER
2386  010256  005037  001036                  CLR     CHRCNT          ;# CHARACTERS PRINTED
2387  010262  005237  001036          NROT2   INC     CHRCNT          ;INCREMENT CHARRACTEPS PRINTED
2388  010266  063737  001064  001054          ADD     OFFSET,STRCHR   ;INCREMENT POINTER
2389  010274  023737  001054  001060          CMP     STRCHR,LEGCHR   ;LEGAL CHARACTER?
2390  010302  002403                          BLT     NROT4           ;BRANCH IF LEGAL
2391  010304  163737  001062  001054          SUB     NUMCHR,STRCHR   ;MAKE LEGAL
2392  010312  005777  170462          NROT4   TST     @LPS            ;TEST FOR ERRORS
2393  010316  100006                          BPL     NROT5           ;BRANCH IF NO ERRORS
2394  010320  012737  000046  001052  ERR46   MOV     #46,    ERCOUNT         ;SET UP ERROR COUNT 46
2395          000047                          N=N+1
2396  010326  004537  011722                  JSR     %5,STAEP        ;REPORT ERROR
2397  010332  000000                          HALT
2398  010334  013777  001054  170440  NROT5   MOV     STRCHR,@LPB     ;LOAD BUFFER
2399  010342  023727  001036  000204          CMP     CHRCNT,#132     ;LINE FINISHED?
2400  010350  001344                          BNE     .ROT2           ;NO GET NEXT CHARACTER
2401  010352  012777  000012  170422          MOV     #    @LPB       ;YES,SEND LINE FEED
2402  010360  105777  170414                  TSTB    @LPS            ;TEST READY
2403  010364  100375                          BPL     -5              ;WAIT FOR READY
2404  010366  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
2405  010372  023727  001042  000037          CMP     LINCNT,#37      ;PATTERN FINISHED
2406  010400  003321                          BGT     NROT6           ;NO. DO NEXT LINE
2407  010402  032777  010000  170374          BIT     #BIT12,@SWR     ;LOOP ON TEST
2408  010410  001363                          BNE     NROTAT          ;LOOP
2409
2410                                  TEST 11 ----  SPURIOUS HAMMER FIRING TEST
2411                                  LEFT AND RIGHT TRIANGLES
2412
2413                                  . STARTING WITH A LEFT TRIANGLE
2414
2415  010412                          LFTTR
2416  010412  022737  000176  001004          CMP     #176 SWR                ;S'W SWP ?
2417  010420  001002                          BNE     1$                      ;NO- CONTINUE
2418  010422  004737  011762                  JSP     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
2419  010426                          1$
2420  010426  004437  011472                  JSR     %4,TYPINT
2421  010432  013737  014604  014050          MOV     TN013,MES15             ;SET TEST NUMBER FOR MESSAGE
2422  010440  004437  011406                  ISR     %4,PRNNT                ;PRINT TEST NUMBER
2423          000014                          M=M+1
2424  010444  012737  000204  001042  LFT     MOV     #132 ,LINCNT    ;SET LINE COUNT
2425  010452  013737  001042  001036  LFT0    MOV     LINCNT,CHRCNT   ;STORE CHAR COUNT
2426  010460  012737  177757  001044          MOV     #-17 ,CYCCNT    ;SET GROUP COUNT
2427  010466  013737  001036  001040          MOV     CHRCNT,CHRGEN   ;FIND FIRST CHAR ON LINE
2428  010474  022737  000022  001040  LFT1    CMP     #18 ,CHRGEN     ;MORE THAN 17 CHARS?
2429  010502  003004                          BGT     LFT2            ;BRANCH IF LESS THAN 17
2430  010504  162737  000021  001040          SUB     #17  CHRGEN     ;SUBTRACT 17. IF > 17
2431  010512  000770                          BR      LFT1             CONTINUE
2432  010514  005437  001040          LFT2    NEG     CHRGEN          ;NEGATE CHRGEN
2433  010520  062737  000100  001040          ADD     #100 CHRGEN     ;START CHAR IN CHRGEN
2434  010526  013737  001040  001054          MOV     CHRGEN STRCHR   ;STORE STARTING CHAR
2435  010534  005777  170240          LFT3    TST     @LPS             TEST FOR ERROR
2436  010540  100006                          BPL     LFT4            ;CONTINUE IF NO ERROR
2437  010542  012737  000047  001052  ERR47   MOV     #47     ERCOUNT         SET UP ERROR COUNT 47
2438          000050                          N=N+1
```

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2439  010550  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
2440  010554  000000                            HALT                    ;HALT ON ERROR
2441  010556  013777  001040  170216  LFT4      MOV     CHRGEN,@LPB     ;LOAD BUFFER
2442  010564  005337  001036                    DEC     CHRCNT          ;DECREMENT CHAR COUNT
2443  010570  001415                            BEQ     LFT6            ;BRANCH IF DONE LINE
2444  010572  005237  001044                    INC     CYCCNT          ;INCREMENT GROUP COUNT
2445  010576  001403                            BEQ     LFT5            ;BRANCH IF DONE GROUP
2446  010600  005237  001040                    INC     CHRGEN          ;NEXT CHAR IN GROUP
2447  010604  000753                            BR      LFT3            ;CONTINUE
2448  010606  013737  001054  001040  LFT5      MOV     STRCHR,CHRGEN   ;GET START CHAR AGAIN
2449  010614  012737  177757  001044            MOV     #-17.,CYCCNT    ;RESET GROUP COUNT
2450  010622  000744                            BR      LFT3            ;CONTINUE
2451  010624  012777  000012  170150  LFT6.     MOV     #12,@LPB        ;SEND LF
2452  010632  105777  170142                    TSTB    @LPS            ;TEST READY
2453  010636  100375                            BPL     .-4             ;WAIT FOR READY
2454  010640  005337  001042                    DEC     LINCNT          ;DECREMENT LINE COUNT
2455  010644  003302                            BGT     LFT0            ;BRANCH IF NOT DONE
2456  010646  001766                            BEQ     LFT6            ;SEND BLANK LINE AT END OF TEST
2457  010650  032777  010000  170126            BIT     #BIT12,@SWR     ;LOOP ON TEST?
2458  010656  001255                            BNE     LFTTR           ;LOOP
2459
2460                                    ;TEST 11 ----- CONTINUED
2461                                    ;RIGHT TRIANGLE
2462
2463  010660  012737  000001  001042  PTTP      MOV     #1,LINCNT       ;INITIALIZE LINE
2464  010666  012737  000077  001040  RT1       MOV     #77,CHRGEN      ;FIRST CHAR IS A ?
2465  010674  013737  001042  001044            MOV     LINCNT,CYCCNT   ;SAVE NO   CHARS ON LINE
2466  010702  012737  177757  001056            MOV     #-17.,STRCNT    ;SET GROUP COUNT
2467  010710  012737  000204  001036            MOV     #132.,CHRCNT    ;NO   CHARS PER LINE
2468  010716  163737  001042  001036            SUB     LINCNT,CHRCNT   ;SUBTRACT NO.  OF CHARS ON LINE
2469  010724  001425                            BEQ     RT3             ;BRANCH IF NO SPACES ON THIS LINE
2470  010726  005777  170046          RT2       TST     @LPS            ;TEST FOR ERROR
2471  010732  100006                            BPL     RT2A            ;CONTINUE IF NO ERROR
2472  010734  012737  000050  001052  ERR50     MOV     #50     ERCOUNT         ;SET UP ERROR COUNT 50
2473          000051                            N=N+1
2474  010742  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
2475  010746  000000                            HALT                    ;HALT ON ERROR
2476  010750  012777  000040  170024  RT2A      MOV     #40,@LPB        ;LOAD BUFFER
2477  010756  005237  001056                    INC     STRCNT          ;INCREMENT GROUP COUNT
2478  010762  001003                            BNE     RT2AA           ;BRANCH IF NOT DONE GROUP
2479  010764  012737  177757  001056            MOV     #-17.,STRCNT    ;RESET GROUP COUNT
2480  010772  005337  001036          RT2AA     DEC     CHRCNT          ;DECREMENT SPACE COUNT
2481  010776  001353                            BNE     RT2             ;BRANCH IF NOT DONE SPACES
2482  011000  005777  167774          RT3       TST     @LPS            ;TEST FOR ERROR
2483  011004  100006                            BPL     RT3A            ;CONTINUE IF NO ERROR
2484  011006  012737  000051  001052  ERR51     MOV     #51.    ERCOUNT         ;SET UP ERROR COUNT 51
2485          000052                            N=N+1
2486  011014  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
2487  011020  000000                            HALT                    ;HALT ON ERROR
2488  011022  013777  001040  167752  RT3A      MOV     CHRGEN,@LPB     ;LOAD BUFFER
2489  011030  005237  001040                    INC     CHRGEN          ;NEXT CHAR
2490  011034  005237  001056                    INC     STRCNT          ;INCREMENT GROUP COUNT
2491  011040  001006                            BNE     RT3B            ;BRANCH IF NOT DONE GROUP
2492  011042  012737  177757  001056            MOV     #-17.,STRCNT    ;RESET GROUP COUNT
2493  011050  162737  000021  001040            SUB     #17.,CHRGEN     ;GET FIRST GROUP CHAR
2494  011056  005337  001044          RT3B      DEC     CYCCNT          ;DECREMENT CHAR COUNT
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011062  001346                                BNE    RT3             ,CONTINUE
011064  012777  000012  167710                MOV    #12,@LPB        ,SEND LF
011072  105777  167702                        TSTB   @LPS            ,TEST READY
011076  100375                                BPL    -4              ,WAIT FOR READY
011100  005237  001042                        INC    LINCNT          ,INCREMENT LINE COUNT
011104  022737  000205  001042                CMP    #133 ,LINCNT    ,DONE?
011112  003265                                BGT    RT1             ,BRANCH IF NOT DONE
011114  032777  010000  167662                BIT    #BIT12,@SWR     ,LOOP ON TEST?
011122  001256                                BNE    RTTR            ,LOOP

                                       ,TEST 12
                                       ,HAMMEF ALIGMENT

011124                                 HAMALN
011124  022737  000176  001004                CMP    #176,SWR                  ,S/W SWR ?
011132  001002                                BNE    1$                        ,NO- CONTINUE
011134  004737  011762                        JSR    PC,ENABL                  ,ENABLE KEYBOARD INTERRUPT
011140                                 1$
011140  004437  011472                        JSR    %4,TYPINT
011144  013737  014606  014050                MOV    TN014,MES15               ,SET TEST NUMBER FOR MESSAGE
011152  004437  011406                        JSR    %4,PRNNT                  ,PRINT TEST NUMBER
        000015                                M=M+1
011156  012737  177701  001042                MOV    #-63 ,LINCNT    ,SET UP FOR 63 LINES
011164  012737  177574  001036         HAM1X  MOV    #-132 ,CHRCNT   ,SET CHAR COUNT
011172  005777  167602                 HAM2   TST    @LPS            ,CHECK FOR ERROR
011176  100006                                BPL    XHAM1           ,BRANCH IF NO ERROR
011200  012737  000052  001052         ERR52  MOV    #52,    ERCOUNT         ,SET UP ERROR COUNT 52
        000053                                N=N+1
011206  004537  011722                        JSR    %5,STAER        ,REPORT ERROR OCCURRED
011212  000000                                HALT                   ,HALT ON ERROR
011214                                 XHAM1
011214  105777  167560                        TSTB   @LPS            ,TEST READY
011220  100375                                BPL    -4              ,WAIT FOR READY
011222  100375                                BPL    -4              ,WAIT FOR READY
011224  012777  000105  167550         XHAM1X MOV    #105,@LPB       ,TRANSMIT E TO PRINTER
011232  005237  001036                        INC    CHRCNT          ,+1 CHAR COUNT
011236  001355                                BNE    HAM2            ,TRANSMIT ANOTHER CHAR
011240  012777  000012  167534                MOV    #12,@LPB        ,TRANSMIT LINE FEED
011246  105777  167526                        TSTB   @LPS            ,TEST READY
011252  100375                                BPL    -4              ,WAIT FOR READY
011254  005237  001042                        INC    LINCNT          ,+1 TO COUNT
011260  001341                                BNE    HAM1X           ,GO DO NEXT LINE
011262  032777  010000  167514                BIT    #BIT12,@SWR     ,CHECK TO LOOP ON TEST
011270  001315                                BNE    HAMALN          ,LOOP ON TEST

011272  032777  040000  167504                BIT    #BIT14,@SWR     ,DAVFU AVAILABLE?
011300  001402                                BEQ    HAMX            ,NO,  RECYCLE PRINTING TESTS
011302  000137  014616                        JMP    DAVFU           ,YES,  DO DAVFU PRINTING TESTS
011306                                 HAMX
011306  013700  000042                        MOV    @#42,R0
011312  001405                                BEQ    DOAGN
011314  000005                                RESET
011316                                 LOGICAL
011316  004710                                JSR    PC (R0)
011320  000240                                NOP
011322  000240                                NOP
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2561  011324  000240                        NOP
2562  011326                        DOAGN
2563  011326  000137  004562                JMP     TEST2           ,RESTART
2564
2565                                ,MISC  ROUTINES
2566
2567
2568
2569
2570
2571                                ,ROUTINE TO INITIALIZE PRINTER
2572                                ,ENTER FROM ISR %5, PRTINT
2573
2574  011332  005777  167442       PRTINT  TST     @LPS            ,TEST FOR ERROR
2575  011336  100403                        BMI     PRTINO          ,BRANCH IF ERROR
2576  011340  105777  167434                TSTB    @LPS            ,TEST FOR READY
2577  011344  100403                        BMI     RDYOK           ,READY SET OK
2578  011346  062705  000002       PRTINO  ADD     #2,%5           ,SET UP FOR ERROR REPORT
2579  011352  000205                        RTS     %5              ,REPORT READY NOT SET
2580  011354  012777  000014  167420 RDYOK  MOV     #14,@LPB        ,ISSUE FORM FEED
2581  011362  105777  167412                TSTB    @LPS            ,TEST FOR READY NOT SET
2582  011366  100003                        BPL     NTRDY           ,READY NOT SET OK
2583  011370  062705  000002                ADD     #2,%5           ,SET UP FOR REPORT
2584  011374  000205                        RTS     %5              ,EXIT AND REPORT
2585  011376                        NTRDY
2586  011376  105777  167376                TSTB    @LPS             TEST READY
2587  011402  100375                        BPL      -4             ,WAIT FOR READY
2588  011404  000205                        RTS     %5              ,READY SET EXIT
2589
2590
2591                                ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER
2592
2593  011406  012737  014032  011470 PRNNT   MOV     #MES14,PRTMSG   ,PRINT TEST NUMBER
2594  011414  012746  000340                MOV     #340,-(SP)       LOCK OUT KEYBOARD INTERRUPTS
2595  011420  010746                        MOV     PC,-(SP)                ,MOVE PRESENT LOCATION TO STACK
2596  011422  062716  000006                ADD     #6,(SP)                 ,SET UP FOR NEXT INSTRUCTION
2597  011426  000002                        RTI                             ,LOAD PSW
2598  011430  005777  167344                TST     @LPS            ,TEST FOR ERROR
2599  011434  100006                        BPL     RINT            ,BRANCH IF OK
2600  011436  012737  000053  001052 ERR53  MOV     #53     ERRCOUNT        ,SET UP ERROR COUNT 53
2601          000054                        N=N+1
2602  011444  004537  011722                JSR     %5,STAER        ,REPORT ERROR SET
2603  011450  000000                        HALT                    ,HALT ON ERROR
2604  011452  013737  001000  001016 RINT    MOV     LPS,TPS ,SET VECTORS -
2605  011460  013737  001002  001012        MOV     LPB TPB ,TO PRINT ON LINE PRINTER
2606  011466  104000                        EMT     +0              ,PRINT
2607  011470  014032                PRTMSG  MES14                   ,MESSAGE
2608  011472  012737  177564  001016 TYPINT  MOV     #177564,TPS     ,RESET VECTORS
2609  011500  012737  177566  001012        MOV     #177566,TPB      FOR TTY
2610  011506  012746  000000                MOV     #0,-(SP)        ,ALLOW KEYBOARD INTERRUPTS
2611  011512  010746                        MOV     PC,-(SP)                ,MOVE PRESENT LOCATION TO STACK
2612  011514  062716  000006                ADD     #6,(SP)                 ,SET UP FOR NEXT INSTRUCTION
2613  011520  000002                        RTI                             ,LOAD PSW
2614  011522  000204                        RTS     %4               RETURN
2615
```

```
                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
                                        ;
011524  011600                  TYP     MOV     @%6,%0          ;GET ADDR  THAT CONTAINS MESS
011526  062716  000002                  ADD     #2,@%6          ;SET UP EXIT
011532  011000                          MOV     @%0,%0          ;ADDRESS OF MESSAGE IN R0
011534  112037  011636          TYPA    MOVB    (0)+,TYPDAT     ;GET CHARACTER
011540  001001                          BNE     TYPC            ;BRANCH IF NOT DONE
011542  000002                          RTI                     ;EXIT
011544  122737  000045  011636  TYPC    CMPB    #45,TYPDAT      ;CHECK FOR "%"
011552  001416                          BEQ     TYPF            ;BRANCH IF "%"
011554  122737  000043  011636          CMPB    #43,TYPDAT      ;CHECK FOR "#"
011562  001417                          BEQ     TYPG            ;BRANCH IF "#"
011564  004737  011572                  JSR     %7,TYPD         ;TYPE CHARACTER IN TYPDAT
011570  000761                          BR      TYPA            ;NEXT CHAR IN MESSAGE
011572  113777  011636  167212  TYPD    MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
011600  105777  167212          TYPDO   TSTB    @TPS
011604  100375                          BPL     -4
011606  000207                          RTS     %7              ;CHAR  TYPED EXIT
011610  112737  000012  011636  TYPF    MOVB    #12,TYPDAT      ;OUTPUT LF
011616  004737  011572                  JSR     %7,TYPD         ;GO TYPE CHAR
011622  112737  000015  011636  TYPG    MOVB    #15,TYPDAT      ;OUTPUT CR
011630  004737  011572                  JSR     %7,TYPD         ;GO TYPE CHAR
011634  000737                          BR      TYPA
011636  000000          TYPDAT  0
                                        ;
                                        ;
                                        ;ROUTINE TO CONVERT OCTAL TO ASCII
                                        ;
                                        ;ENTER ROUTINE AS FOLLOWS
                                        ;       JSR     %5,CONV
                                        ;XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
                                        ;XXXXXX=ADDRESS OF ASCII MESSAGE
                                        ;XXXXXX=NUMBER OF OCTAL NO 'S TO BE CONVERTED
                                        ;
011640  013537  011720          CONV    MOV     @(5)+,ACNVX     ;ADDRSS OF NO  TO BE CONVERTED
011644  011501                          MOV     (5)+,%1         ;ADDRESS OF MESSAGE
011646  012502                          MOV     (5)+,%2         ;NUMBER OF ASCII CHARACTERS
011650  060201                          ADD     %2,%1           ;FIRST CHAR ADDRESS
011652  013703  011720          ACVN    MOV     ACNVX,%3        ;STORE NUMBER
011656  042703  177770                  BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT BIT
011662  062703  000060                  ADD     #60,%3          ;SET UP ASCII CHARACTER
011666  110341                          MOVB    %3,-(1)         ;STORE CHARACTER
011670  000241                          CLC                     ;GET NEXT SIGNIFICANT BIT
011672  006037  011720                  ROR     ACNVX
011676  000241                          CLC
011700  006037  011720                  ROR     ACNVX
011704  000241                          CLC
011706  006037  011720                  ROR     ACNVX
011712  005302                          DEC     %2              ;-1 FROM ASCII CHAR  CNT
011714  001356                          BNE     ACVN            ;CONVERT NEXT CHARACTER
011716  000205                          RTS     %5              ;EXIT: CONVERSION DONE
                                        ;
011720  000000          ACNVX   0               ;WORK REGISTER
                                        ;
                                        ;ROUTINE TO REPORT ERROR COUNT
                                        ;
```

```
011722  032777  001000  167054  STAER:  BIT     #BIT9,@SWR              ;INHIBIT ERROR REPORTS ?
011730  001007                          BNE     STAER1                  ;YES
011732  004537  011640                  JSR     %5,CONV                 ;CONVERT OCTAL TO ASCII
011736  001052                          ERCOUNT
011740  012401                          HED1
011742  000003                          3
011744  104000                          EMT     +0                      ;TYPE ERROR MESSAGE
011746  012400                          HED0
011750  005777  167030          STAER1: TST     @SWR                    ;TEST FOR HALT ON ERROR
011754  100401                          BMI     .+4                     ;BRANCH IF NO HALT WANTED
011756  000000                          HALT                            ;HALT ON ERROR
011760  000205                          RTS     %5                      ;RETURN


                                ;ROUTINE TO ENABLE THE KEYBOARD INTERRUPT
                                ;AND LOWER THE PROCESSOR PRIORITY SO INTERRUPTS
                                ;CAN BE SERVICED


011762  005046                  ENABL:  CLR     -(SP)                   ;NEW PSW
011764  012746  011772                  MOV     #1$,-(SP)               ;NEW PC
011770  000002                          RTI                             ;LOAD NEW PSW
011772  052737  000100  177560  1$:     BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
012000  000207                  ENABLX: RTS     PC                      ;RETURN TO MAINLINE PROGRAM





                                ;KEYBOARD INTERRUPT ROUTINE
                                ;FOR ACCESS TO THE S/W SWITCH REGISTER


012002  010046                  TKINT:  MOV     %0,-(SP)                ;SAVE REGISTERS
012004  010146                          MOV     %1,-(SP)
012006  010246                          MOV     %2,-(SP)
012010  010346                          MOV     %3,-(SP)                ;
012012  010446                          MOV     %4,-(SP)                ;
012014  010546                          MOV     %5,-(SP)                ;
012016  005737  001072                  TST     SET                     ;INITIAL SWR ENTRY ?
012022  001130                          BNE     TYPSWR                  ;YES-PRINT HEADER
012024  005737  001070                  TST     SIGNAL                  ;PREVIOUS CONTROL-G INPUT ?
012030  001477                          BEQ     CNTRLG                  ;YES-CONTINUE
012032  017737  166756  001074          MOV     @TKB,CHAR               ;GET INPUT CHARACTER
012040  042737  177600  001074          BIC     #177600,CHAR            ;STRIP OFF PARITY BIT
012046  022737  000015  001074          CMP     #15,CHAR                ;CARRIAGE RETURN ?
012054  001456                          BEQ     DGTS                    ;YES-CONTINUE
012056  022737  000025  001074          CMP     #25,CHAR                ;CONTROL-U INPUT ?
012064  001530                          BEQ     TK4                     ;YES-CONTINUE
012066  023727  001074  000060          CMP     CHAR,#60                ;LEGAL CHECK (LESS THAN 60) ?
012074  100001                          BPL     TK1                     ;NO-CONTINUE
012076  000466                          BR      WT3                     ;YES-PRINT "?"
012100  022737  000067  001074  TK1:    CMP     #67,CHAR                ;LEGAL CHECK (GREATER THAN 67) ?
012106  100001                          BPL     TK2                     ;NO-CONTINUE
012110  000461                          BR      WT3                     ;YES PRINT "?"
012112  005237  001066          TK2:    INC     DIGITS                  ;NEXT DIGIT OF SWR (NEXT ?)
```

```
2713  012116  022737  000006  001066          CMP     #6,DIGITS       ;MORE THAN SIX DIGITS ?
2720  012124  100453                          BMI     WT3             ;YES-PRINT "?"
2721  012126  105777  166664          WT2     TSTB    @TPS            ;TTY PRINTER READY ?
2722  012132  100375                          BPL     WT2             ; NO-WAIT
2723  012134  013777  001074  166650          MOV     CHAR,@TPB       ;PRINT CHARACTER
2724  012142  162737  000060  001074          SUB     #60,CHAR        ;CONVERT TO OCTAL
2725  012150  022737  000001  001066          CMP     #1,DIGITS       ;FIRST DIGIT ?
2726  012156  001411                          BEQ     TK5             ;YES-CONTINUE
2727  012160  000241                          CLC                     ;ROTATE LEFT THREE
2728  012162  006137  001076                  ROL     OCT             ;TIMES
2729  012166  000241                          CLC                     ;THIS WILL SHIFT
2730  012170  006137  001076                  ROL     OCT             ;SWR VALUE ONE
2731  012174  000241                          CLC                     ;PLACE LEFT
2732  012176  006137  001076                  ROL     OCT             ;OCTAL
2733  012202  063737  001074  001076  TK5     ADD     CHAR,OCT        ;NEW VALUE OF SWR
2734  012210  000464                          BR      TK6             ;RETURN FROM INTERRUPT
2735  012212  005737  001066          DGTS    TST     DIGITS           SWR VALUE CHANGED ?
2736  012216  001451                          BEQ     TK3             ;NO-RETURN ;NO CHANGE TO SWR
2737  012220  013777  001076  166556          MOV     OCT,@SWR        ;YES-ENTER NEW SWR VALUE
2738  012226  000445                          BR      TK3             ;RETURN FROM INTERRUPT
2739  012230  017737  166560  001074  CNTRLG  MOV     @TKB,CHAR       ;GET CHARACTER
2740  012236  042737  177600  001074          BIC     #177600,CHAR    ;STRIP OFF PARITY BIT
2741  012244  022737  000007  001074          CMP     #7,CHAR         ;CONTROL-G INPUT ?
2742  012252  001414                          BEQ     TYPSWR          ;YES-PRINT HEADER
2743  012254  105777  166536          WT3     TSTB    @TPS            ;TTY PRINTER READY ?
2744  012260  100375                          BPL     WT3              NO-WAIT
2745  012262  013777  001074  166522          MOV     CHAR,@TPB       ;PRINT CHARACTER
2746  012270  104000                          EMT     +0              ;PRINT "?"
2747  012272  014506                          MES20
2748  012274  005737  001070                  TST     SIGNAL           BAD VALUE ?
2749  012300  001001                          BNE     TYPSWR          ;YES-PRINT HEADER
2750  012302  000427                          BR      TK6              RETURN FROM INTERRUPT
2751  012304  012737  000001  001070  TYPSWR  MOV     #1,SIGNAL        SET FLAG  CONTROL-G ENTERED
2752  012312  104000                          EMT     +0              ;PRINT HEADER
2753  012314  014512                          MES23
2754  012316  004537  011640                  JSR     %5,CON           CONVERT SWR VALUE TO ASCII
2755  012322  000176                          176
2756  012324  014542                          MES25
2757  012326  000006                          6
2758  012330  104000                          EMT     +0               PRINT SWR VALUE
2759  012332  014542                          MES25
2760  012334  104000                          EMT     +0               PRINT HEADER
2761  012336  014523                          MES24
2762  012340  000404                          BR      TK7             ;RETURN FROM INTERRUPT
2763  012342  005037  001070          TK3     CLR     SIGNAL           CLEAR CONTROL-G FLAG
2764  012346  104000                  TK4     EMT     +0                PRINT LINE FEED AND CARRIAGE RETURN
2765  012350  014504                          MES21
2766  012352  005037  001066          TK      CLR     DIGITS           CLEAR DIGIT COUNT
2767  012356  005037  001076                  CLR     OCT             ;CLEAR SWR INPUT
2768  012362  012605                  TK6     MOV     (SP)+,%5         RESTORE REGISTERS
2769  012364  012604                          MOV     (SP)+,%4
2770  012366  012603                          MOV     (SP)+,%3
2771  012370  012602                          MOV     (SP)+,%2
2772  012372  012601                          MOV     (SP)+,%1
2773  012374  012600                          MOV     (SP)+,%0
2774  012376  000002                          RT                       RETURN FROM INTERRUPT
```

```
012400     045                         HEDO      ASCII  /%/
012401     040    020040    042440     HED1      ASCIZ  /     ERROR COUNT%/
012422  051105    047522    020122     MESA      ASCIZ  /ERROR SET OK - CLEAR & TURN ON LINE%/
012467     105    051122    051117     MESB      ASCIZ  /ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/
012542  050045    044522    052116     MESC      ASCII  /%PRINT SPEED CHECK USING MANUAL TIMING%/
012611     045    052520    020124               ASCII  /%PUT SWITCH 0 UP TO START TIMING%/
012652  050045    052125    051440               ASCIZ  /%PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
012721     045    052123    051101     MESDD     ASCIZ  /%STARTING DAVFU PRINTING TESTS%/
012761     045    050114    032460     MES1      ASCIZ  /%LP05-LP11-LP14 LINE PRINTER TEST%/
013024  042522    052123    051101     MES2      ASCIZ  /RESTART ADDRESS 600%/
013051     045    047520    042527     MES3      ASCIZ  /%POWER ON - TURN ON LINE%/
013103     117    020116    044514     MES4      ASCIZ  /ON LINE OK - TRY TORN PAPER SWITCH%/
013147     122    040505    054504     MES5      ASCIZ  /READY SET OK - TRY DRUM GATE SWITCH%/
013214  051105    047522    020122     MES6      ASCIZ  /ERROR SET OK - TURN ON LINE%/
        013252                          EVEN
013252  042522                         MES7A     ASCII  /RE/
013254  042523    020124    047524     MES7      ASCII  /SET TOP OF FORM SWITCH TO    /
013310  020040    020040    044440     MES8.     ASCIZ  /      INCHES%/
        013326                          EVEN
013326  026455    026455    026455     MES9      ASCII  /- ----------------------------------     TH S LINE SHOULD BE /
013423     040    020040    020040     MES10     ASCIZ        INCHES FROM THE LAST LINE      ------------------------------------
013534  005012                         MES11A    ASCII   12><12>
013536  050045    044522    052116     MES11     ASCII  /%PRINT SPEED IS APPROXIMATELY/
013575     040    020040    020040     MES12     ASCIZ  /      LINES PER MINUTE%/
013624  026455    026455    026455     MES13     ASCI   /------------------------- --------- -------------/
013706  026455    026455    026455               ASCII  /------------------------ -- --  ----------------/
013770  026455    026455    026455               ASCIZ   ------------------------- -----#
                                                 EVEN
014032  005012    042524    052123     MES14     ASCII   12  12 /TEST NUMBER
014050  020040    005012    000012     MES15     ASCIZ      12><12><12>
                                        EVEN
014056  044124    051511    046040     MES16     ASCIZ  /THIS LINE SHOULD BE PR NTED#
014113     040    020040    020040     MES17     ASCIZ  .                                   ALL ON ONE LINE ---  F SLEWED 0 LINES%/
                                        EVEN
014216  026455    026455    026455     MES18     ASCII   -------------------------- -------        THERE SHOULD BE  /
014310  020040    020040    020040     MES19     ASCIZ          BLANK LINES BEFORE TH S LINE       ---- ---------------------------
                                        EVEN
014424  052040    051505    044524     MES20     ASCII    TESTING  HANNEL SLEWING USING CHANNEL NO
014500  020040       000               MES20A    ASCIZ
        014504                          EVEN
014504  000045                         MES21     ASCIZ  [illegible]
014506  037440    000045               MES22     ASCIZ  [illegible]
014512  051445    051127    036440     MES23     ASCIZ  /%SWR =
014523     040    020040    042516     MES24     ASCIZ     NEW SWR =
014542  020040    020040    020040     MES25     ASCIZ
        014552                                   EVEN
014552  030504                         TNDAV1    ASCII  /D1              TEST NUMBERS FOR DAVFU TESTS
014554  031104                         TNDAV2    ASCII   D2
014556  031504                         TNDAV3    ASCII  /D3
014560  020061                         TN01      ASCII   1
014562  020062                         TN02      ASCII   2
014564  020063                         TN03      ASCII   3
014566  020064                         TN04      ASCII   4
```

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 014570  020065                    TN05    ASCII  /5 /
 014572  020066                    TN06    ASCII  /6 /
 014574  020067                    TN07    ASCII  /7 /
 014576  020070                    TN010   ASCII  /8 /
 014600  020071                    TN011   ASCII  /9 /
 014602  030061                    TN012.  ASCII  /10/
 014604  030461                    TN013   ASCII  /11/
 014606  031061                    TN014   ASCII  /12/
 014610  031461                    TN015   ASCII  /13/
 014612  032061                    TN016   ASCII  /14/
 014614  032461                    TN017   ASCII  /15/
                                    EVEN


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


                                ;TESTS D1 AND D2
                                ;CHECK DAVFU LINE COUNT SLEWING

 014616                         DAVFU
 014616  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 014624  001002                        BNE     1$                      ;NO- CONTINUE
 014626  004737  011762                JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
 014632                         1$
 014632  004437  011472                JSP     %4,TYPINT       ;INITIALIZE
 014636  013737  016676  014012        MOV     SPSP,MES19+2
 014644  104000                        EMT     +0                      ;TYPE MESSAGE
 014646  012721                        MESDD                           ;STARTING DAVFU TESTS
 014650  012737  000220  015244        MOV     #220,DAV11      ;SET DAVFU INSTRUCTIONS
 014656  012737  000221  015346        MOV     #221,DAV12
 014664  013737  014552  014050        MOV     TNDAV1,MES15    SET TEST NUMBER FOR MESSAGE
 014672  004437  011406                JSR     %4,PRNNT        PRINT TEST NUMBER
 014676  012737  015276  001040  DAV0  MOV     #DAVTAB,CHRGEN  ;SET TABLE POINTER
 014704  005777  164070          DAV00 TST     @LPS            ;TEST FOR ERROR
 014710  100010                        BPL     DAV1            ;BRANCH IF NO ERROR
 014712  012737  000054  001052  ERR54 MOV     #54,    ERCOUNT         ;SET UP ERROR COUNT 54
 000055                         N=N+1
 014720  004537  011722                JSR     %5,STAER        ;REPORT ERROR SET
 014724  000000                        HALT                    HALT ON ERROR
 014726  000137  014676                JMP     DAV0            ;RESTART TEST
 014732  017777  164102  164042  DAV1  MOV     @CHRGEN @LPB    LOAD DAVFU
 014740  062737  000002  001040        ADD     #2,CHRGEN       ;INCREMENT TABLE PC NTER
 014746  005777  164066                TST     @CHRGEN         ;TEST IF DONE LOAD
 014752  001405                        BEQ     D5              ;CONTINUE IF DONE
 014754  105777  164020                TSTB    @LPS            ;TEST READY
 014760  100375                        BPL     .-4             WAIT FOR READY
 014762  000137  014704                JMP     DAV00
 014766  012737  000002  001044  D5    MOV     #2,CYLCNT       ;SET CYCLE COUNT
 014774  012737  014056  011470  C0    MOV     #MES16,PRTMSG   ;SET MESSAGE ADDRESS
 015002  004437  011452                JSP     %4,PRINT        ;PRINT MESSAGE
 015006  005777  163766                TST     @LPS            ;TEST FOR ERROR
 015012  100006                        BPL     D1              CONTINUE IF NO ERROR
 015014  012737  000055  001052  ERR55 MOV     #55,    ERCOUNT         ;SET UP ERROR COUNT 55
 000056                         N=N+1
 015022  004537  011722                JSR     %5,STAER        REPORT ERROR SET
```

```
015026  000000                                    HALT                       ,HALT ON ERROR
015030  013777  015344  163744   D1               MOV     DAV11,@LPB         ,SEND DAVFU INSTRUCTION,  SKIP 0 LINES
015036  105777  163736                            TSTB    @LPS               ,TEST READY
015042  100375                                    BPL     -4                 ,WAIT FOR READY
015044  012737  014113  011470                    MOV     #MES17,PRTMSG      ,SET PRINTER MESSAGE ADDRESS
015052  004437  011452                            JSR     %4,RINT            ,PRINT MESSAGE
015056  012737  014216  011470                    MOV     #MES18,PRTMSG      ,SET MESSAGE ADDRESS
015064  013737  015346  001040                    MOV     DAV12,CHRGEN       ,FIRST DAVFU INSTRUCTION
015072  012737  014560  001054                    MOV     #TN01,STRCHR       ,SET TABLE POINTER
015100  012737  000017  001036                    MOV     #15 ,CHRCNT        ,SET TABLE COUNT
015106  005777  163666           D2               TST     @LPS               ,TEST FOR ERROR
015112  100006                                    BPL     D3                 ,CONTINUE IF NO ERRORS
015114  012737  000056  001052   ERR56            MOV     #56,    ERCOUNT            ,SET UP ERROR COUNT 56
        000057                                    N=N+1
015122  004437  011722                            JSR     %4,STAER           ,REPORT ERROR SET
015126  000000                                    HALT                       ,HALT ON ERROR
015130  013777  001040  163644   D3               MOV     CHRGEN,@LPB        ,SEND DAVFU INSTR
015136  105777  163636                            TSTB    @LPS               ,TEST READY
015142  100375                                    BPL     -4                 ,WAIT FOR READY
015144  017737  163704  014310                    MOV     @STRCHR,MES19      ,SET PRINTER MESSAGE
015152  004437  011452                            JSR     %4,RINT            ,PRINT MESSAGE
015156  005337  001036                            DEC     CHRCNT             ,DEC TABLE COUNT
015162  001407                                    BEQ     D4                 ,EXIT TEST IF DONE
015164  005237  001040                            INC     CHRGEN             ,NEXT DAVFU INSTR
015170  062737  000002  001054                    ADD     #2,STRCHR          ,INC TABLE POINTER
015176  000137  015106                            JMP     D2                 ,CONTINUE
015202  005337  001044           D4               DEC     CYCCNT             ,DEC CYCLE COUNT
015206  001415                                    BEQ     DEXO               ,EXIT IF DONE
015210  062737  000140  015344                    ADD     #140,DAV11         ,CHANGE DAVFU INSTR
015216  062737  000140  015346                    ADD     #140,DAV12         ,CHANGE DAVFU INSTR
015224  013737  014554  014050                    MOV     TNDAV2,MES15       ,SET TEST NUMBER FOR MESSAGE
015232  004437  011406                            JSR     %4,PRNNT           ,PRINT TEST NUMBER
015236  000137  014774                            JMP     D0                 ,RETEST LINE COUNT SLEWING
015242  012737  000220  015344   DEXO             MOV     #220,DAV11         ,RESET DAVFU INSRT
015250  012737  000221  015346                    MOV     #221,DAV12         ,RESET DAVFU INSTR
015256  032777  010000  163520                    BIT     #BIT12,@SWR        ,LOOP ON TEST?
015264  001002                                    BNE     1$                 LOOP
015266  000137  015350                            JMP     DAV2               NEXT TEST
015272  000137  014616           1$               JMP     DAVFU              ,LOOP


015276  000356                   DAVTAB           356                        DAVFU LOAD TABLE
015300  000001                                    1
015302  000002                                    2
015304  000003                                    3
015306  000004                                    4
015310  000005                                    5
015312  000006                                    6
015314  000007                                    7
015316  000010                                    10
015320  000011                                    11
015322  000012                                    12
015324  000013                                    13
015326  000014                                    14
015330  000015                                    15
015332  000016                                    16
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2876  015334  000017                          17
2877  015336  000020                          20
2878  015340  000357                          357
2879  015342  000000                          0
2880
2881
2882  015344  000220                  DAV11   220
2883  015346  000221                  DAV12   221
2884
2885                                  ;TEST D3
2886                                  ;CHECK DAVFU CHANNEL SLEW COMMANDS
2887
2888  015350                          DAV2
2889  015350  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
2890  015356  001002                          BNE     1$                      ;NO- CONTINUE
2891  015360  004737  011762                  JSR     PC,ENABL                ;ENABLE KEYBOARD INTERRUPT
2892  015364                          1$
2893  015364  004437  011472                  JSR     %4,TYPINT       ;INITIALIZE
2894  015370  013737  016676  014312          MOV     SPSP,MES19+2
2895  015376  013737  014556  014050          MOV     TNDAV3,MES15    ;SAT TEST NUMBER FOR MESSAGE
2896  015404  004437  011406                  JSR     %4,PRNNT        ;PRINT TEST NUMBER D3
2897  015410  012737  016660  016142          MOV     #MTAB,MTABP     ;SET MESSAGE TABLE POINTER
2898  015416  012737  016626  016136          MOV     #ITAB,ITABP     ;SET INSTRUCTION TABLE POINTER
2899  015424  017737  000506  001054          MOV     @ITABP,STRCHR   ;SAT FIRST INSTRUCTION
2900  015432  012737  014560  016144          MOV     #TNO1,MTABP     ;SET HEADER MESSAGE TABLE POINTER
2901  015440  012737  016610  016140          MOV     #ICTAB,ICTABP   ;SET INSTR COUNT TABLE POINTER
2902  015446  017737  000466  001056          MOV     @ICTABP,STRCNT  ;GET FIRST INSTR COUNT
2903  015454  012737  016146  016134  LOAD    MOV     #DTAB,DTABP     ;SET DATA TABLE POINTER
2904  015462  017737  000446  001040          MOV     @DTABP,CHRGEN   ;SET FIRST DATA PAIR
2905  015470  005777  163304                  TST     @LPS            ;TEST FOR ERROR
2906  015474  100007                          BPL     DL1             ;BRANCH IF NO ERROR
2907  015476  012737  000057  001052  ERR57   MOV     #57,    ERCOUNT         ;SET UP ERROR COUNT 57
2908          000060                          N=N+1
2909  015504  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2910  015510  000000                          HALT                    ;HALT ON ERROR
2911  015512  000760                          BR      LOAD            ;RESTART LOAD
2912  015514  012737  000002  001036  DL1     MOV     #2,CHRCNT       ;SET PAIR COUNT
2913  015522  013777  001040  163252  DL2     MOV     CHRGEN,@LPB     ;LOAD DAVFU
2914  015530  105777  163244                  TSTB    @LPS            ;TEST READY
2915  015534  100375                          BPL     -4              ;WAIT FOR READY
2916  015536  005777  163236                  TST     @LPS            ;TEST FOR ERROR
2917  015542  100010                          BPL     DL6             ;BRANCH IF NO ERROR
2918  015544  012737  000060  001052  ERR60   MOV     #60,    ERCOUNT         ;SET UP ERROR COUNT 60
2919          000061                          N=N+1
2920  015552  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2921  015556  000000                          HALT                    ;HALT ON ERROR
2922  015560  000137  015454                  JMP     LOAD            ;RESTART LOAD
2923  015564  022737  000356  001040  DL6     CMP     #356,CHRGEN     ;LOAD COMMAND?
2924  015572  001407                          BEQ     DL6A            ;YES, SEND ONLY ONCE
2925  015574  022737  000357  001040          CMP     #357,CHRGEN     ;LOAD COMMAND?
2926  015602  001403                          BEQ     DL6A            ;YES,  SEND ONLY ONCE
2927  015604  005337  001036                  DEC     CHRCNT          ;DEC PAIR COUNT
2928  015610  001344                          BNE     DL2             ;FINISH PAIR IF NOT DONE
2929  015612  062737  000002  016134  DL6A    ADD     #2,DTABP        ;INC DATA TABLE POINTER
2930  015620  017737  000310  001040          MOV     @DTABP,CHRGEN   ;SET NEXT DATA PAIR
2931  015626  022737  077777  001040          CMP     #77777,CHRGEN   ;DONE LOAD?
```

```
2932  015634  001327                          BNE     DL1
2933
2934                                  ;START OF CHANNEL SLEW TESTS
2935
2936  015636                          DL8
2937  015636  013777  001054  163136          MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2938  015644  105777  163130                  TSTB    @LPS            ;TEST READY
2939  015650  100375                          BPL      -4             ;WAIT FOR READY
2940  015652  105777  163122                  TSTB    @LPS            ;TEST READY
2941  015656  100375                          BPL      -4             ;WAIT FOR READY
2942  015660                          DL8A
2943  015660  017737  000260  014500          MOV     @HTABP,MES20A   ;SET HEADER MSSG ADDRESS
2944  015666  012737  014424  011470          MOV     #MES20,PRTMSG   ;SET HEADER MSG ADDRESS
2945  015674  004437  011452                  JSR     %4,RINT         ;PRINT HEADER MESSAGE
2946  015700  013777  001054  163074  DL9     MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2947  015706  105777  163066                  TSTB    @LPS            ;TEST READY
2948  015712  100375                          BPL      -4             ;WAIT FOR READY
2949  015714  005777  163060                  TST     @LPS            ;TEST FOR ERROR
2950  015720  100010                          BPL     DL10            ;BRANCH IF OK
2951  015722  012737  000061  001052  ERR61   MOV     #61,    ERCOUNT         ;SET UP ERROR COUNT 61
2952          000062                          N=N+1
2953  015730  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2954  015734  000000                          HALT                    ;HALT ON ERROR
2955  015736  000137  015454                  JMP     LOAD            ;RELOAD DAVFU
2956  015742  017737  000174  014310  DL10    MOV     @MTABP,MES19    ;SET MESSAGE
2957  015750  027727  000164  000001          CMP     @ICTABP,#1      ;CHECK IF MAX LINE SLEW
2958  015756  001004                          BNE     DL10A           ;NOT, CONTINUE
2959  015760  013737  016674  014312          MOV     FS,MES19+2      ;SET MESSAGE
2960  015766  000403                          BR      DL10B           ;CONTINUE
2961  015770  013737  016676  014312  DL10A   MOV     SPSP,MES19+2    ;SET MESSAGE
2962  015776  012737  014216  011470  DL10B   MOV     #MES18,PRTMSG   ;SET MSG ADDRESS
2963  016004  004437  011452                  JSR     %4,RINT         ;PRINT MESSAGE
2964  016010  005337  001056                  DEC     STRCNT          ;DEC INSTR COUNT
2965  016014  001331                          BNE     DL9             ;FINISH TESTING THIS CHANNEL
2966  016016  062737  000002  016142          ADD     #2,MTABP        ;INC MSG TABLE POINTER
2967  016024  062737  000002  016144          ADD     #2,HTABP        ;INC HEADER MSG TABLE POINTER
2968  016032  062737  000002  016140          ADD     #2,ICTABP       ;INC INSTR COUNT TABLE PO NTER
2969  016040  005777  000074                  TST     @ICTABP         ;CHECK INSTR COUNT
2970  016044  001006                          BNE     DL12
2971  016046  012737  016610  016140          MOV     #ICTAB,ICTABP   ;RESET TABLE POINTER
2972  016054  012737  016660  016142          MOV     #MTAB,MTABP     ;RESET MSG TABLE PO NTER
2973  016062  017737  000052  001056  DL12    MOV     @ICTABP,STRCNT  ;GET INSTR COUNT
2974  016070  062737  000002  016136          ADD     #2,ITABP        ;INC INSTR TABLE POINTER
2975  016076  017737  000034  001054          MOV     @ITABP,STRCHR   ;GET INSTRUCTION
2976  016104  001254                          BNE     DL8             ;CONTINUE IF NOT DONE TEST
2977  016106  013737  016676  014312          MOV     SPSP,MES19+2    ;RESET MESSAGE
2978  016114  032777  010000  162662          BIT     #BIT12,@SWR     ;LOOP ON TEST?
2979  016122  001402                          BEQ     DLEX
2980  016124  000137  015350                  JMP     DAV2            ;LOOP ON TEST
2981  016130  000137  004562          DLEX    JMP     TEST2           ;RECYCLE PRINTING TESTS
2982
2983  016134  000000                  DTABP   0                       ;DATA TABLE POINTER
2984  016136  000000                  ITABP   0                       ;INSTRUCTION TABLE POINTER
2985  016140  000000                  ICTABP  0                       ;INSTR COUNT TABLE POINTER
2986  016142  000000                  MTABP   0                       ;MESSAGE TABLE POINTER
2987  016144  000000                  HTABP   0                       ;HEADER MESSAGE TABLE POINTER
```

```
2988
2989                                    ;DATA TABLE FOR DAVFU LOAD
2990
2991  016146  000356                    DTAB    356             ;START LOAD
2992  016150  000077                            77              ;HEADER MESSAGES
2993  016152  000000                            0
2994  016154  000001                            1
2995  016156  000002                            2
2996  016160  000005                            5
2997  016162  000000                            0
2998  016164  000003                            3
2999  016166  000010                            10
3000  016170  000005                            5
3001  016172  000002                            2
3002  016174  000001                            1
3003  016176  000000                            0
3004  016200  000007                            7
3005  016202  000000                            0
3006  016204  000011                            11
3007  016206  000002                            2
3008  016210  000005                            5
3009  016212  000000                            0
3010  016214  000003                            3
3011  016216  000000                            0
3012  016220  000005                            5
3013  016222  000012                            12
3014  016224  000001                            1
3015  016226  000000                            0
3016  016230  000007                            7
3017  016232  000020                            20
3018  016234  000001                            1
3019  016236  000002                            2
3020  016240  000015                            15
3021  016242  000000                            0
3022  016244  000003                            3
3023  016246  000000                            0
3024  016250  000005                            5
3025  016252  000002                            2
3026  016254  000001                            1
3027  016256  000010                            10
3028  016260  000007                            7
3029  016262  000000                            0
3030  016264  000001                            1
3031  016266  000002                            2
3032  016270  000005                            5
3033  016272  000000                            0
3034  016274  000013                            13
3035  016276  000000                            0
3036  016300  000005                            5
3037  016302  000002                            2
3038  016304  000001                            1
3039  016306  000000                            0
3040  016310  000007                            7
3041  016312  000010                            10
3042  016314  000021                            21
3043  016316  000002                            2
```

```
2044  016320  000005
2045  016322  000000
2046  016324  000003
2047  016326  000000
2048  016330  000015
2049  016332  000002
2050  016334  000001
2051  016336  000000
2052  016340  000007
2053  016342  000000
2054  016344  000001
2055  016346  000012
2056  016350  000005
2057  016352  000000
2058  016354  000003
2059  016356  000000
2060  016360  000005
2061  016362  000002
2062  016364  000011
3063  016366  000000
3064  016370  000007
3065  016372  000000
3066  016374  000001
3067  016376  000022
3068  016400  000005
3069  016402  000010
3070  016404  000003
3071  016406  000000
3072  016410  000005
3073  016412  000002
3074  016414  000001
3075  016416  000000
3076  016420  000017
3077  016422  000000
3078  016424  000001
3079  016426  000002
3080  016430  000005
3081  016432  000000
3082  016434  000003
3083  016436  000010
3084  016440  000006
3085  016442  000002
3086  016444  000001
3087  016446  000000
3088  016450  000007
3089  016452  000000
3090  016454  000011
3091  016456  000002
3092  016460  000026
3093  016462  000000
3094  016464  000003
3095  016466  000000
3096  016470  000006
3097  016472  000012
3098  016474  000001
3099  016476  000000
```

```
016500  000007          7
016502  000000          0
016504  000001          1
016506  000002          2
016510  000015          15
016512  000000          0
016514  000003          3
016516  000000          0
016520  000005          5
016522  000002          2
016524  000001          1
016526  000010          10
016530  000007          7
016532  000000          0
016534  000001          1
016536  000002          2
016540  000005          5
016542  000020          20
016544  000013          13
016546  000000          0
016550  000005          5
016552  000002          2
016554  000001          1
016556  000000          0
016560  000007          7
016562  000010          10
016564  000001          1
016566  000002          2
016570  000005          5
016572  000000          0
016574  000003          3
016576  000000          0
016600  000001          1
016602  000000          0
016604  000357          357             STOP LOAD
016606  077777          77777           STOP !!!!!

                ;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

016610  000105  ICTAB   105
016612  000056          56
016614  000042          42
016616  000023          23
016620  000005          5
016622  000001          1
016624  000000          0                       ;END OF TABLE

                ;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

016626  000200  ITAB    200                     ;CHANNEL 1
016630  000201          201                     ;CHANNEL 2
016632  000202          202                     ;CHANNEL 3
016634  000203          203                     ;CHANNEL 4
016636  000204          204                     ;CHANNEL 5
016640  000205          205                     ;CHANNEL 6
016642  000206          206                     ;CHANNEL 7
```

```
2156 016644 000207          207          ;CHANNEL 8
2157 016646 000210          210          ;CHANNEL 9
2158 016650 000211          211          ;CHANNEL 10
2159 016652 000212          212          ;CHANNEL 11
2160 016654 000213          213          ;CHANNEL 12
2161 016656 000000          0            ;END OF TABLE
2162
```

```
                                        ;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE

016660  030440                          MTAB    ASCII   / 1/
016662  031040                                  ASCII   / 2/
016664  031440                                  ASCII   / 3/
016666  033040                                  ASCII   / 6/
016670  032062                                  ASCII   /24/
016672  032061                                  ASCII   /14/
016674  020063                          FS      ASCII   /3 /
016676  020040                          SPSP    ASCII   /  /

                                        ;SCOPE LOOP ROUTINE

                                        ;SET CHARACTER IN SWITCH REGISTER -0
```

```
016700                              SCOPE
016700  022737  000176  001004              CMP     #176,SWR              ;S/W SWR ?
016706  001002                              BNE     1$                    ;NO- CONTINUE
016710  004737  011762                      JSR     PC,ENABL              ;ENABLE KEYBOARD INTERRUPT
016714                              1$
```

```
[illegible] [illegible]714  004437  011472            JSR     %4,TYPINT
[illegible] [illegible]720  017737  162060  001050    MOV     @SWR,SAVE          ;FETCH SWITCHES
```

```
016726 012737 177574 001036          MOV    #-132,CHRCNT   ,SET CHAR COUNT
016734 042737 177400 001050          BIC    #177400,SAVE   ,MASK CHARACTER
016742                        LDLPX:
016742 105777 162032                 TSTB   @LPS           ,TEST READY
016746 100375                        BPL    -4             ,WAIT FOR READY
016750 005777 162024                 TST    @LPS           ,TEST FOR ERROR
```

```
016754  100006                           BPL     LPSCOPE           ,BRANCH IF NO EPROR
016756  012737  000062  001052  EPP62    MOV     #62,    ERCOUNT           ,SET UP ERROR COUNT 62
        000063                           N=N+1
016764  004537  011722                   JSR     %5,STAER          ,REPORT ERROR SET
016770  000000                           HALT                      ,HALT ON ERROR
016772  012737  001050  162002  LPSCOPE  MOV     SAVE @LPB         ,LOAD PRINTER BUFFEP
```

```
017000  032777  004000  161776          BIT     #BIT11,@SWR     ;SEND ONLY ONE CHAR?
017006  001402                          BEQ     LSCO            ;NO,  BRANCH
017010  000000                          HALT                    HALT - WAIT FOR OPERATOR
017012  000734                          BR      SCOPE           ;NEXT CHAR
017014  000177  000024          LSCO:   JMP     @LOSCOP         ;SEND LF?
017020  005237  001036          LSCA:   INC     CHRCNT          ;INCREMENT CHAR COUNT
017024  001346                          BNE     LDLPX           ;CONTINUE IF NOT DONE LINE
017026  012777  000012  161746          MOV     #12,@LPB        ;SEND LF
017034  105777  161740                  TSTB    @LPS            ;TEST READY
017040  100375                          BPL     .-4             ;WAIT FOR READY
017042  000716                          BR      SCOPE           ;CONTINUE

017044  017020                  LOSCOP: LSCA

        000001                          .END
```

```
ACNV    011720    2641#  2645   2650*  2652*  2654*  2659#
ACNN    011652    2645#  2656
BIT0  = 000001     937#  1484   1550
BIT1  = 000002     936#
BIT10 = 002000     927#  1528   2183   2329
BIT11 = 004000     926#  3198
BIT12 = 010000     925#  1887   1955   2006   2065   2120   2167   2226   2272   2311   2366   2407   2457
                  2502   2537   2855   2978
BIT13 = 020000     924#  1520   1917   1945   2083   2185   2235   2288   2331   2374
BIT14 = 040000     923#   960   1678   2540
BIT15 = 100000     922#
BIT2  = 000004     935#
BIT3  = 000010     934#
BIT4  = 000020     933#
BIT5  = 000040     932#
BIT6  = 000100     931#
BIT7  = 000200     930#
BIT8  = 000400     929#
BIT9  = 001000     928#  2663
CHAR    001074    1146#  1196*  2706*  2707*  2708   2710   2712   2715   2723   2724*  2733   2739*  2740*
                  2741   2745
CHPCHK  005374    1010   1962#  2007
CHRCNT  001036    1131#  1530*  1540*  1556*  1566*  1791*  1792*  1860*  1879*  1884*  1905*  1914*  1974*
                  1985*  2003*  2027*  2029   2044*  2052   2059*  2088*  2097*  2138*  2148*  2194*  2204*
                  2246*  2255*  2294*  2302*  2386*  2387*  2399   2425*  2427   2442*  2467*  2468*  2480*
                  2518*  2530*  2829*  2841*  2912*  2927*  3185*  3203*
CHRE    005604    1973   1982   1998#
CHPGEN  001040    1132#  1533*  1534*  1535   1537*  1539   1561*  1562   1564*  1565   1568*  1731*  1739
                  1740*  1741   1775*  1783   1784*  1785   1906*  1913   1916*  1919   1922   1928*  1935
                  1936*  1937   1939   1941   1943   1947*  1948   2031*  2033*  2034   2058*  2089*  2096
                  2100*  2114*  2139*  2147   2196*  2203   2206*  2209   2211*  2213*  2247*  2254   2257*
                  2258   2260*  2293*  2301   2307*  2342*  2343*  2344   2356   2383*  2384*  2385   2427*
                  2428   2430*  2432*  2433*  2434   2441   2446*  2448*  2464*  2488   2489*  2493*  2797*
                  2805   2806*  2807   2827*  2836   2543*  2904*  2913   2923   2925   2930*  2931
CHPS    005602    1993   1997#
CLCKAV  002440    1461#
CNTR    003250    1514*  1573#  1581*
CNTPLG  012230    2705   2739#
CONV    011640    2641#  2665   2754
CNIPT   003264     973   1551   1582   1588#
CP      005450    1974#  1992
CP0     005456    1975#  1986
CP1     005500    1976   1981#
CR2     005504    1982#  1997
CR3     005520    1984#  1995   2005
CR5     005606    1988   1999#
CR7     005562    1993#  1998
CSBR    001022    1053#  1499*
CYCCNT  001044    1134#  1532*  1542*  1859*  1885*  1903*  1953*  1972*  1987*  2002*  2028*  2046*  2061*
                  2195*  2207*  2214*  2340*  2341*  2358   2426*  2444*  2449*  2465*  2494*  2812*  2846*
DAVAV   003710    1669   1674#
DAVFU   014616     991   2542   2784#  2858
DAV11   015344    2793*  2821   2848*  2853*  2882#
DAV12   015346    2794*  2827   2849*  2854*  2883#
DAVTAB  015276    2797   2861#
DAV0    014676    2797#  2904
```

```
DAV00   014704          2798#   2811
DAV1    014732          2799    2805#
DAV2    015350           992    2857    2888#   2980
DE*0    015242          2847    2853#
DGTS    012212          2709    2735#
DIA     003252          1483*   1500*   1515*   1574#   1588*
DIGITS  001066          1143#   1194*   2718*   2719    2725    2735    2766*
DISPLA  001006          1047#   1162*
DISPPE  000174           977#   1162
DLE*    016130          2979    2981#
DL1     015514          2906    2912#   2930
DL10    015742          2950    2956#
DL10A   015770          2958    2961#
DL10B   015776          2960    2962#
DL12    016062          2970    2973#
DL2     015522          2913#   2928
DL6     015564          2917    2923#
DL6A    015612          2924    2926    2929#
DL8     015636          2936#   2976
DL8A    015660          2942#
DL9     015700          2946#   2965
DOAGN   011326          2545    2552#
DTAB    016146          2903    2991#
DTABP   016134          2903*   2904    2929*   2930    2983#
D0      014774          2813#   2852
D1      015030          2816    2821#
D2      015106          2830#   2845
D3      015130          2831    2836#
D4      015202          2842    2846#
D5      014766          2808    2812#
ENABL   011762          1476    1494    1509    1631    1728    1771    1846    1897    1965    2020    2076    2131    2177
                        2282    2322    2418    2511    2682#   2787    2891    3181
ENABL*  012000          2686#
ERCOUN  001052          1137#   1229*   1235*   1253*   1263*   1269*   1279*   1295*   1305*   1316*   1322*   1330*   1344*
                        1350*   1355*   1367*   1380*   1393*   1418*   1424*   1434*   1636*   1659*   1734*   1748*   1778*
                        1796*   1851*   1864*   1909*   1931*   1977*   2037*   2092*   2143*   2199*   2250*   2297*   2351*
                        2394*   2437*   2472*   2484*   2521*   2591*   2666    2800*   2817*   2832*   2907*   2918*   2951*
                        3192*
ERR0    001342          1229#
ERR1    001364          1235#
ERR10   001674          1316#
ERR11   001716          1322#
ERR12   001746          1330#
ERR13   002004          1344#
ERR14   002026          1350#
ERR15   002042          1355#
ERR16   002102          1367#
ERR17   002142          1380#
ERR2    001460          1253#
ERR20   002202          1393#
ERR21   002302          1418#
ERR22   002324          1424#
ERR23   002364          1434#
ERR24   003512          1636#
ERR25   003616          1659#
ERR26   004130          1734#
```

ERR27	004212	1748#							
ERR3	001510	1263#							
ERR30	004322	1778#							
ERR31	004424	1796#							
ERR32	004610	1851#							
ERR33	004666	1864#							
ERR34	005110	1909#							
ERR35	005226	1931#							
ERR36	005464	1977#							
ERR37	005776	2037#							
ERR4	001532	1269#							
ERR40	006260	2092#							
ERR41	006532	2143#							
ERR42	007030	2199#							
ERR43	007322	2250#							
ERR44	007562	2297#							
ERR45	010052	2351#							
ERR46	010320	2394#							
ERR47	010542	2437#							
ERR5	001562	1279#							
ERR50	010734	2472#							
ERR51	011006	2484#							
ERR52	011200	2521#							
ERR53	011436	2591#							
ERR54	011712	2800#							
ERR55	015014	2817#							
ERR56	015114	2832#							
ERR57	015476	2907#							
ERR6	001614	1295#							
ERR60	015544	2918#							
ERR61	015722	2951#							
ERR62	016756	3192#							
ERR7	001640	1305#							
FFSET	004020	1641	1708#						
FFTAB	003742	1640	1683#						
FS	016674	2959	3171#						
FTABE	004016	1668	1705#						
HAMALN	011124	1018	2508#	2538					
HAMX	011306	2541	2543#						
HAM1X	011164	2518#	2536						
HAM2	011172	2519#	2531						
HEDO	012400	2670	2777#						
HED1	012401	2667	2777#						
HSPRT	006660	1014	2174#	2227					
HSO	007000	2194#	2223	2225					
HSOO	006764	2189	2192#						
HSOOA	006750	2186	2190#						
HS1	007022	2197#	2210	2212	2215				
HS2	007044	2198	2203#						
HS3	007112	2208	2213#						
HS4	007130	2205	2216#						
HS6	007200	2220	2226#						
HTABP	016144	2900*	2943	2967*	2987#				
ICTAB	016610	2901	2971	3139#					
ICTABP	016140	2901*	2902	2957	2968*	2969	2971*	2973	2985#
INDAT	004074	989	1679	1725#	1738	1752			

```
INDATT  004244            1731    1759#
INDATO  004150            1733    1739#
INDAT1  004232            1747    1753#
INDO    004122            1732#   1745
IND1    004204            1742    1746#
INT1C   002246            1340    1407#
INT1D   002400            1414    1441#
ITAB    016626            2898    3149#
ITABP   016136            2898*   2899    2974*   2975    2984#
MAIL    002650             999    1467    1506#
MAILP   002572            1000    1472    1491#
MDLH    005242            1930    1935#   1944    1949
MELPX   016742            3187#   3204
MEGCHP  001060            1140#   1522*   1525*   1527    1535    2187*   2190*   2209    2238*   2241*   2258    2334*   2338*
                          2346    2377*   2381*   2389
MFT     010444            2424#
MFTTP   010412            1017    2369    2415#   2458
MFT0    010452            2425#   2455
MFT1    010474            2428#   2431
MFT2    010514            2429    2432#
MFT3    010534            2435#   2447    2450
MFT4    010556            2436    2441#
MFT5    010606            2445    2448#
MFT6    010624            2443    2451#   2456
MINCNT  001042            1133#   1478*   1496*   1511*   1534    1546*   1591    1593*   1599    1601*   1606    1640*   1654
                          1667*   1668    1670    1971*   2004*   2026*   2054*   2056    2150*   2151*   2152*   2156*   2193*
                          2219*   2245*   2265*   2290*   2292*   2308*   2333*   2337*   2345    2363*   2364    2376*   2380*
                          2404*   2405    2424*   2425    2454*   2463*   2465    2468    2499*   2500    2517*   2535*
MKS     001026            1055#   1464    1515    1516*
MKSRV   003254             970    1581#
MOAD    015454            2903#   2911    2922    2955
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                          1929    1951    1975    1990    2000    2035    2050    2090    2104    2141    2154    2197    2217
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