

LP14-LP11-LP05

LINE PRINTER TEST
MD-11-DZLPK-H

EP-DZLPK-H-DL

JAN 1978

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IDENTIFICATION

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1 0 ABSTRACT

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

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

2 0 REQUIREMENTS

2 1 EQUIPMENT

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

LPC11	LINE PRINTER INTERFACE
LP05	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
LP11	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER
LP14	DATAPRODUCTS 132 COLUMN 64 OR 96 CHARACTER LINE PRINTER

TELETYPE MODEL 33 OR EQUIVALENT CONSOLE UNIT

2 2 STORAGE

MEMORY LOCATIONS 0 - TO - 17200 ARE USED BY THIS DIAGNOSTIC

2 3 PRELIMINARY PROGRAMS

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

3.1 METHOD

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(3) 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

600	TEST 2 INTERFACE & DATA PATHS TEST (ALSO GENERAL PRINT TEST STARTING ADDRESS)
610	TEST 3 CHAP 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

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
17	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 EPRCP 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 APPROXIMATE PRINT SPEED WILL BE PRINTED ON BOTH THE LINE PRINTER AND THE TELEPRINTER. SWITCH 0 IS NOT USED IN ANY OTHER TESTS. MAKE SURE SWITCH 0 IS DOWN AT THE START OF THE TEST IF USING MANUAL TIMING OR UP IF USING AN INTERNAL CLOCK OPTION (KW11-L OR KW11-P).

2 SWITCH - 9

SWITCH 9 IN THE UP POSITION WILL INHIBIT EPRCP 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 LPO5/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

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.

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

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

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

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

THE DIAGNOSTIC WILL PROMPT THE OPERATOR WITH THE MESSAGE

SWR = XXXXXX NEW SWR =

THE FIRST TIME THE SWR VALUE IS NEEDED ANY TIME THEREAFTER,
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 SWP IN LOCATION 17E(3)

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 D GIT 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-L (U) AND THEN ENTER THE CORRECT SWR VALUE

5.3 NOT 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) AND THE CORRECT PSW IN LOCATION 1032(8)

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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 DIFFICULTIES. DETAILED DESCRIPTIONS OF EACH TEST PATTERN APPEARS IN THE DESCRIPTION OF THE CORRESPONDING TEST ROUTINES.

7 0 TEST DESCRIPTIONS

7 1 TEST 1 - CONTROL TESTS AND OPERATOR INTERACTIVE TESTS

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

7 1 1 TEST 1 - SECTION 1 - COMMAND DECODE, CONTROL INTERFACE

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

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

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

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

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

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

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7 1 2 TEST 1 - SECTION 2 - PRINT SPEED TIMING TEST

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

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

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

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

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

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

7 1 3 TEST 1 - SECTION 3 - TOP OF FORM SWITCH TEST

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

UPON COMPLETION OF THIS SECTION OF TEST 1 THE MESSAGE "TURN ON DAFU 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 DAFU (IF AVAILABLE)

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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 "X" AND "U" CHARACTERS ARE TRANSMITTED TO THE PRINTER ON A FULL 132 COLUMN BASIS. SINCE THESE CHARACTERS ARE COMPLEMENTARY BITWISE, THEY PROVIDE BOTH A ONES AND ZEROES CHECK OF ALL TRANSMISSION LINES. END OF LINE IS SENSED WITHIN THE PROCESSOR AND A LINE FEED CHARACTER IS TRANSMITTED TO PRINT EACH LINE. PRINTING OF THE TEST LINE IS REPEATED 32 TIMES, ALTERNATING THE COLUMN POSITIONS OF THE "X" AND "U" CHARACTERS TO PRODUCE A CHECKER-BOARD PATTERN.

7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

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

7.2.3 TEST 4 - OVER PRINT TEST

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

7.2.4 TEST 5 - SHUTTLE POSITIONING TEST

THIS TEST CHECKS THE HAMMER SHUTTLE FOR CORRECT OPERATION. FULL LINES OF E'S ARE PRINTED BY PRINTING A PAIR OF E'S AT A TIME THEN OVERPRINTING THOSE E'S PRINTED WITH SPACES AND ADDING ANOTHER PAIR OF E'S TO THE LINE UNTIL THE LINE IS COMPLETED. THEN A FULL LINE OF M'S ARE PRINTED FOR COMPARISON. A TOTAL OF 16 LINES ARE PRINTED DURING THIS TEST. 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.

764
 765
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7 2 6 TEST 7 - MULTIPLE LINE ADVANCE TEST

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

7 2 7 TEST 8 - HIGH SPEED PRINT TEST

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

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

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

```

77777--- -----77777
@#@#@@-----@#@#@@
AAAAA-----AAAAA
BBBBB--- -----BBBBB
-----
-----
ZZZZZ-----ZZZZZ
  
```

7 2 9 TEST 10 - DRUM PATTERN TEST

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

7 2 10 TEST 11 - SPURIOUS HAMMER FIRING TEST

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

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

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

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

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

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

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 REFERENCE LINE. BEFORE TESTING EACH CHANNEL, A HEADER MESSAGE IS PRINTED TELLING WHICH CHANNEL IS BEING TESTED. AFTER TESTING EACH SLEW COMMAND, A LINE IS PRINTED GIVING THE CORRECT NUMBER OF BLANK LINES FROM THE LAST PRINTED LINE TO THAT LINE. UPON COMPLETION OF THIS TEST THE DIAGNOSTIC WILL RESTART THE PRINTING TESTS WITH TEST 2.

7 3 SCOPE DRIVE ROUTINE

THE PRUPOSE OF THIS TEST SEQUENCE IS TO PROVIDE THE OPERATOR WITH A SHORT BUT COMPREHENSIVE SCOPE DRIVER ROUTINE FOR USE IN TROUBLE SHOOTING THE PRINTER INTERFACE CONTROL MODULE WITH THE SCOPE. DEPENDING ON THE SETTING OF SWITCH 11 THIS TEST WILL EITHER CONTINUALLY SEND WHATEVER CHARACTER IS SET IN THE SWITCH REGISTER TO THE LINE PRINTER, OR ONLY SEND IT ONCE AND HALT (SEE DESCRIPTION OF SWITCH 11 OPERATION IN SECTION 5 1)

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

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

WHEN SWITCH 11 IS UP, TO SEND ONLY ONE CHARACTER THEN HALT, DEPPRESS 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 DEPPRESS CONTINUE TO STOP SEND NG CONTINUOUSLY PLACE SWITCH 11 UP

ENDP

8880
8881
8882
8883
8884
8885
8886
8887
8888
8889

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	P1=.1
000002	P2=.2
000003	P3=.3
000004	P4=.4
000005	P5=.5
000006	P6=.6
000007	P7=.7
000006	SP=R6
000007	PC=R7
100000	BIT15 = 100000
040000	BIT14 = 40000
020000	BIT13 = 20000
010000	BIT12 = 10000
004000	BIT11 = 4000
002000	BIT10 = 2000
001000	BIT9 = 1000
000400	BIT8 = 400
000200	BIT7 = 200
000100	BIT6 = 100
000040	BIT5 = 40
000020	BIT4 = 20
000010	BIT3 = 10
000004	BIT2 = 4
000002	BIT1 = 2
000001	BIT0 = 1
	ENABLE ABS
	ENABLE AMA
000000	-0

SEQ 0022

940					
941		000030		=30	
942	000030	011524		TYP	
950	000032	000340		340	
951					
952					
953		000042		=42	
954					
955	000042	000000		0	
956					
957		000046		=46	
958	000046	011316		LOGICAL	
959		000052		=52	
960	000052	040000		BIT14	
961					
962					
963		000060		=60	
964	000060	012002		TKINT	
965	000062	000300		300	KEYBOARD INTERRUPT ROUTINE
966					
967					
968		000100		=100	
969					
970	000100	003254		LKSRV	
971	000102	000340		340	LINE CLOCK SERVICE ROUTINE
972					
973	000104	003264		CONVRT	
974	000106	000340		340	
975					
976		000174		=174	
977	000174	000000		DISPREG	0
978	000176	000000		SWREG	0
979					
980		000200		=200	
981					
982	000200	012706	001000	MOV	#1000, %6
983	000204	000137	001102	JMP	SETUP
984					
985					
986		000300		=300	
987					
988					
989	000300	000137	004074	JMP	INDAT
990	000304	000137	004260	JMP	NO DAT
991	000310	000137	014616	JMP	DAVFU
992	000314	000137	015350	JMP	DAV2
993					
994					
995		000400		=400	
996					
997					
998	000400	000137	002514	JMP	SWTIME
999	000404	000137	002650	JMP	KW11L
1000	000410	000137	002572	JMP	KW11P
1001	000414	000137	003464	JMP	SLEWCK

START FOR DAVFU TESTS
 ILLEGAL LOAD TEST
 NO STOP BIT - CHANNEL SLEW TEST
 LINE COUNT SLEW TEST
 CHANNEL SLEW TEST
 1 MINUTE PRINT SPEED CHECK
 START FOR USING SWITCH PEG FOR TIMING
 START FOR KW11-L LINE CLOCK
 START FOR KW11-P LINE CLOCK
 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      001000      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      C_SPLAY 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      LIST ME
1064
1065      MACR      SERROR X
1066      MOV      #X,      ERCOUNT      .SET UP ERROR COUNT X
1067      N=N+1
1068      ENDM      SERROR
1069
1070
1071      .MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1072      LIST ME
1073
1074      MACR      SPRINT Y
1075      MOV      TNO'Y',MES15      .SET TEST NUMBER FOR MESSAGE
1076      JSR      %4,PRNT      .PRINT TEST NUMBER
1077      M=M+1
1078      ENDM      SPRINT
1079
1080
1081      .MACRO FOR WAITING FOR PRINTER TO PRINT OP SLEW
1082      LIST ME
1083
1084      MACR      SWAIT
1085      TSTB      @LPS      .TEST READY
1086      BPL      -4      WAIT FOR READY
1087      ENDM      SWAIT
1088
1089
1090      .MACRO FOR ENABLING KEYBOARD INTERRUPT IF THERE IS NO
1091      H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1092      LIST ME
1093
1094      MACR      SENABLE
1095      CMP      #176,SWR      .S/W SWP ?
1096      BNE      15      .NO- CONTINUE
1097      JSR      PC,ENABL      .ENABLE KEYBOARD INTERRUPT
1098      ENDM      SENABLE
1099
1100
1101      .MACRO USED TO LOAD THE PSW WITH THE
1102      CORRECT PROCESSOR PRIORITY LEVEL
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113

```

LIST ME

MACR	SSETPSW	
MOV	PC, -(SP)	, MOVE PRESENT LOCATION TO STACK
ADD	#6, (SP)	, SET UP FOR NEXT INSTRUCTION
PTI		, LOAD PSW
ENDM	SSETPSW	

, MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

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	QCT	0
1148	001100	000000	TEMP	0

, ROUTINE TO TEST THE MECH OPERATION OF THE LPO5

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	#15, 4	, SET UP TIMEOUT VECTOR
1158	001126	005777	177652		TST	@SWP	, TRY TO ACCESS HARDWARE SWP
1159	001132	000407			BR	25	, IF THERE, GO TO 25
1160	001134			15			
1161	001134	012737	000176	001004	MOV	#SWREG, SWP	, POINT TO SOFTWARE SWP
1162	001142	012737	000174	001006	MOV	#DISPREG, DISPLAY	, POINT TO SOFTWARE DISPLAY
1163	001150	022626			CMP	(SP)+, (SP)+	, RESTORE STACK
1164	001152	012637	000006	25	MOV	(SP)+, 6	, RESTORE TIMEOUT VECTORS
1165	001156	012637	000004		MOV	(SP)+, 4	
1166							
1167	001162	104000			ENT	+0	
1168	001164	012761			MES1		, TYPE DIAGNOSTIC TITLE
1169	001166	104000			ENT	+0	

```

1170 001170 013024 MES2 ,TYPE RESTART ADDRESS INFO
1171
1172
1173
1174 ,LOWER PROCESSOR PRIORITY
1175
1176
1177 001172 005046 35 CLR -(SP) ,NEW PSW
1178 001174 012746 001202 MOV #45, -(SP) ,NEW PC
1179 001200 000002 RTI ,LOAD NEW PSW
1180 001202 45
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 CLP 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 SWP VALUE ENTERED ?
1210 001320 001772 BEQ WT NO WAIT
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

```

1225	001334	005777	177440		STP1	TST	ALPS		. TEST FOR ERROR
1226	001340	100006				BPL	STP2		. NO ERROR TEST FOR READY
1229	001342	012737	000000	001052	ERR0	MOV	#0,	ERCOUNT	. SET UP ERROR COUNT 0
1230		000001				N=N+1			
1231	001350	004537	011722			JSR	%5, STAEF		. REPORT ERROR BIT SET
1232	001354	000767				BR	STP1		. GO TEST FOR ERROR
1233	001356	105777	177416		STP2	TSTB	ALPS		. TEST FOR READY
1234	001362	100406				BMI	STP3		. READY SET OK
1235	001364	012737	000001	001052	ERR1	MOV	#1,	ERCOUNT	. SET UP ERROR COUNT 1
1236		000002				N=N+1			
1237	001372	004537	011722			JSR	%5, STAEF		. REPORT READY NOT SET
1238	001376	000767				BR	STP2		. GO TEST FOR READY
1239	001400	104000			STP3	EMT	+0		. TYPE MESSAGE
1240	001402	013103				MES4			. PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1241	001404	000000				HALT			. DEPRESS CONTINUE WHEN READY
1242	001406				STP4				
1243	001406	012777	000014	177306		MOV	#14, ALPB		. SEND A "FF" TO THE PRINTER
1244	001414	012737	000100	001100		MOV	#100, TEMP		. DELAY COUNT
1245	001422	005337	001100		15	DEC	TEMP		. DECREMENT COUNTER
1246	001426	001375				BNE	15		. CONTINUE WAIT LOOP
1247	001430	012777	000015	177344		MOV	#15, ALPB		. ATTEMPT "FF" BY SENDING A "CR"
1248	001436	012737	000100	001100		MOV	#100, TEMP		. DELAY COUNT
1249	001444	005337	001100		25	DEC	TEMP		. DECREMENT COUNTER
1250	001450	001375				BNE	25		. CONTINUE WAIT LOOP
1251	001452	005777	177322			TST	ALPS		. TEST FOR ERROR
1252	001456	100406				BMI	STP5		. BRANCH IF ERROR SET
1253	001460	012737	000002	001052	ERR2	MOV	#2,	ERCOUNT	. SET UP ERROR COUNT 2
1254		000003				N=N+1			
1255	001466	004537	011722			JSR	%5, STAEF		. REPORT ERROR NOT SET
1256	001472	000745				BR	STP4		. LOOP ON ERROR
1257	001474	104000			STP5	EMT	+0		. TYPE MESSAGE
1258	001476	013214				MES6			. ERROR SET OK - TURN ON LINE
1259	001500	000000				HALT			. WAIT FOR OPERATOR
1260									
1261	001502	005777	177272		STP5A	TST	ALPS		. TEST FOR ERROR
1262	001506	100006				BPL	STP5B		. NO ERROR CONTINUE
1263	001510	012737	000003	001052	ERR3	MOV	#3,	ERCOUNT	. SET UP ERROR COUNT 3
1264		000004				N=N+1			
1265	001516	004537	011722			JSR	%5, STAEF		. REPORT ERROR SET
1266	001522	000767				BR	STP5A		. LOOP ON ERROR
1267	001524	105777	177250		STP5B	TSTB	ALPS		. TEST READY
1268	001530	100406				BMI	STP5C		. READY SET OK
1269	001532	012737	000004	001052	ERR4	MOV	#4,	ERCOUNT	. SET UP ERROR COUNT 4
1270		000005				N=N+1			
1271	001540	004537	011722			JSR	%5, STAEF		. REPORT ERROR NOT SET
1272	001544	000767				BR	STP5B		. LOOP ON ERROR
1273	001546	104000			STP5C	EMT	+0		. TYPE MESSAGE
1274	001550	013147				MES5			. READY SET OK - TRY DRUM GATE SWITCH
1275	001552	000000				HALT			. DEPRESS CONTINUE WHEN READY
1276									
1277	001554	005777	177220		STP6	TST	ALPS		. TEST FOR ERROR
1278	001560	100406				BMI	STP7		. BRANCH IF ERROR SET
1279	001562	012737	000005	001052	ERR5	MOV	#5,	ERCOUNT	. SET UP ERROR COUNT 5
1280		000006				N=N+1			
1281	001570	004537	011722			JSR	%5, STAEF		. REPORT ERROR NOT SET


```

1282 001574 000767
1283 001576 104000
1284 001600 013214
1285 001602 000000
1286
1287
1288
1289
1290
1291
1292 001604 000005
1293 001606 005777 177166
1294 001612 100006
1295 001614 012737 000006 001052 ERR6
1296 000007
1297 001622 004537 011722
1298 001626 000766
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1301
1302 001630 000005
1303 001632 105777 177142
1304 001636 100406
1305 001640 012737 000007 001052 ERR7
1306 000010
1307 001646 004537 011722
1308 001652 000766
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1312 001654 005037 001046
1313 001660 012777 000012 177114
1314 001666 105777 177106
1315 001672 100006
1316 001674 012737 000010 001052 ERR10
1317 000011
1318 001702 004537 011722
1319 001706 000762
1320 001710 005777 177064
1321 001714 100006
1322 001716 012737 000011 001052 ERR11
1323 000012
1324 001724 004537 011722
1325 001730 000751
1326 001732 105777 177042
1327 001736 100411
1328 001740 005237 001046
1329 001744 001361
1330 001746 012737 000712 001052 ERR12
1331 000013
1332 001754 004537 011722
1333 001760 000735
1334
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      STP7      BR      STP6
              EMT      +0
              MES6
              HALT

      , LOOP ON ERROR
      , TYPE MESSAGE
      , ERROR SET OK - TURN ON LINE
      , DEPRESS CONTINUE WHEN READY

      , TEST 1
      , PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING
      , IS THE PRINTER FREE OF ERRORS

      TEST1      RESET
              TST      @LPS
              BPL      TEST1A
              MOV      #6,      ERCOUNT
              N=N+1
              JSR      %5, STAER
              BR      TEST1
      , CLEAR THE WORLD
      , IS ERROR FLAG CLEAR
      , ERROR IS CLEAR OK
      , SET UP ERROR COUNT 6
      , REPORT ERROR SET
      , LOOP ON ERROR

      , IS READY SET (NO ERRORS EXIST)

      TEST1A      RESET
              TSTB     @LPS
              BMI      TEST1B
              MOV      #7,      ERCOUNT
              N=N+1
              JSR      %5, STAER
              BR      TEST1A
      , CLEAR THE WORLD
      , IS READY SET
      , READY SET! PRINTER OK
      , SET UP ERROR COUNT 7
      , REPORT READY NOT SET
      , LOOP ON ERROR

      , DOES LOADING THE BUFFER RESET READY

      TEST1B      CLR      WORK
              MOV      #12, @LPB
              TSTB     @LPS
              BPL      LP1
              MOV      #10,      ERCOUNT
              N=N+1
              JSR      %5, STAER
              BR      TEST1B
              TST      @LPS
              BPL      LP2
              MOV      #11,      ERCOUNT
              N=N+1
              JSR      %5, STAER
              BR      TEST1B
              TSTB     @LPS
              BMI      TEST1C
              INC      WORK
              BNE      LP1
              MOV      #12,      ERCOUNT
              N=N+1
              JSR      %5, STAER
              BR      TEST1B
      , CLEAR COUNTER
      , LOAD LINE FEED INTO BUFFER
      , IS READY CLEAR
      , READY TO CLEAR OK!
      , SET UP ERROR COUNT 10
      , REPORT READY STILL SET
      , LOOP ON ERROR
      , IS THERE AN ERROR
      , NO ERROR CONTINUE
      , SET UP ERROR COUNT 11
      , REPORT ERROR OCCURRED
      , LOOP ON ERROR
      , IS THE PRINTER STILL BUSY
      , NO! GO TO NEXT TEST
      , YES! GO CHECK FLAGS
      , PRINTER STILL BUSY WAIT
      , SET UP ERROR COUNT 12
      , ERROR REPORT TIME OUT
      , LOOP ON ERROR

      CHECK INTERRUPT LEVEL OF PRINTER
      THE PRINTER SHOULD BE AT LEVEL 4
  
```

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1338
1339
1340 001762 012777 002246 177040 TEST1C MOV #INT1C, @PTRVEC , SET UP INT VECTOR
1341 001770 012777 000340 177034 MOV #340, @PTRPSW , SET PRIORITY
1342 001776 005777 176776 TST @LPS , TEST FOR ERROR
1343 002002 100006 BPL LP3 , NO ERROR CONTINUE
1344 002004 012737 000013 001052 ERR13 MOV #13, ERCOUNT , SET UP ERROR COUNT 13
1345 000014 N=N+1
1346 002012 004537 011722 JSR %5, STAER , REPORT ERROR SET
1347 002016 000761 BP TEST1C , LOOP ON ERROR
1348 002020 105777 176754 LP3 TSTB @LPS , TST FOR READY
1349 002024 100406 BMI LP3X , READY SET OK
1350 002026 012737 000014 001052 ERR14 MOV #14, ERCOUNT , SET UP ERROR COUNT 14
1351 000015 N=N+1
1352 002034 004537 011722 JSR %5, STAER , REPORT READY NOT SET
1353 002040 000750 BR TEST1C , LOOP ON ERROR
1354 002042 LP3X
1355 002042 012737 000015 001052 ERR15 MOV #15, ERCOUNT , SET UP ERROR COUNT 15
1356 000016 N=N+1
1357 002050 012746 000340 MOV #340, -(SP) , LOCKUP PROCESSOR, NEW PRIORITY
1358 002054 010746 MOV PC, -(SP) , MOVE PRESENT LOCATION TO STACK
1359 002056 062716 000006 ADD #6, (SP) , SET UP FOR NEXT INSTRUCTION
1360 002062 000002 RTI , LOAD PSW
1361 002064 052777 000100 176706 BIS #100, @LPS , SET PRINTER INTO ENABLE
1362 002072 000240 NOP , WAIT
1363 002074 042777 000100 176676 BIC #100, @LPS , CLEAR PRINTER INT ENABLE
1364
1365
1366
1367 002102 012737 000016 001052 ERR16 MOV #16, ERCOUNT , SET UP ERROR COUNT 16
1368 000017 N=N+1
1369 002110 012746 000300 MOV #300, -(SP) , SET PROCESSOR PRIORITY LEVEL 6
1370 002114 010746 MOV PC, -(SP) , MOVE PRESENT LOCATION TO STACK
1371 002116 062716 000006 ADD #6, (SP) , SET UP FOR NEXT INSTRUCTION
1372 002122 000002 RTI , LOAD PSW
1373 002124 052777 000100 176646 BIS #100, @LPS , SET PRINTER INT ENABLE
1374 002132 000240 NOP , WAIT
1375 002134 042777 000100 176636 BIC #100, @LPS , CLEAR PRINTER INT ENABLE
1376
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1380 002142 012737 000017 001052 ERR17 MOV #17, ERCOUNT , SET UP ERROR COUNT 17
1381 000020 N=N+1
1382 002150 012746 000240 MOV #240, -(SP) , SET UP PROCESSOR TO LEVEL 5
1383 002154 010746 MOV PC, -(SP) , MOVE PRESENT LOCATION TO STACK
1384 002156 062716 000006 ADD #6, (SP) , SET UP FOR NEXT INSTRUCTION
1385 002162 000002 RTI , LOAD PSW
1386 002164 052777 000100 176606 BIS #100, @LPS , SET PRINTER INT ENABLE
1387 002172 000240 NOP , WAIT
1388 002174 042777 000100 176576 BIC #100, @LPS , CLEAR INT ENABLE PRINTER OF
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1393 002202 012737 000020 001052 ERR20 MOV #20, ERCOUNT , SET UP ERROR COUNT 20
  
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1394      000021
1395 002210 012746 000200      N=N+1
1396 002214 010746      MOV      #200, -(SP)      , SET PROCESSOR TO LEVEL 4
1397 002216 062716 000006      MOV      PC, -(SP)      , MOVE PRESENT LOCATION TO STACK
1398 002222 000002      ADD      #6, (SP)      , SET UP FOR NEXT INSTRUCTION
1399 002224 052777 000100 176546      RTI      , LOAD PSW
1400 002232 000240      BIS      #100, @LPS      , SET PRINTER INT ENABLE
1401 002234 042777 000100 176536      NOP      , WAIT
1402 002242 000137 002260      BIC      #100, @LPS      , CLEAR PRINTER INT ENABLE
1403      JMP      TEST10      , PRINTER OK CONTINUE
1404
1405      , INTERRUPT HANDLE FOR TEST1C
1406      , RESTORE STACK AND REPORT ERROR
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      _P4  TSTB      @LPS      , IS READY SET
1423 002322 100406      BMI      LP5      , YES - PRINTER READY
1424 002324 012737 000022 001052 EPR22 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 EPR23 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
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.1 MINUTE PRINT SPEED CHECK
IF A KW11-L OR KW11-P ARE NOT AVAILABLE, THE SR BIT IS USED
FOR MANUAL TIMING OF THE PRINTER

CLCKAV	MOV	#RT1, @#6				.SET TRAP TO RETURN
	MOV	#6, @#4				
	SEC					
	TSTB	@LKS				.KW11-L AVAILABLE?
	BCS	15				.NO, BRANCH
	CLR	@#4				.RESET TRAP VECTOR TO HALT
	JMP	KW11L				.USE KW11L FOR TIMING
15	SEC					
	TSTB	@PLKS				.KW11-P AVAILABLE?
	BCS	SWTIME				.NO, USE SWITCH REG FOR TIMING
	CLR	@#4				.RESET TRAP VECTOR TO HALT
	JMP	KW11P				.USE KW11-P FOR TIMING
SWTIME						
	CMP	#176, SWR				.S/W SWR ?
	BNE	15				.NO- CONTINUE
	JSR	PC, ENABL				.ENABLE KEYBOARD INTERRUPT
15						
	CLR	LINCNT				.CLEAR LINE COUNT
	JSP	%4, TYPINT				
	CLR	@#4				.RESET TRAP VECTOR TO HALT
	EMT	+0				.TYPE MESSAGE
	MESC					.PRINT SPEED CHECK USING MANUAL TIMING
	MOV	#2, DIA				.SET DUMMY ADDRESS
25	BIT	#BIT0, @SWR				START?
	BEQ	25				.WAIT FOR START
	IMP	STARO				.START PRINTING

.START FOR KW11-P

KW11P						
	CMP	#176, SWR				.S/W SWR ?
	BNE	15				.NO- CONTINUE
	JSP	PC, ENABL				.ENABLE KEYBOARD INTERRUPT
15						
	CLR	LINCNT				.CLEAR LINE COUNT
	JSR	%4, TYPINT				
	MOV	#1000, %6				.RESET STACK
	MOV	MINCNT, @CSBR				.SET CLOCK COUNT
	MOV	PLKS, DIA				.STORE PLKS ADDRESS
	MOV	#105, @PLKS				.START CLOCK
	JMP	STARO				.START PRINTING

.START FOR KW11-L

1506	002650				KW11L			
1507	002650	022737	000176	001004		CMP	#176, SWR	, S/W SWR ?
1508	002656	001002				BNE	15	, NO- CONTINUE
1509	002660	004737	011762			JSR	PC, ENABL	, ENABLE KEYBOARD INTERRUPT
1510	002664				15			
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								
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, CHRCNT	, GET CHAR FROM TABLE
1534	003032	063737	001042	001040		ADD	LINCNT, CHRCNT	, ADD LINE COUNT
1535	003040	023737	001060	001040	15	CMP	LEGCHR, CHRCNT	, LEGAL CHAR?
1536	003046	003004				BGT	STAR1	, YES, BRANCH
1537	003050	163737	001062	001040		SUB	NUMCHR, CHRCNT	, NO, MAKE LEGAL
1538	003056	000770				BP	15	, RECHECK CHAR
1539	003060	013777	001040	175714	STAR1	MOV	CHRCNT, @LPB	, LOAD BUFFER
1540	003066	005337	001036			DEC	CHRCNT	, DECREMENT CHAR COUNT
1541	003072	001410				BEQ	STAR1	, 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		STAR1	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								
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	000240		CMP	STRCHR, #40	, LEGAL CHARACTER ?
1559	003170	100303				BPL	35	, YES-CONTINUE
1560	003172	063737	001062	001054		ADD	NUMCHR, STRCHR	, NO-MAKE LEGAL
1561	003200	013737	001054	001040	35	MOV	STRCHR, CHRCNT	, GET CHARACTER

1562 003206 023727 001040 000040 TMTST2 CMP CHRGEN, #40
 1563 003214 100003 001062 001040 15 BPL 15
 1564 003216 063737 001040 175550 15 ADD NUMCHR, CHRGEN
 1565 003224 013777 001036 001036 DEC CHRGEN, @LPB
 1566 003232 005337 001040 001040 BEQ CHRCNT
 1567 003236 001726 001040 001040 BEQ STARED
 1568 003240 005337 001040 001040 DEC CHRGEN
 1569 003244 000760 001040 001040 TMTST1 BP TMTST2

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 1572 003246 007020
 1573 003250 000000
 1574 003252 000002
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MINCNT 7020
 CNTR 0
 DIA 2

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

LINE CLOCK SERVICE ROUTINE FOR KW11-L

1581 003254 005337 003250
 1582 003260 001401
 1583 003262 000002
 1584
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 1587

LSPV DEC CNTP
 BEQ CONVRT
 RTI

ROUTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE

1588 003264 042777 000100 177760 CONVRT BIC #100, @DIA
 1589 003272 005037 011636 TYPDAT
 1590 003276 012703 013575 MOV #MES12, %3
 1591 003302 022737 000144 001042 15 CMP #100, LINCNT
 1592 003310 003006 BGT 25
 1593 003312 162737 000144 001042 SUB #100, LINCNT
 1594 003320 005237 011636 INC TYPDAT
 1595 003324 000766 BR 15
 1596 003326 062737 000060 011636 25 ADD #60, TYPDAT
 1597 003334 113723 011636 MOV TYPDAT, (%3)+
 1598 003340 005037 011636 CLR TYPDAT
 1599 003344 022737 000012 001042 35 CMP #10, LINCNT
 1600 003352 003006 BGT 45
 1601 003354 162737 000012 001042 SUB #10, LINCNT
 1602 003362 005237 011636 INC TYPDAT
 1603 003366 000766 BR 35
 1604 003370 062737 000060 011636 45 ADD #60, TYPDAT
 1605 003376 113723 011636 MOV TYPDAT, (%3)+
 1606 003402 013737 001042 011636 MOV LINCNT, TYPDAT
 1607 003410 062737 000060 011636 ADD #60, TYPDAT
 1608 003416 113723 011636 MOV TYPDAT, (%3)+
 1609 003422 104000 ENT +0
 1610 003424 013536 MES11
 1611 003426 012737 013534 011470 MOV #MES11A, PPTMSG
 1612 003434 004437 011452 JSR %4 RINT
 1613 003440 000137 003464 JMP SLEWCK

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 1617 003444 000040
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FHTTB 40

1612	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							
1627							
1628	003464						
1629	003464	022737	000176	001004	SLEWCK-		
1630	003472	001002			CMP	#176, SWR	, S/W SWR ?
1631	003474	004737	011762		BNE	15	, NO- CONTINUE
1632	003500				JSP	PC, ENABL	, ENABLE KEYBOARD INTERRUPT
1633	003500	004437	011472		15		
1634	003504	004537	011332		JSR	%4, TYPINT	
1635	003510	000406			JSR	%5, PRTINT	, INITIALIZE PRINTER
1636	003512	012737	000024	001052	BR	SLW	, BRANCH IF OK
1637		000025			MOV	#24, ERCOUNT	, SET UP ERROR COUNT 24
1638	003520	004537	011722		N=N+1		
1639	003524	000000			JSR	%5, STAEP	, REPORT PRINTER NOT READY
1640	003526	012737	003742	001042	HALT		, HALT ON ERROR
1641	003534	012704	004020		MOV	#FFTAB, LINCNT	, LINE COUNT FOR SWITCH SETTING
1642	003540	012703	012310		MOV	#FFSET, %4	, INIT SWITCH SETTING TABLE POINTER
1643	003544	012702	012427		MOV	#MES8, %3	, INIT MESSAGE POINTER
1644	003550	111413			MOV	#MES10, %2	
1645	003552	111412			MOVB	(%4), (%3)	, PUT SWITCH SETTINGS INTO MESSAGES
1646	003554	122423			MOVB	(%4), (%2)	
1647	003556	105722			CMPB	(%4)+, (%3)+	, INCREMENT POINTERS
1648	003560	105714			TSTB	(%2)+	
1649	003562	001372			TSTB	(%4)	, DONE MOVING SWITCH SETTINGS TO MSG'S?
1650	003564	005204			BNE	SLW1	, BRANCH IF NOT DONE
1651	003566	104000			INC	%4	, TABLE POINTER SET FOR NEXT SWITCH SETTING
1652	003570	013254			EMT	+0	, TYPE MESSAGE
1653	003572	000000			MES7		, SET TOP OF FORM SWITCH TO ---
1654	003574	005777	175242		HALT		, WAIT FOR OPERATOR TO SET SWITCH
1655	003600	001003			TST	@LINCNT	, CHECK LINE COUNT
1656	003602	012737	013624	011470	BNE	SLW1A	, BRANCH IF NOT ZERO
1657	003610	005777	175164		MOV	#MES13, PRTMSG	, CHANGE PRINTER MESSAGE
1658	003614	100006			TST	@LPS	, TEST FOR ERRORS
1659	003616	012737	000025	001052	BPL	SLW2	, BRANCH IF NO ERROR
1660		000026			MOV	#25, ERCOUNT	, SET UP ERROR COUNT 25
1661	003624	004537	011722		N=N+1		
1662	003630	000000			JSR	%5, STAEP	, REPORT ERROR SET
1663	003632	012777	000014	175142	HALT		, HALT ON ERROR
1664	003640	105777	175134		MOV	#14, @LPE	, SEND FF
1665	003644	100375			TSTB	@LPS	, TEST READY
1666	003646	004437	011452		BPL	-4	, WAIT FOR READY
1667	003652	062737	000002	001042	JSR	%4, RINT	, PRINT MESSAGE ON LINE PRINTER
1668	003660	022737	004016	001042	ADD	#2, LINCNT	, NEXT LINE COUNT
1669	003666	001410			CMP	#FTABE LINCNT	, DONE TEST?
1670	003670	005777	175146		BEQ	DAVAV	, YES, EXIT
1671	003674	001721			TST	@LINCNT	, DONE CHECK OF THIS SWITCH SETTING?
1672	003676	012737	013326	011470	BEQ	SLW0	, YES, NEXT SWITCH SETTING
1673	003704	000137	003574		MOV	#MES9, PRTMSG	, NO, CHECK THIS SETTING
					JMP	SLW11	, CONTINUE

1674	003710	013737	014604	013310	DAVAV	MOV	TN013, MES8	. SET MESSAGE
1675	003716	104000				ENT	+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, 2SWR	. 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				15		
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	027063	000065			ASCIZ	'3 5/	
1710	004030	020064	000040			ASCIZ	'4 /	
1711	004034	027065	000065			ASCIZ	'5 5/	
1712	004040	020066	000040			ASCIZ	'6 /	
1713	004044	020067	000040			ASCIZ	'7 /	
1714	004050	020070	000040			ASCIZ	'8 /	
1715	004054	027070	000065			ASCIZ	'8 5/	
1716	004060	030461	000040			ASCIZ	'11 /	
1717	004064	031061	000040			ASCIZ	'12 /	
1718	004070	032061	000040			ASCIZ	'14 /	
1719								
1720								
1721								
1722								
1723								
1724								
1725	004074							
1726	004074	022737	000176	001004	INDAT	CMP	#176, SWR	. S/W SWR ?
1727	004102	001002				BNE	15	. NO- CONTINUE
1728	004104	004737	011762			JSP	PC, ENABL	. ENABLE KEYBOARD INTERRUPT
1729	004110							

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	ERP26	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	ERP27	MOV	#27, ERCOUNT	, SET UP ERROR COUNT 27
1749		000030				N=N+1		
1750	004220	004537	011722			JSR	%5, STAEP	, 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								
1767								
1768	004260				NODAT.			
1769	004260	022737	000176	001004		CMP	#176, SWP	, S/W SWP ?
1770	004266	001002				BNE	15	, NO- CONTINUE
1771	004270	004737	011762			JSR	PC, ENABL	, ENABLE KEYBOARD INTERRUPT
1772	004274				15			
1773	004274	004437	011472			JSR	%4, TYPINT	
1774	004300	012737	000200	001054		MOV	#200, STRCHR	, SET PAPER INSTRUCTION
1775	004306	012737	004502	001040	NODOR	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	ERP30	MOV	#30, ERCOUNT	, SET UP ERPOP 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

SEQ 0037

1786	004362	001405				BEQ	NODATA		
1787	004364	105777	174410			TSTB	@LPS		, BRANCH IF DONE
1788	004370	100375				BPL	-4		, TEST READY
1789	004372	000137	004314			JMP	NODD		, WAIT FOR READY
1790	004376	013777	001054	174376	NODATA	MOV	STRCHR, @LPB		, SEND DATA
1791	004404	005037	001036			CLR	CHRCNT		, DELAY
1792	004410	005237	001036		15	INC	CHRCNT		
1793	004414	001375				BNE	15		
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, STAEF		, REPORT ERROR NOT SET
1799	004436	000000				HALT			, HALT ON ERROR
1800	004440	000137	004306			JMP	NODDA		, 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	10+000				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	NODDA		, RELOAD & TEST NEXT CHANNEL
1808	004470	104000			NODAT2	EMT	+0		, TYPE MESSAGE
1809	004472	012422				MESA			, ERROR SET OK - TURN ON LINE
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									
1840									
1841									

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


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1842
1843 004562 TEST2
1844 004562 022737 000176 001004 CMP #176, SWR ; S/W SWR ?
1845 004570 001002 BNE 15 ; NO- CONTINUE
1846 004572 004737 011762 JSR PC, ENABL ; ENABLE KEYBOARD INTERRUPT
1847 004576 15
1848 004576 004437 011472 JSR %4, TYPINT
1849 004602 004537 011332 JSR %5, PRINT ; 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, PRNT ; PRINT TEST NUMBER
1858 000003 M=M+1
1859 004636 012737 177740 001044 MOV #-32, CYCNT ; 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 CYCNT ; 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 15 ; NO- CONTINUE
1897 005032 004737 011762 JSR PC, ENABL ; ENABLE KEYBOARD INTERRUPT

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1898	005036				15			
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	T280	MOV	#-132, CHRCNT	.SET CHAR COUNT FOR 132
1906	005074	012737	000040	001040	T280A	MOV	#40, CHRCNT	.SET FIRST CHAR
1907	005102	005777	173672		T281	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	CHRCNT, @LPB	.PRINT CHARACTER
1914	005132	005237	001036			INC	CHRCNT	.INC CHAR COUNT
1915	005136	001420				BEQ	T282	.BRANCH IF LINE IS FINISHED
1916	005140	005237	001040			INC	CHRCNT	.NEXT CHAR
1917	005144	032777	020000	173632		BIT	#BIT13, @SWR	.CHECK CHAR SET
1918	005152	001405				BEQ	T282B	.BRANCH IF 64 CHARS
1919	005154	022737	000200	001040		CMP	#200, CHRCNT	.LEGAL CHAR?
1920	005162	001744				BEQ	T280A	.MAKE SPACE IF ILLEGAL
1921	005164	000746				BR	T291	.CONTINUE IF LEGAL CHAR
1922	005166	022737	000140	001040	T282B	CMP	#140, CHRCNT	.LEGAL CHAR?
1923	005174	001737				BEQ	T280A	.MAKE SPACE IF ILLEGAL
1924	005176	000741				BR	T281	.CONTINUE IF LEGAL CHAR
1925	005200	012777	000012	173574	T282	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	CHRCNT	.FIRST ILLEGAL CHAR
1929	005220	005777	173554		T283	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	CHRCNT, @LPB	.TRANSMIT CHARACTER
1936	005250	005237	001040		T284	INC	CHRCNT	.NEXT CHAR
1937	005254	022737	000012	001040		CMP	#12, CHRCNT	.TEST FOR LINE FEED
1938	005262	001772				BEQ	T284	.SKIP IF LF
1939	005264	022737	000014	001040		CMP	#14, CHRCNT	.TEST FOR FORM FEED
1940	005272	001766				BEQ	T284	.SKIP IF FF
1941	005274	022737	000015	001040		CMP	#15, CHRCNT	.TEST FOR CARRIAGE RETURN
1942	005302	001762				BEQ	T284	.SKIP IF CR
1943	005304	023727	001040	000040		CMP	CHRCNT, #40	.CHECK IF LEGAL CHAR

1944	005312	002753			BLT	LDCH	CONTINUE IF STILL ILLEGAL CHAR
1945	005314	032777	020000	173462	BIT	#81713, @SWR	CHECK CHAR SET
1946	005322	001007			BNE	T285	BRANCH IF 96 CHAR SET
1947	005324	052737	000100	001040	BIS	#100, CHGEN	SET BIT 7 IF NOT SET
1948	005332	032737	000200	001040	BIT	#200, CHGEN	DONE ILLEGAL CHARS
1949	005340	001740			BEG	LDCH	BRANCH IF NOT DONE

1950	005342	012777	000C12	173432	T2B5	MOV	#12, @LPB	.ISSUE LINE FEED
1951	005350	105777	173424			TSTB	@LPS	.TEST READY
1952	005354	100375				BPL	-4	.WAIT FOR READY
1953	005356	005237	001044			INC	CYC CNT	.INCREMENT LINE COUNT
1954	005362	001241				BNE	T2B0	.CONTINUE IF NOT DONE
1955	005364	032777	010000	173412		BIT	#BIT12, @SWR	.CHECK TO LOOP ON TEST
1956	005372	001213				BNE	TEST3	.LOOP
1957								
1958								
1959								
1960								
1961								

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

1962	005374				CHRCNK	
1963	005374	022737	000176	001004	CMP	#176, SWR
1964	005402	001002			BNE	15
1965	005404	004737	011762		JSP	PC, ENABL
1966	005410				15	

SW SW ?
NO- CONTINUE
ENABLE KEYBOARD INTERRUPT

W NDE -11-02LPA-H-D MAC(11 30(1046) 17-NOV-77 12.10 PAGE 43 E 4
02LPA-H P11 17-NOV-77 12:07

SEQ 0043

12-1 005410 004437 011472

JSR 24.TYPINT

MA NEE-11-02LPM-H-D MACY11 30(1046) 17-NOV-77 12 10 PAGE 44 F 4
02LPM P11 17-NOV-77 12 07

SEQ 0044

1963 005414 013737 014566 014050
1963 005422 004437 011406
1963 000005

MOV TN04,MES15
JSR %4,PRNNT
M=M+1

,SET TEST NUMBER FOR MESSAGE
,PRINT TEST NUMBER

1971	005426	012737	177750	001042	MOV	#-24 ,LINCNT	SET UP LINE COUNT FOR 24 LINES
1972	005434	012737	177776	001044	MOV	#-2,CYC CNT	SET UP CYCLE COUNT
1973	005442	013737	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, ERCCOUNT	,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

001422

BEQ CR5

BRANCH IF FINISHED OVERPRINTS

1989 005542 012777 000015 173232
1990 005550 105777 173224
1991 005554 100375

MOV #15, 0LFB
TSTB 0LPS
BPL -4

. SEND CR
. TEST READY
. WAIT FOR READY

1932	005556	000137	005450		JMP	CR	.OVERPRINT LINE
1933	005562	013737	005602	001054	MOV	CHRS, STRCHR	.RESET CHAR SWITCH
1934	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
2000	005614	105777	173160			TSTB	@LPS
2001	005620	100375				BPL	-4
2002	005622	012737	177776	001044		MOV	#-2, CYCNT
2003	005630	012737	177574	001036		MOV	#-132, CHRCNT
2004	005636	005237	001042			INC	LINCNT
2005	005642	001326				BNE	CR3
2006	005644	032777	010000	173132		BIT	#BIT12, @SWR
2007	005652	001250				BNE	CHRCNK

, SEND LF
 , TEST READY
 , WAIT FOR READY
 , RESET CYCLE COUNT
 , RESET CHAR COUNT
 , INCREMENT LINE COUNT
 , BRANCH IF NOT DONE
 , LOOP ON TEST?
 , YES, LOOP

, TEST 5
 , SHUTTLE POS T ON NG TEST
 , SENDS PAIRS OF E S THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER

YEAR	LINE NO.	ADDRESS	DATA	OPERATION	DESCRIPTION
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	
2019	005662	001002			
2020	005664	004737	011762		
2021	005670			15	
2022	005670	004437	011472		
2023	005674	013737	014570	014050	
2024	005702	004437	011406		
2025		000006			
2026	005706	012737	177760	001042	
2027	005714	012737	177574	001036	OVR
2028	005722	012737	177776	001044	OVRD
2029	005730	013737	001036	001056	
2030	005736	062737	000205	001056	
2031	005744	012737	000040	001040	
2032	005752	000406			
2033	005754	012737	000105	001040	OVR4

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

22-2 005016 003361

BGT OVR1

.BRANCH IF NOT DONE SPACES

2042	006020	001755		BEG	OVR4	BRANCH IF NOT FIRST E
2044	006022	005237	001036	INC	CHRCNT	INCREMENT CHAR COUNT
2045	006026	001437		BEG	OVR8	BRANCH IF DONE LINE
2046	006030	005237	001044	INC	CYCCNT	INCREMENT CYCLE COUNT

OVR5

2047	006034	001352			BNE	OVR1	.CONTINUE SENDING E'S IF NOT DONE
2048	006036	012777	000015	172736	MOV	#15, 2LPA	SEND CR
2049	006044						
2050	006044	105777	172730		OVR6		
2051	006050	100375			TSTB	2LPS	.TEST READY
2052	006052	005737	001036		BPL	-4	.WAIT FOR READY
2053	006056	001321			TST	CHRCNT	.LINE DONE?
2054	006060	005237	001042		BNE	OVR0	.NO. CONTINUE OVER PRINT
2055	006064	001425			INC	LINCNT	.YES. INCREMENT LINE COUNT
2056	006066	032737	000001	001042	BEQ	OVR EXT	.EXIT IF DONE TEST
2057	006074	001707			BIT	#1, LINCNT	.WHICH LINE NEXT?
2058	006076	012737	000115	001040	BEQ	OVR	.BRANCH TO SEND E'S
2059	006104	012737	177573	001036	MOV	#115, CHRCNT	.SET UP TO SEND M'S
2060	006112	005037	001056		MOV	#-133, CHRCNT	.SET CHAR COUNT
2061	006116	005037	001044		CLP	STRCNT	.CLEAR SPACE COUNT
					CLP	CYC CNT	.CLEAR CYCLE COUNT

0000	000122	000137	005770						
0000	000126	012777	000012	172646	OVR8.	JMP	OVR2		PRINT LINE OF M'S
						MOV	#12, 0LPB		SEND LF

NOV 11 00LPH-H-D MAR 11 30(1946) 17-NOV-77 12 10 PAGE 57 F 5
00LPH-H 11 17-NOV-77 12 07

SEQ 0057

000134 000137 006044

JMP

0VR6

.CONTINUE

ADDRESS	DATA	DISASSEMBLY	COMMENT
2065	006140 032777 010000 172636	OVREXT BIT	#BIT12, SWR
2066	006146 001242	BNE	OURPRT
2067			, LOOP ON TEST
2068			, LOOP
2069			, TEST 6
2070			, PRINT CONTROL TEST
2071			, SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
2072			, SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
2073	006150	PPTCTL	
2074	006150 022737 000176 001004	CMF	#176, SWR
2075	006156 001002	BNE	15
2076	006160 004737 011762	JCF	PC, ENABL
2077	006164		15
2078	006164 004437 011762	JCF	14, TYP NT

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, ASHR	, 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, CHRCNT	, GET START CHAR
2090	006252	005777	172522		PRT3	TST	ALPS	, 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, STREP	, REPORT ERROR SET
2095	006272	000000				HALT		, HALT ON ERROR
2096	006274	013777	001040	172530	PRT4	MOV	CHRCNT, ALPB	, 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	PRT4	START OVERFLOW
2100	006312	005237	001040			INC	CHRCNT	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	PRT0	CONTINUE
2114	006400	012737	000041	001040	MOV	#41, CHRGEN	GET FIRST CHAR IN SET
2115	006406	000137	006252		JMP	PRT3	START OVERFLOW
2116	006412	012737	000066	001054	MOV	#66, STRCHR	SET START CHAR TO 6
2117	006420	000137	006210		JMP	PRT0	CONTINUE
2118	006424	012737	000040	001054	MOV	#40, STRCHR	SET START CHAR TO SPACE
2119	006432	000137	006210		JMP	PRT0	CONTINUE
2120	006436	032777	010000	172340	BIT	#BIT12, @SWR	CHECK LOOP ON TEST
2121	006444	001241			BNE	PFTCTL	LOOP
2122							
2123							
2124							
2125							
2126							
2127							
2128	006446				MLF		
2129	006446	022737	000176	001004	CMP	#176, SWR	S/W SWR?
2130	006454	001002			BNE	15	NO- CONTINUE
2131	006456	004737	011762		SEP	PC ENABL	ENABLE KEYBOARD INTERRUPT
2132	006462				15		
2133	006462	004437	011472		JSR	%4, T P NT	
2134	006466	013737	014574	014050	MOI	TN07, MES15	SET TEST NUMBER FOR MESSAGE
2135	006474	004437	011406		JSR	%4, PRNNT	PP NT TEST NUMBER
2136		000010			M=M+1		
2137	006500	012737	006632	001054	MOV	#TABSTR, STRCHP	FIRST CHAR
2138	006506	012737	177574	001036	MOV	#-132, CHRCNT	SET CHAR COUNT
2139	006514	117737	172334	001040	MOVB	@STRCHP, CHRGEN	GET CHAR
2140	006522	001452			BEQ	MLF4	BRANCH IF DONE
2141	006524	005777	172250		TST	@LPS	TEST FOR ERROR
2142	006530	100006			BPL	MLF1	CONTINUE IF NO ERROR
2143	006532	012737	000041	001052	MOV	#41, EPCOUNT	SET UP ERROR COUNT 41
2144		000042			N=N+1		
2145	006540	004537	011722		JSR	%5, STAEF	REPORT ERROR
2146	006544	000000			HALT		HALT ON ERROR
2147	006546	013777	001040	172226	MOI	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	MOV	#12, @LPB	SEND LF
2154	006610	105777	172164		TSTB	@LPS	TEST READY
2155	006614	100375			BPL	-4	WAIT FOR READY
2156	006616	005377	001042		DEC	LINCNT	DECREMENT LINE COUNT

TEST 7

MULTIPLE LINE ADVANCE TEST

TESTS MULTIPLE LINE ADVANCES AND T MINGS

PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PR NTEP

2157 006622 001367
2158 006624 005237 001054

BNE MLF2
INC STRCHR

.CONTINUE
.NEXT CHR

2159	006630	000726			BR	MLFA		, CONTINUE
2160								
2161	006632	033462	033062	033463	TABSTR	ASCIZ	/272637463540/	
2162	006640	033064	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								
2172								
2173								
2174	006660							
2175	006660	022737	000176	001004				
2176	006666	001002			CMP	#176, SWR		, S/W SWR ?
2177	006670	004737	011762		BNE	15		, NO- CONTINUE
2178	006674				JSR	PC, ENABL		, ENABLE KEYBOARD INTERRUPT
2179	006674	004437	011472					
2180	006700	013737	014576	014050	JSR	%4, TYPINT		
2181	006706	004437	011406		MOV	TN010, MES15		, SET TEST NUMBER FOR MESSAGE
2182		000011			JSR	%4, PRNNT		, PRINT TEST NUMBER
2183	006712	032777	002000	172064	M=M+1			
2184	006720	001135			BIT	#BIT10, @SWR		, CHECK FOR NEW DRUM / OLD DRUM
2185	006722	032777	020000	172054	BNE	NHSPRT		, BRANCH IF NEW DRUM
2186	006730	001007			BIT	#BIT13, @SWR		, CHECK CHAR SET
2187	006732	012737	000140	001060	BNE	HS00A		, BRANCH IF 96 CHAR SET
2188	006740	012737	000100	001062	MOV	#140, LEGCHR		, LEGAL CHK
2189	006746	000406			MOV	#100, NUMCHR		, #CHARS
2190	006750	012737	000200	001060	BR	HS00		, CONTINUE
2191	006756	012737	000140	001062	MOV	#200, LEGCHR		, LEGAL CHECK
2192	006764	012737	000040	001054	MOV	#140, NUMCHR		, #CHARS
2193	006772	012737	000177	001042	MOV	#40, STRCHR		, SET UP FIRST LINE
2194	007000	012737	177574	001036	MOV	#127, LINCNT		, SET LINE COUNT FOR 2 PAGES
2195	007006	012737	177757	001044	MOV	#-132, CHRCNT		, SET CHAR COUNT
2196	007014	013737	001054	001040	MOV	#-17, CYCCNT		, SET GROUP COUNT
2197	007022	005777	171752		MOV	STRCHR, CHRCNT		, STORE START CHAR
2198	007026	100006			TST	@LPS		, TEST FOR ERROR
2199	007030	012737	000042	001052	BPL	HS2		, BRANCH IF NO ERROR
2200		000043			MOV	#42, EPCOUNT		, SET UP ERROR COUNT 42
2201	007036	004537	011722		N=N+1			
2202	007042	000000			JSR	%5, STAER		, REPORT ERROR SET
2203	007044	013777	001040	171730	HALT			, HALT ON ERROR
2204	007052	005237	001036		MOV	CHRCNT, @LPS		, LOAD BUFFER
2205	007056	001424			INC	CHRCNT		, INCREMENT CHAR COUNT
2206	007060	005237	001040		BEQ	HS4		, BRANCH IF DONE LINE
2207	007064	005237	001044		INC	CHRCNT		, NEXT CHAR
2208	007070	001410			INC	CYCCNT		, INCREMENT GROUP COUNT
2209	007072	023737	001060	001040	BEQ	HS3		, BRANCH IF DONE GROUP
2210	007100	001350			CMP	LEGCHR, CHRCNT		, LEGAL CHAR?
2211	007102	163737	001062	001040	BNE	HS1		, BRANCH AND CONTINUE IF LEGAL CHAR
2212	007110	006744			SUB	NUMCHR, CHRCNT		, MAKE LEGAL
2213	007112	013737	001054	001040	BR	HS1		, CONTINUE
2214	007120	012737	177757	001044	MOV	STRCHR, CHRCNT		, GET FIRST CHAR IN GROUP
					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								
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	, COLUMN/CHARACTER OFFSET
2244	007264	012737	000040	001054		MOV	#40, STRCHR	, SET UP FIRST CHARACTER OF FIRST LINE
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, CHRCNT	, 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, ERRCOUNT	, SET UP ERROR COUNT 43
2251		000044				N=N+1		
2252	007330	004537	011722			JSR	%5, STAER	, REPORT ERROR SET
2253	007334	000000				HALT		, HALT ON ERROR
2254	007336	013777	001040	171436	NHS2	MOV	CHRCNT, @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, CHRCNT	, NEXT CHARACTER
2258	007360	023737	001060	001040		CMP	LEGCHR, CHRCNT	, LEGAL CHARACTER
2259	007366	003352				BGT	NHS1	, BRANCH + CONTINUE IF LEGAL CHARACTER
2260	007370	163737	001062	001040		SUB	NUMCHR, CHRCNT	, 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, STRCHR	, START CHARACTER A LEGAL CHARACTER
2269	007436	003720				BLE	NHS0	, CONTINUE IF LEGAL START CHARACTER
2270	007440	063737	001062	001054		ADD	NUMCHR, STRCHR	, MAKE LEGAL + CONTINUE

2271	007446	000714			BR	NHSO		
2272	007450	032777	010000	171326	BIT	#BIT12, @SWR		, CONTINUE
2273	007456	001256			BNE	NHSPRT		, LOOP ON TEST
2274								, LOOP
2275								
2276								, TEST 9
2277								, WORST CASE NOISE TEST
2278								, SINGLE CHAR ACROSS ALL COLS
2279	007460							
2280	007460	022737	000176	001004	SNGCHR			
2281	007466	001002			CMP	#176, SWR		, S/W SWR ?
2282	007470	004737	011762		BNE	15		, NO- CONTINUE
2283	007474				JSR	PC, ENABL		, ENABLE KEYBOARD INTERRUPT
2284	007474	004437	011472		15			
2285	007500	013737	014600	014050	JSR	%4, TYPINT		
2286	007506	004437	011406		MOV	TN011, MES15		, SET TEST NUMBER FOR MESSAGE
2287		000012			JSR	%4, PRNNT		, PRINT TEST NUMBER
2288	007512	032777	020000	171204	M=M+1			
2289	007520	001404			BIT	#BIT13, @SWR		, TEST CHAR SET
2290	007522	012737	177640	001042	BEQ	S2		, BRANCH IF 64
2291	007530	000403			MOV	#-96, LINCNT		, 96 CHAR
2292	007532	012737	177700	001042	BR	+10		, BRANCH
2293	007540	012737	000040	001040	MOV	#-64, LINCNT		, 64 CHAR
2294	007546	012737	177574	001036	MOV	#40, CHRCNT		, SET UP SPACE
2295	007554	005777	171220		MOV	#-132, CHRCNT		, SET CHAR COUNT FOR 132
2296	007560	100006			S1	TST	@LPS	, TEST FOR ERRORS
2297	007562	012737	000044	001052	BPL	XS1X		, BRANCH IF NO ERRORS
2298		000045			MOV	#44, ERPCOUNT		, SET UP ERROR COUNT 44
2299	007570	004537	011722		N=N+1			
2300	007574	000000			JSR	%5, STAER		, REPORT ERROR
2301	007576	013777	001040	171176	HALT			, HALT ON ERROR
2302	007604	005237	001036		MOV	CHRCNT, @LPB		, LOAD PRINTER BUFFER
2303	007610	001361			INC	CHRCNT		, INCREMENT CHAR COUNT
2304	007612	012777	000012	171162	BNE	S1		, CONTINUE IF NOT DONE L NE
2305	007620	105777	171154		MOV	#12, @LPB		, ISSUE LINE FEED
2306	007624	100375			TSTB	@LPS		, TEST READY
2307	007626	005237	001040		BPL	-4		, WAIT FOR READY
2308	007632	005237	001042		INC	CHRCNT		, +1 CHAR
2309	007636	002743			INC	LINCNT		, +1 LINE COUNT
2310	007640	001764			BLT	S2A		, CONTINUE IF NOT DONE
2311	007642	032777	010000	171134	BEQ	S4X2		, SEND BLANK LINE AT END OF TEST
2312	007650	001303			BIT	#BIT12 @SWR		, CHECK TO LOOP ON TEST
2313					BNE	SNGCHR		, LOOP ON TEST
2314								
2315								
2316								
2317								, TEST 10
2318								, DRUM PATTERN CHARACTER TEST
2319	007652				ROTATE			
2320	007652	022737	000176	001004				
2321	007660	001002			CMP	#176, SWR		, S/W SWR ?
2322	007662	004737	011762		BNE	15		, NO- CONTINUE
2323	007666				JSR	PC, ENABL		, ENABLE KEYBOARD INTERRUPT
2324	007666	004437	011472		15			
2325	007672	013737	014600	014050	JSR	%4, TYPINT		
2326	007700	004437	011406		MOV	TN012, MES15		, SET TEST NUMBER FOR MESSAGE
					JSR	%4, PRNNT		, PRINT TEST NUMBER

2327		000013				M=M+1		
2328								
2329	007704	032777	002000	171072		BIT	#BIT10, @SWR	, CHECK FOR NEW D- JM/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	ROTO	, 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	ROTO	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 ERROR 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	POTATE	, LOOP
2368								
2369	010154	000137	010412			JMP	LFTTR	, JUMP TO TEST 11 AFTER COMPLETION
2370								
2371								
2372								
2373								
2374	010160	032777	020000	170616	NROTAT	BIT	#BIT13, @SWR	, TEST CHARACTER SET
2375	010166	001012				BNE	NROTO	, 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	NROTO	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

NEW DRUM (LP14) PATTERN CHARACTER TEST

2323	010236	012737	000040	001040	NROT1	MOV	#40, CHRG	.GET POINTER
2384	010244	005237	001040		NROT6	INC	CHRG	.SET POINTER
2385	010250	013737	001040	001054		MOV	CHRG, STRCHR	.STORE POINTER
2386	010256	005037	001036			CLP	CHRG	.# CHARACTERS PRINTED
2387	010262	005237	001036		NROT2	INC	CHRG	.INCREMENT CHARACTERS 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	ALPS	.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, STAEF	.REPORT ERROR
2397	010332	000000				HALT		
2398	010334	013777	001054	170440	NROT5	MOV	STRCHR, ALPB	.LOAD BUFFER
2399	010342	023727	001036	000204		CMP	CHRG, #132	.LINE FINISHED?
2400	010350	001344				BNE	.POT2	.NO GET NEXT CHARACTER
2401	010352	012777	000012	170422		MO	# ALPB	.YES, SEND LINE FEED
2402	010360	105777	170414			TST	ALPS	.TEST READY
2403	010364	100375				BPL		.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, ASWP	.LOOP ON TEST
2408	010410	001263				BNE	NROTAT	.LOOP
2409								
2410								
2411								
2412								
2413								
2414								
2415	010412							
2416	010412	022737	000176	001004		CMP	#176 SWR	.S'W SWP ?
2417	010420	001002				BNE	15	.NO- CONTINUE
2418	010422	004737	011762			JSP	PC, ENABL	.ENABLE KEYBOARD INTERRUPT
2419	010426							
2420	010426	004437	011472			JSR	24, TYPINT	
2421	010432	013737	014604	014050		MOV	TNO13, MES15	.SET TEST NUMBER FOR MESSAGE
2422	010440	004437	011406			ISR	24, PPNT	.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, CHRG	.STORE CHAR COUNT
2426	010460	012737	177757	001044		MOV	#-17, CYCNT	.SET GROUP COUNT
2427	010466	013737	001036	001040		MOV	CHRG, CHRG	.FIND FIRST CHAR ON LINE
2428	010474	022737	000022	001040	LFT1	CMP	#18, CHRG	.MORE THAN 17 CHARS?
2429	010502	003004				BGT	LFT2	.BRANCH IF LESS THAN 17
2430	010504	162737	000021	001040		SUB	#17, CHRG	.SUBTRACT 17, IF < 17
2431	010512	000770				BR	LFT1	.CONTINUE
2432	010514	005437	001040		LFT2	NEG	CHRG	.NEGATE CHRG
2433	010520	062737	000100	001040		ADD	#100, CHRG	.START CHAR IN CHRG
2434	010526	013737	001040	001054		MOV	CHRG, STRCHR	.STORE STARTING CHAR
2435	010534	005777	170240		LFT3	TST	ALPS	.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		

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

STARTING WITH A LEFT TRIANGLE

LFTTR

15

LFT

LFT0

LFT1

LFT2

LFT3

ERR47

2439	010550	004537	011722			JSR	%5, STAEF	. REPORT ERROR SET
2440	010554	000000				HALT		. HALT ON ERROR
2441	010556	013777	001040	170216	LFT4	MOV	CHRGEM, %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	CHRGEM	. NEXT CHAR IN GROUP
2447	010604	000753				BR	LFT3	. CONTINUE
2448	010606	013737	001054	001040	LFT5	MOV	STRCHR, CHRGEM	. GET START CHAR AGAIN
2449	010614	012737	177757	001044		MOV	%-17, CYCCNT	. RESET GROUP COUNT
2450	010622	000744				BP	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, %SWP	. LOOP ON TEST?
2458	010656	001255				BNE	LFTTR	. LOOP
2459								
2460								
2461								
2462								
2463	010660	012737	000001	001042	PTTR	MOV	%1, LINCNT	. INITIALIZE LINE
2464	010666	012737	000077	001040	RT1	MOV	%77, CHRGEM	. 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	PT2A	. 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			JSP	%5, STAEF	. 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	STPCNT	. INCREMENT GROUP COUNT
2478	010762	001003				BNE	RT2AA	. BRANCH IF NOT DONE GROUP
2479	010764	012737	177757	001056		MOV	%-17, STPCNT	. 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			JSP	%5, STAEF	. REPORT ERROR SET
2487	011020	000000				HALT		. HALT ON ERROR
2488	011022	013777	001040	167752	RT3A	MOV	CHRGEM, %LPB	. LOAD BUFFER
2489	011030	005237	001040			INC	CHRGEM	. NEXT CHAR
2490	011034	005237	001056			INC	STPCNT	. INCREMENT GROUP COUNT
2491	011040	001006				BNE	RT3B	. BRANCH IF NOT DONE GROUP
2492	011042	012737	177757	001056		MOV	%-17, STPCNT	. RESET GROUP COUNT
2493	011050	162737	000021	001040		SUB	%17, CHRGEM	. GET FIRST GROUP CHAR
2494	011056	005337	001044		RT3B	DEC	CYCCNT	. DECREMENT CHAR COUNT

2495	011062	001346			BNE	RT3	.CONTINUE
2496	011064	012777	000012	167710	MOV	#12, @LPB	.SEND LF
2497	011072	105777	167702		TSTB	@LPS	.TEST READY
2498	011076	100375			BPL	-4	.WAIT FOR READY
2499	011100	005237	001042		INC	LINCNT	.INCREMENT LINE COUNT
2500	011104	022737	000205	001042	CMP	#133, LINCNT	.DONE?
2501	011112	003265			BGT	RT1	.BRANCH IF NOT DONE
2502	011114	032777	010000	167662	BIT	#BIT12, @SWR	.LOOP ON TEST?
2503	011122	001256			BNE	RTTR	.LOOP
2504							
2505							
2506							
2507							
2508	011124						
2509	011124	022737	000176	001004	CMP	#176, SWP	.S/W SWR ?
2510	011132	001002			BNE	15	.NO- CONTINUE
2511	011134	004737	011762		JSR	PC, ENABL	.ENABLE KEYBOARD INTERRUPT
2512	011140						
2513	011140	004437	011472		JSR	%4, TYPINT	
2514	011144	013737	014606	014050	MOV	TN014, MES15	.SET TEST NUMBER FOR MESSAGE
2515	011152	004437	011406		JSR	%4, PRNNT	.PRINT TEST NUMBER
2516		000015			M=M+1		
2517	011156	012737	177701	001042	MOV	#-63, LINCNT	.SET UP FOR 63 LINES
2518	011164	012737	177574	001036	MOV	#-132, CHRCNT	.SET CHAR COUNT
2519	011172	005777	167602		TST	@LPS	.CHECK FOR ERROR
2520	011176	100006			BPL	XHAM1	.BRANCH IF NO ERROR
2521	011200	012737	000052	001052	MOV	#52, ERCOUNT	.SET UP ERROR COUNT 52
2522		000053			N=N+1		
2523	011206	004537	011722		JSR	%5, STAEF	.REPORT ERROR OCCURRED
2524	011212	000000			HALT		.HALT ON ERROR
2525	011214						
2526	011214	105777	167560		TSTB	@LPS	.TEST READY
2527	011220	100375			BPL	-4	.WAIT FOR READY
2528	011222	100375			BPL	-4	.WAIT FOR READY
2529	011224	012777	000105	167550	MOV	#105, @LPB	.TRANSMIT E TO PRINTER
2530	011232	005237	001036		INC	CHRCNT	.+1 CHAR COUNT
2531	011236	001355			BNE	HAM2	.TRANSMIT ANOTHER CHAP
2532	011240	012777	000012	167534	MOV	#12, @LPB	.TRANSMIT LINE FEED
2533	011246	105777	167526		TSTB	@LPS	.TEST READY
2534	011252	100375			BPL	-4	.WAIT FOR READY
2535	011254	005237	001042		INC	LINCNT	.+1 TO COUNT
2536	011260	001341			BNE	HAM1X	.GO DO NEXT LINE
2537	011262	032777	010000	167514	BIT	#BIT12, @SWR	.CHECK TO LOOP ON TEST
2538	011270	001315			BNE	HAMALN	.LOOP ON TEST
2539							
2540	011272	032777	040000	167504	BIT	#BIT14, @SWP	.DAVFU AVAILABLE?
2541	011300	001402			BEQ	HAMX	.NO, RECYCLE PRINTING TESTS
2542	011302	000137	014616		JMP	DAVFU	.YES, DO DAVFU PRINTING TESTS
2543	011306						
2544	011306	013700	000042		MOV	@#42, RC	
2545	011312	001405			BEQ	DOAGN	
2546	011314	000005			RESET		
2547	011316						
2548	011316	004710			JSR	PC (RC)	
2549	011320	000240			NOP		
2550	011322	000240			NOP		

Address	Op Code	Op 1	Op 2	Op 3	Op 4	Op 5	Op 6	Op 7	Op 8	Op 9	Op 10	Op 11	Op 12	Op 13	Op 14	Op 15	Op 16	Op 17	Op 18	Op 19	Op 20	Op 21	Op 22	Op 23	Op 24	Op 25	Op 26	Op 27	Op 28	Op 29	Op 30	Op 31	Op 32	Op 33	Op 34	Op 35	Op 36	Op 37	Op 38	Op 39	Op 40	Op 41	Op 42	Op 43	Op 44	Op 45	Op 46	Op 47	Op 48	Op 49	Op 50	Op 51	Op 52	Op 53	Op 54	Op 55	Op 56	Op 57	Op 58	Op 59	Op 60	Op 61	Op 62	Op 63	Op 64	Op 65	Op 66	Op 67	Op 68	Op 69	Op 70	Op 71	Op 72	Op 73	Op 74	Op 75	Op 76	Op 77	Op 78	Op 79	Op 80	Op 81	Op 82	Op 83	Op 84	Op 85	Op 86	Op 87	Op 88	Op 89	Op 90	Op 91	Op 92	Op 93	Op 94	Op 95	Op 96	Op 97	Op 98	Op 99	Op 100	Op 101	Op 102	Op 103	Op 104	Op 105	Op 106	Op 107	Op 108	Op 109	Op 110	Op 111	Op 112	Op 113	Op 114	Op 115	Op 116	Op 117	Op 118	Op 119	Op 120	Op 121	Op 122	Op 123	Op 124	Op 125	Op 126	Op 127	Op 128	Op 129	Op 130	Op 131	Op 132	Op 133	Op 134	Op 135	Op 136	Op 137	Op 138	Op 139	Op 140	Op 141	Op 142	Op 143	Op 144	Op 145	Op 146	Op 147	Op 148	Op 149	Op 150	Op 151	Op 152	Op 153	Op 154	Op 155	Op 156	Op 157	Op 158	Op 159	Op 160	Op 161	Op 162	Op 163	Op 164	Op 165	Op 166	Op 167	Op 168	Op 169	Op 170	Op 171	Op 172	Op 173	Op 174	Op 175	Op 176	Op 177	Op 178	Op 179	Op 180	Op 181	Op 182	Op 183	Op 184	Op 185	Op 186	Op 187	Op 188	Op 189	Op 190	Op 191	Op 192	Op 193	Op 194	Op 195	Op 196	Op 197	Op 198	Op 199	Op 200	Op 201	Op 202	Op 203	Op 204	Op 205	Op 206	Op 207	Op 208	Op 209	Op 210	Op 211	Op 212	Op 213	Op 214	Op 215	Op 216	Op 217	Op 218	Op 219	Op 220	Op 221	Op 222	Op 223	Op 224	Op 225	Op 226	Op 227	Op 228	Op 229	Op 230	Op 231	Op 232	Op 233	Op 234	Op 235	Op 236	Op 237	Op 238	Op 239	Op 240	Op 241	Op 242	Op 243	Op 244	Op 245	Op 246	Op 247	Op 248	Op 249	Op 250	Op 251	Op 252	Op 253	Op 254	Op 255	Op 256	Op 257	Op 258	Op 259	Op 260	Op 261	Op 262	Op 263	Op 264	Op 265	Op 266	Op 267	Op 268	Op 269	Op 270	Op 271	Op 272	Op 273	Op 274	Op 275	Op 276	Op 277	Op 278	Op 279	Op 280	Op 281	Op 282	Op 283	Op 284	Op 285	Op 286	Op 287	Op 288	Op 289	Op 290	Op 291	Op 292	Op 293	Op 294	Op 295	Op 296	Op 297	Op 298	Op 299	Op 300	Op 301	Op 302	Op 303	Op 304	Op 305	Op 306	Op 307	Op 308	Op 309	Op 310	Op 311	Op 312	Op 313	Op 314	Op 315	Op 316	Op 317	Op 318	Op 319	Op 320	Op 321	Op 322	Op 323	Op 324	Op 325	Op 326	Op 327	Op 328	Op 329	Op 330	Op 331	Op 332	Op 333	Op 334	Op 335	Op 336	Op 337	Op 338	Op 339	Op 340	Op 341	Op 342	Op 343	Op 344	Op 345	Op 346	Op 347	Op 348	Op 349	Op 350	Op 351	Op 352	Op 353	Op 354	Op 355	Op 356	Op 357	Op 358	Op 359	Op 360	Op 361	Op 362	Op 363	Op 364	Op 365	Op 366	Op 367	Op 368	Op 369	Op 370	Op 371	Op 372	Op 373	Op 374	Op 375	Op 376	Op 377	Op 378	Op 379	Op 380</
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2607      SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
2608
2609      011524 011600      TYPE      MOV      @%6,%0      ,GET ADDR THAT CONTAINS MESS
2610      011526 062716 000002      ADD      #2,@%6      ,SET UP EXIT
2611      011532 011000      MOV      @%0,%0      ,ADDRESS OF MESSAGE IN RO
2612      011534 112037 011636      TYFA      MOV8      (0)+,TYPDAT ,GET CHARACTER
2613      011540 001001      BNE      TYPC      ,BRANCH IF NOT DONE
2614      011542 000002      RTI      ,EXIT
2615      011544 122737 000045 011636      TYPC      CMPB      #45,TYPDAT ,CHECK FOR "%"
2616      011552 001416      BEQ      TYPF      ,BRANCH IF "%"
2617      011554 122737 000043 011636      CMPB      #43,TYPDAT ,CHECK FOR "#"
2618      011562 001417      BEQ      TYPG      ,BRANCH IF "#"
2619      011564 004737 011572      JSR      %7,TYPD ,TYPE CHARACTER IN TYPDAT
2620      011570 000761      BR      TYPD ,NEXT CHAR IN MESSAGE
2621      011572 113777 011636 167212      TYPD      MOV8      TYPDAT,@TPB ,OUTPUT CHARACTER TO PRINTER
2622      011600 105777 167212      TYPD      TSTB      @TPB
2623      011604 100375      BPL      -4
2624      011606 000207      RTS      %7 ,CHAR TYPED EXIT
2625      011610 112737 000012 011636      TYPF      MOV8      #12,TYPDAT ,OUTPUT LF
2626      011616 004737 011572      JSR      %7,TYPD ,GO TYPE CHAR
2627      011622 112737 000015 011636      TYPG      MOV8      #15,TYPDAT ,OUTPUT CR
2628      011630 004737 011572      JSR      %7,TYPD ,GO TYPE CHAR
2629      011634 000737      BR      TYPD
2630      011636 000000      TYPDAT 0

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2631
2632
2633      ROUTINE TO CONVERT OCTAL TO ASCII
2634
2635      ENTER ROUTINE AS FOLLOWS
2636      JSR      %5,CONV
2637      ,XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
2638      ,XXXXXX=ADDRESS OF ASCII MESSAGE
2639      ,XXXXXX=NUMBER OF OCTAL NO 'S TO BE CONVERTED
2640

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2641      011640 013537 011720      CONV      MOV      @(%5)+,ACNVX ,ADDRESS OF NO TO BE CONVERTED
2642      011644 011501      MOV      (%5)+,%1 ,ADDRESS OF MESSAGE
2643      011646 012502      MOV      (%5)+,%2 ,NUMBER OF ASCII CHARACTERS
2644      011650 060201      ADD      %2,%1 ,FIRST CHAR ADDRESS
2645      011652 013703 011720      ACVN      MOV      ACNVX,%3 ,STORE NUMBER
2646      011656 042703 177770      BIC      #177770,%3 ,ISOLATE LEAST SIGNIFICANT BIT
2647      011662 062703 000060      ADD      #60,%3 ,SET UP ASCII CHARACTER
2648      011666 110341      MOV8      %3,%1 ,STORE CHARACTER
2649      011670 000241      CLC      ,GET NEXT SIGNIFICANT BIT
2650      011672 006037 011720      ROR      ACNVX
2651      011676 000241      CLC
2652      011700 006037 011720      ROR      ACNVX
2653      011704 000241      CLC
2654      011706 006037 011720      ROR      ACNVX
2655      011712 005302      DEC      %2 ,--1 FROM ASCII CHAR CNT
2656      011714 001356      BNE      ACVN ,CONVERT NEXT CHARACTER
2657      011716 000205      RTS      %5 ,EXIT: CONVERSION DONE
2658
2659      011720 000000      ACNVX 0 ,WORK REGISTER
2660

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2661      ROUTINE TO REPORT ERROR COUNT
2662

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2663	011722	032777	001000	167054	STAER	BIT	#BIT9, @SWR	.INHIBIT ERROR REPORTS ?
2664	011730	001007				BNE	STAER1	.YES
2665	011732	004537	011640			JSR	%5, CONV	.CONVERT OCTAL TO ASCII
2666	011736	001052				ERCOUNT		
2667	011740	012401				HED1		
2668	011742	000003				3		
2669	011744	104000				EMT	+0	.TYPE ERROR MESSAGE
2670	011746	012400				HED0		
2671	011750	005777	167030		STAER1	TST	@SWR	.TEST FOR HALT ON ERROR
2672	011754	100401				BMI	+4	.BRANCH IF NO HALT WANTED
2673	011756	000000				HALT		.HALT ON ERROR
2674	011760	000205				RTS	%5	.RETURN

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

2682	011762	005046			ENABL	CLR	(SP)	.NEW PSW
2683	011764	012746	011772			MOV	#15, -(SP)	.NEW PC
2684	011770	000002				PTI		.LOAD NEW PSW
2685	011772	052777	000100	167722	15	BIS	#100, @TFS	.ENABLE KEYBOARD INTERRUPT
2686	012000	000207			ENABL	PTS	PC	.RETURN TO MAINLINE PROGRAM

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

2696	012002	010046			TR NT	MOV	%0, -(SP)	.SAVE REGISTER
2697	012004	010146				MOV	%1, -(SP)	
2698	012006	010246				MOV	%2, -(SP)	
2699	012010	010346				MOV	%3, -(SP)	
2700	012012	010446				MOV	%4, -(SP)	
2701	012014	010546				MOV	%5, -(SP)	
2702	012016	005737	001072			TST	SET	.INITIAL SWP ENTRY ?
2703	012022	001130				BNE	TYP SWR	.YES-PRINT HEADER
2704	012024	005737	001070			TST	SIGNAL	.PREVIOUS CONTROL-G NPJT ?
2705	012030	001477				BEQ	CNTRLG	.YES-CONTINUE
2706	012032	017737	166756	001074		MOV	@TK8, CHAR	.GET INPUT CHARACTER
2707	012040	042737	177600	001074		BIC	#177600, CHAR	.STRIP OFF PARITY BIT
2708	012046	022737	000015	001074		CMP	#15, CHAR	.CARRIAGE RETURN ?
2709	012054	001456				BEQ	DGTS	.YES-CONTINUE
2710	012056	022737	000025	001074		CMP	#25, CHAR	.CONTROL-U INPUT ?
2711	012064	001530				BEQ	TK4	.YES-CONTINUE
2712	012066	023727	001074	000060		CMP	CHAR, #60	.LEGAL CHECK LESS THAN 60
2713	012074	100001				BPL	TK1	.NO-CONTINUE
2714	012076	000466				BR	WT3	.YES-PRINT "?"
2715	012100	022737	000067	001074	TK1	CMP	#67, CHAR	.LEGAL CHECK GREATER THAN 67
2716	012106	100001				BPL	TK2	.NO-CONTINUE
2717	012110	000461				BR	WT3	.YES PRINT "?"
2718	012112	005237	001066		TK2	INC	DGTS	.NEXT DIGIT OF SWP

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		OGTS	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	CNTPLG	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	TYP SWR	, YES-PRINT HEADER
2743	012254	105777	166576		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				ENT	+0	, PRINT "?"
2747	012272	014506				MES20		
2748	012274	005737	001074			TST	SIGNAL	, BAD VALUE ?
2749	012300	001001				BNE	TYP SWR	, YES-PRINT HEADER
2750	012302	000427				BR	TK6	, RETURN FROM INTERRUPT
2751	012304	012737	000001	001070	T P SWP	MOV	#1, SIGNAL	, SET FLAG CONTROL-G ENTERED
2752	012312	104000				ENT	+0	, PRINT HEADER
2753	012314	014512				MES23		
2754	012316	004537	011640			JSR	15 CON	, CONVERT SWR VALUE TO ASCII
2755	012322	000176				176		
2756	012324	014542				MES25		
2757	012326	000006				6		
2758	012330	104000				ENT	+0	, PRINT SWR VALUE
2759	012332	014542				MES25		
2760	012334	104000				ENT	+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	ENT	+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)+, 25	, RESTORE REGISTERS
2769	012364	012604				MOV	(SP)+, 24	
2770	012366	012603				MOV	(SP)+, 23	
2771	012370	012602				MOV	(SP)+, 22	
2772	012372	012601				MOV	(SP)+, 21	
2773	012374	012600				MOV	(SP)+, 20	
2774	012376	000002				RT		, RETURN FROM INTERRUPT

012400	045			MED0	ASCII	/%
012401	040	020040	042440	MED1	ASCII2	/ ERROR COUNT%/
012422	051105	047522	020122	MESA	ASCII2	/ERROR SET OK - CLEAR & TURN ON LINE%/
012467	105	051122	051117	MESB	ASCII2	/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		ASCII2	/%PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
012721	045	052123	051101	MESDD	ASCII2	/%STARTING DAVFU PRINTING TESTS%/
012761	045	050114	032460	MES1	ASCII2	/%LP05-LP11-LP14 LINE PRINTER TEST%/
013024	042522	052123	051101	MES2	ASCII2	/RESTART ADDRESS 600%/
013051	045	047520	042527	MES3	ASCII2	/%POWER ON - TURN ON LINE%/
013103	117	020116	044514	MES4	ASCII2	/ON LINE OK - TRY TORN PAPER SWITCH%/
013147	122	040505	054504	MES5	ASCII2	/READY SET OK - TRY DRUM GATE SWITCH%/
013214	051105	047522	020122	MES6	ASCII2	/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	ASCII2	/ INCHES%/
	013326			EVEN		
013326	026455	026455	026455	MES9	ASCII	----- THIS LINE SHOULD BE /
013423	040	020040	020040	MES10	ASCII2	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	ASCII2	LINES PER MINUTE%/
013624	026455	026455	026455	MES13	ASCII	-----
013706	026455	026455	026455		ASCII	-----
013770	026455	026455	026455		ASCII2	-----
				EVEN		
014032	005012	042524	052123	MES14	ASCII	12 12<TEST NUMBER
014050	020040	005012	000012	MES15	ASCII2	12><12>12>
				EVEN		
014056	044124	051511	046040	MES16	ASCII2	THIS LINE SHOULD BE PRINTED#
014113	040	020040	020040	MES17	ASCII2	ALL ON ONE LINE --- F SLEWED 0 LINES%/
				EVEN		
014216	026455	026455	026455	MES18	ASCII	-----
014310	020040	020040	020040	MES19	ASCII2	THESE SHOULD BE /
				EVEN		
014424	052040	051505	044524	MES20	ASCII	TESTING CHANNEL SLEWING USING CHANNEL NO
014500	020040	000		MES20A	ASCII2	
	014504			EVEN		
014504	000045			MES21	ASCII2	
014506	037440	000045		MES22	ASCII2	
014512	051445	051127	036440	MES23	ASCII2	NEW SWR =
014523	040	020040	042516	MES24	ASCII2	NEW SWR =
014542	020040	020040	020040	MES25	ASCII2	
	014552			EVEN		
014552	030504			TNDAY1	ASCII	TEST NUMBERS FOR DAVFU TESTS
014554	031104			TNDAY2	ASCII	
014556	031504			TNDAY3	ASCII	
014560	020061			TND1	ASCII	
014562	020062			TND2	ASCII	
014564	020063			TND3	ASCII	
014566	020064			TND4	ASCII	

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TN05      ASCII  /5 /
TN06      ASCII  /6 /
TN07      ASCII  /7 /
TN010     ASCII  /8 /
TN011     ASCII  /9 /
TN012     ASCII  /10/
TN013     ASCII  /11/
TN014     ASCII  /12/
TN015     ASCII  /13/
TN016     ASCII  /14/
TN017     ASCII  /15/
          EVEN

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DAVFU PRINTING TESTS IF DAVFU IS AVAILABLE -- SET SWITCH !4

TESTS D1 AND D2
CHECK DAYFU LINE COUNT SLEWING

ADDRESS	HEX	ASCII	OPCODE	OPERANDS	INSTR	COMMENT
2784	014616			DAVFU		
2785	014616	022737	000176	001004	CMP	#176, SWR
2786	014624	001002			BNE	15
2787	014626	004737	011762		ISR	PC ENABL
2788	014632					ENABLE KEYBOARD INTERRUPT
2789	014632	004437	011472		JSP	%4, TYPINT
2790	014636	013737	016676	014212	MOV	SPSP, MES19+2
2791	014644	104000			ENT	+0
2792	014646	012721			MESDD	
2793	014650	012737	000220	015244	MOV	#220, DAV11
2794	014656	012737	000221	015346	MOV	#221, DAV12
2795	014664	013737	014552	014050	MOV	TNDV1, MES15
2796	014672	004437	011406		JSR	%4, PRNT
2797	014676	012737	015276	001040	MOV	#DAVTAB, CHGEN
2798	014704	005777	164070		TST	@LPS
2799	014710	100010			BPL	DAV1
2800	014712	012737	000054	001052	MOV	#54, EPCOUNT
2801		000055			N=N+1	
2802	014720	004537	011722		JSR	%5, STAEF
2803	014724	000000			HALT	
2804	014726	000137	014676		JMP	DAV0
2805	014732	017777	164102	164042	MOV	@CHGEN @LPS
2806	014740	062737	000002	001040	ADD	#2, CHGEN
2807	014746	005777	164066		TST	@CHGEN
2808	014752	001405			REQ	D5
2809	014754	105777	164020		TSTB	@LPS
2810	014760	100375			BPL	4
2811	014762	000137	014704		JMP	DAV00
2812	014766	012737	000002	001044	MOV	#2, CYLCNT
2813	014774	012737	014056	011470	MOV	#MES16, PRMSG
2814	015002	004437	011452		JSP	%4, RINT
2815	015006	005777	163766		TST	@LPS
2816	015012	100006			BPL	D1
2817	015014	012737	000055	001052	MOV	#55, EPCOUNT
2818		000056			N=N+1	
2819	015022	004537	011722		JSR	%5, STAEF

2820	015026	000000				HALT		, HALT ON ERROR
2821	015030	013777	015344	163744	01	MOV	DAV11, @LPB	, SEND DAVFU INSTRUCTION, SKIP 0 LINES
2822	015036	105777	163736			TSTB	@LPS	, TEST READY
2823	015042	100375				BPL	-4	, WAIT FOR READY
2824	015044	012737	014113	011470		MOV	#MES17, PRMSG	, SET PRINTER MESSAGE ADDRESS
2825	015052	004437	011452			JSR	%4, RINT	, PRINT MESSAGE
2826	015056	012737	014216	011470		MOV	#MES18, PRMSG	, SET MESSAGE ADDRESS
2827	015064	013737	015346	001040		MOV	DAV12, CHGEN	, FIRST DAVFU INSTRUCTION
2828	015072	012737	014560	001054		MOV	#TN01, STRCHR	, SET TABLE POINTER
2829	015100	012737	000017	001036		MOV	#15, CHRCNT	, SET TABLE COUNT
2830	015106	005777	163666		D2	TST	@LPS	, TEST FOR ERROR
2831	015112	100006				BPL	D3	, CONTINUE IF NO ERRORS
2832	015114	012737	000056	001052	ERR56	MOV	#56, ERRCOUNT	, SET UP ERROR COUNT 56
2833		000057				N=N+1		
2834	015122	004437	011722			JSR	%4, STAER	, REPORT ERROR SET
2835	015126	000000				HALT		, HALT ON ERROR
2836	015130	013777	001040	163644	D3	MOV	CHGEN, @LPB	, SEND DAVFU INSTR
2837	015136	105777	163636			TSTB	@LPS	, TEST READY
2838	015142	100375				BPL	-4	, WAIT FOR READY
2839	015144	017737	163704	014310		MOV	@STRCHR, MES19	, SET PRINTER MESSAGE
2840	015152	004437	011452			JSR	%4, RINT	, PRINT MESSAGE
2841	015156	005337	001036			DEC	CHRCNT	, DEC TABLE COUNT
2842	015162	001407				BEQ	D4	, EXIT TEST IF DONE
2843	015164	005237	001040			INC	CHGEN	, NEXT DAVFU INSTR
2844	015170	062737	000002	001054		ADD	#2, STRCHR	, INC TABLE POINTER
2845	015176	000137	015106			JMP	D2	, CONTINUE
2846	015202	005337	001044		D4	DEC	CYCCNT	, DEC CYCLE COUNT
2847	015206	001415				BEQ	DEXO	, EXIT IF DONE
2848	015210	062737	000140	015344		ADD	#140, DAV11	, CHANGE DAVFU INSTR
2849	015216	062737	000140	015346		ADD	#140, DAV12	, CHANGE DAVFU INSTR
2850	015224	013737	014554	014050		MOV	TNDV2, MES15	, SET TEST NUMBER FOR MESSAGE
2851	015232	004437	011406			JSR	%4, PRNT	, PRINT TEST NUMBER
2852	015236	000137	014774			JMP	D0	, RETEST LINE COUNT SLEWING
2853	015242	012737	000220	015344	DEXO	MOV	#220, DAV11	, RESET DAVFU INSTR
2854	015250	012737	000221	015346		MOV	#221, DAV12	, RESET DAVFU INSTR
2855	015256	032777	010000	163520		BIT	#BIT12, @SWP	, LOOP ON TEST?
2856	015264	001002				BNE	15	, LOOP
2857	015266	000137	015350			JMP	DAV2	, NEXT TEST
2858	015272	000137	014616		15	JMP	DAV11	, LOOP
2859								
2860								
2861	015276	000356				DAV11	356	DAV11 LOAD TABLE
2862	015300	000001					1	
2863	015302	000002					2	
2864	015304	000003					3	
2865	015306	000004					4	
2866	015310	000005					5	
2867	015312	000006					6	
2868	015314	000007					7	
2869	015316	000010					10	
2870	015320	000011					11	
2871	015322	000012					12	
2872	015324	000013					13	
2873	015326	000014					14	
2874	015330	000015					15	
2875	015332	000016					16	

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							
2886							
2887							
2888	015350						
2889	015350	022737	000176	001004	DAV2		
2890	015356	001002					
2891	015360	004737	011762				
2892	015364						
2893	015364	004437	011472				
2894	015370	013737	016676	014312			
2895	015376	013737	014556	014050			
2896	015404	004437	011406				
2897	015410	012737	016660	016142			
2898	015416	012737	016626	016136			
2899	015424	017737	000506	001054			
2900	015432	012737	014560	016144			
2901	015440	012737	016610	016140			
2902	015446	017737	000466	001056			
2903	015454	012737	016146	016134	LOAD		
2904	015462	017737	000446	001040			
2905	015470	005777	163304				
2906	015474	100007					
2907	015476	012737	000057	001052	ERPE7		
2908		000060					
2909	015504	004537	011722				
2910	015510	000000					
2911	015512	000760					
2912	015514	012737	000002	001036	DL1		
2913	015522	013777	001040	163252	DL2		
2914	015530	105777	163244				
2915	015534	100375					
2916	015536	005777	163236				
2917	015542	100010					
2918	015544	012737	000060	001052	EPR60		
2919		000061					
2920	015552	004537	011722				
2921	015556	000000					
2922	015560	000137	015454				
2923	015564	022737	000356	001040	DL6		
2924	015572	001407					
2925	015574	022737	000357	001040			
2926	015602	001403					
2927	015604	005337	001036				
2928	015610	001344					
2929	015612	062737	000002	016134	DL6A		
2930	015620	017737	000310	001040			
2931	015626	022737	077777	001040			

CMP	#176, SWR	, S/W SWR ?
BNE	15	, NO- CONTINUE
ISP	PC, ENABL	, ENABLE KEYBOARD INTERRUPT
15		
JSR	%4, TYPINT	, INITIALIZE
MOV	SPSP, MES19+2	
MOV	TNDV3, MES15	, SAT TEST NUMBER FOR MESSAGE
JSR	%4, PRNNT	, PRINT TEST NUMBER D3
MOV	#MTAB, MTABP	, SET MESSAGE TABLE POINTER
MOV	#ITAB, ITABP	, SET INSTRUCTION TABLE POINTER
MOV	@ITABP, STRCHR	, SAT FIRST INSTRUCTION
MOV	#TN01, HTABP	, SET HEADER MESSAGE TABLE POINTER
MOV	@ICTABP, ICTABP	, SET INSTR COUNT TABLE POINTER
MOV	@ICTABP, STRCNT	, GET FIRST INSTR COUNT
MOV	#DTAB, DTABP	, SET DATA TABLE POINTER
MOV	@DTABP, CHRGEN	, SET FIRST DATA PAIR
TST	@LPS	, TEST FOR ERROR
BPL	DL1	, BRANCH IF NO ERROR
MOV	#57, ERCOUNT	, SET UP ERROR COUNT 57
N=N+1		
JSR	%5, STAER	, REPORT ERROR SET
HALT		, HALT ON ERROR
BR	LOAD	, RESTART LOAD
MOV	#2, CHRCNT	, SET PAIR COUNT
MOV	CHRGEN, @LPS	, LOAD DAVFU
TSTB	@LPS	, TEST READY
BPL	-4	, WAIT FOR READY
TST	@LPS	, TEST FOR ERROR
BPL	DL6	, BRANCH IF NO ERROR
MOV	#60, ERCOUNT	, SET UP ERROR COUNT 60
N=N+1		
JSR	%5, STAER	, REPORT ERROR SET
HALT		, HALT ON ERROR
JMP	LOAD	, RESTART LOAD
CMP	#356, CHRGEN	, LOAD COMMAND?
BEQ	DL6A	, YES, SEND ONLY ONCE
CMP	#357, CHRGEN	, LOAD COMMAND?
BEQ	DL6A	, YES, SEND ONLY ONCE
DEC	CHRCNT	, DEC PAIR COUNT
BNE	DL2	, FINISH PAIR IF NOT DONE
ADD	#2, DTABP	, INC DATA TABLE POINTER
MOV	@DTABP, CHRGEN	, SET NEXT DATA PAIR
CMP	#77777, CHRGEN	, DONE LOAD?

2932	015634	001327			BNE	DL1	
2933							
2934							
2935							, START OF CHANNEL SLEW TESTS
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, PRMSG	, SET HEADER MSG ADDRESS
2945	015674	004437	011452		JSR	%4, RINT	, PRINT HEADER MESSAGE
2946	015700	013777	001054	163074	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	MOV	#61, ERRCOUNT	, 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	MOV	@MTABP, MES19	, SET MESSAGE
2957	015750	027727	000164	000001	CMF	@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	MOV	SPSP, MES19+2	, SET MESSAGE
2962	015776	012737	014216	011470	MOV	#MES18, PRMSG	, 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 POINTER
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 POINTER
2973	016062	017737	000052	001056	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		JMP	TEST2	, RECYCLE PRINTING TESTS
2982							
2983	016134	000000			CTABP	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

SEQ 0078

. DATA TABLE FOR DAVFU LOAD

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

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99

3100	016500	000007	7
3101	016502	000000	0
3102	016504	000001	1
3103	016506	000002	2
3104	016510	000015	15
3105	016512	000000	0
3106	016514	000003	3
3107	016516	000000	0
3108	016520	000005	5
3109	016522	000002	2
3110	016524	000001	1
3111	016526	000010	10
3112	016530	000007	7
3113	016532	000000	0
3114	016534	000001	1
3115	016536	000002	2
3116	016540	000005	5
3117	016542	000020	20
3118	016544	000013	13
3119	016546	000000	0
3120	016550	000005	5
3121	016552	000002	2
3122	016554	000001	1
3123	016556	000000	0
3124	016560	000007	7
3125	016562	000010	10
3126	016564	000001	1
3127	016566	000002	2
3128	016570	000005	5
3129	016572	000000	0
3130	016574	000003	3
3131	016576	000000	0
3132	016600	000001	1
3133	016602	000000	0
3134	016604	000357	357
3135	016606	077777	77777

STOP LOAD
 STOP 1111

INSTRUCTION COUNT TABLE - FOR DAVEU CHANNEL SLEW INSTRUCTIONS

ICTAB	105
	56
	42
	23
	5
	1
	0

END OF TABLE

INSTRUCTION TABLE - DAVEU CHANNEL SLEW INSTRUCTIONS

ITAB	200
	201
	202
	203
	204
	205
	206

CHANNEL	1
CHANNEL	2
CHANNEL	3
CHANNEL	4
CHANNEL	5
CHANNEL	6
CHANNEL	7

3149	016626	000200
3150	016630	000201
3151	016632	000202
3152	016634	000203
3153	016636	000204
3154	016640	000205
3155	016642	000206

SEQ 0081

0150	016644	000207	207	CHANNEL 8
0151	016646	000210	210	CHANNEL 9
0152	016650	000211	211	CHANNEL 10
0153	016652	000212	212	CHANNEL 11
0154	016654	000213	213	CHANNEL 12
0155	016656	000000	0	END OF TABLE

0165 016660 030440
0166 016662 031040
0167 016664 031440
0168 016666 033040
0169 016670 032062
0170 016672 032061
0171 016674 020063
0172 016676 020040

MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE

MTAB ASCII / 1/
ASCII / 2/
ASCII / 3/
ASCII / 6/
ASCII / 24/
ASCII / 14/
FS ASCII / 3 /
SPSP ASCII / /

SCOPE LOOP ROUTINE

SET CHARACTER IN SWITCH REGISTER -0

3178	016700				SCOPE			
3179	016700	022737	000176	001004	CMP	#176, SWR		
3180	016706	001002			BNE	15		.S/W SWR ?
3181	016710	004737	011762		JSP	PC, ENABL		:NO- CONTINUE
3182	016714							.ENABLE KEYBOARD INTERRUPT

15

FILE: COLPH-M-D MACY11 30(1046) 17-NOV-77 12 10 PAGE 84 G 7
17-NOV-77 12 07

SEQ 0084

0111 006714 004437 011472
0114 006720 017737 162060 001050

JSR
MOV

24, TYP INT
@SWR, SAVE

.FETCH SWITCHES

SEQ 0085

012737	177574	001036	MOV	#-132 ,CHRCNT	.SET CHAR COUNT
042737	177400	001050	B.C	#177400,SAVE	.MASK CHARACTER
			LDLPY		
105777	162032		TSTB	@LPS	.TEST READY
100775			BPL	-4	.WAIT FOR READY
005777	162024		TST	@LPS	.TEST FOR ERROR

15754	100006			BPL	LPSCOPE	BRANCH IF NO EPROR
15756	012737	000062	001052	MOV	#62, ERCOUNT	SET UP ERROR COUNT 62
	000063			N=N+1		
15764	004537	011722		JSE	%5, STAER	REPORT ERROR SET
15770	000000			HALT		HALT ON ERROR
15772	010777	001050	162002	LPSCOPE MOV	SAVE 2LPB	LOAD PRINTER BUFFER

SEQ 0087

0198	017000	032777	004000	161776	BIT	#BIT11, @SWF	.SEND ONLY ONE CHAR?
0199	017006	001402			REQ	LSCO	.NO, BRANCH
0200	017010	000000			HALT		.HALT - WAIT FOR OPERATOR
0201	017012	000732			BR	SCOPE	.NEXT CHAR
0202	017014	000177	000024		JMP	@LOSCOP	.SEND LF?
0203	017020	005237	001036		LSCA	CHRCNT	.INCREMENT CHAR COUNT
0204	017024	001346			BNE	LDLPX	.CONTINUE IF NOT DONE LINE
0205	017026	012777	000012	161746	MOV	#12, @LPB	.SEND LF
0206	017034	105777	161740		TSTB	@LPS	.TEST READY
0207	017040	100375			BPL	-4	.WAIT FOR READY
0208	017042	000716			BF	SCOPE	.CONTINUE
0209							
0210	017044	017020			LOSCOP	LSCA	
0211							
0212							
0213							
0214							
0215							
0216							
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0250							
0251							
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0254							
0255							
0256							
0257							
0258							
0259							
0260							
0261							
0262							
0263							
0264							
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0270							
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0279							
0280							
0281							
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0290							
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0390							
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0400							
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0425							
0426				</			

ACQU	011720	2641*	2645	2650*	2652*	2654*	2659*									
ACQU	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		
BIT13	= 020000	2502	2537	2855	2978											
BIT14	= 040000	924*	1520	1917	1945	2083	2185	2235	2288	2331	2374					
BIT15	= 100000	923*	960	1678	2540											
BIT2	= 000004	922*														
BIT3	= 000010	935*														
BIT4	= 000020	934*														
BIT5	= 000040	933*														
BIT6	= 000100	932*														
BIT7	= 000100	931*														
BIT8	= 000100	930*														
BIT9	= 001000	929*														
CHAR	001074	928*	2663													
CHPCHK	005374	1146*	1196*	2706*	2707*	2708	2710	2712	2715	2723	2724*	2733	2739*	2740*		
CHRCNT	001036	2741	2745													
		1010	1962*	2007												
		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	2842*	2904*	2913	2923	2925	2930*	2931			
CHPS	005602	1993	1997*													
CLOCKAV	002440	1461*														
CNTR	003250	1514*	1573*	1581*												
CNTPLG	012230	2705	2739*													
CONV	011640	2641*	2665	2754												
CNTRPT	003264	973	1551	1582	1588*											
CP	005450	1974*	1992													
CPO	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*													
CYC CNT	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*		
DAUAV	003710	1669	1674*													
DAUFU	014616	991	2542	2784*	2858											
DAU11	015344	2793*	2821	2848*	2853*	2882*										
DAU12	015346	2794*	2827	2849*	2854*	2883*										
DAUTAB	015276	2797*	2861*													
DAUO	014676	2797*	2804													

[illegible]

SEQ 0090

ERP27	004212	1748#							
ERP3	001510	1263#							
ERP30	004322	1778#							
ERP31	004424	1796#							
ERR32	004610	1851#							
ERR33	004666	1864#							
ERP34	005110	1909#							
ERP35	005226	1931#							
ERP36	005464	1977#							
ERP37	005776	2037#							
ERP4	001532	1269#							
ERP40	006260	2092#							
ERP41	006532	2143#							
ERP42	007030	2199#							
ERP43	007322	2250#							
ERP44	007562	2297#							
ERP45	010052	2351#							
ERP46	010320	2394#							
ERR47	010542	2437#							
ERR5	001562	1279#							
ERR50	010734	2472#							
ERR51	011006	2484#							
ERR52	011200	2521#							
ERR53	011436	2591#							
ERR54	014712	2800#							
ERR55	015014	2817#							
ERR56	015114	2832#							
ERP57	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					
HAMY	011306	2541	2543#						
HAMIX	011164	2518#	2536						
HAM2	011172	2519#	2531						
HED0	012400	2670	2777#						
HED1	012401	2667	2777#						
HSPRT	006660	1014	2174#	2227					
HS0	007000	2194#	2223	2225					
HS00	006764	2189	2192#						
HS00A	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	959	1679	1725#	1738	1752			

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

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	2319	2415	2508	2784	2888	3178									
SECT	10668	1229	1235	1253	1263	1269	1279	1295	1305	1316	1322	1330	1344	1350	1354
	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
	2800	2817	2832	2907	2918	2951	3192								
SECT	10768	1855	1900	1968	2023	2079	2134	2180	2285	2325	2421	2514			
SECT	11178	1358	1370	1383	1396	1429	1444	2586	2802						
	10878	1548	1664	1743	1787	1882	1926	1951	1990	2000	2049	2104	2154	2217	2263
	2305	2361	2402	2452	2497	2525	2533	2575	2809	2822	2837	2914	2938	2947	3187
	3206														

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SECT 0

DELPHI RUN DELPHI LET CREF 101 10 TO DELPHI P11
 RUN-TIME 3 6 9 SECONDS
 RUN-TIME PRT 101 11-9 1
 CORE USED 24 11 PAGES

