

LP14-LP11-LP05

LINE PRINTER TEST  
MD-11-DZLPK-H

EP-DZLPK-H-DL  
COPYRIGHT ©74-77  
FICHE 1 OF 1

JAN 1978  
**digital**  
MADE IN USA

REM !  
REPT 0

IDENTIFICATION  
-----

PRODUCT CODE: MAINDEC-11-DZLPK-H-D  
PRODUCT NAME: LP14/LP11/LP05 LINE PRINTER TEST  
PRODUCT DATE: 25-NOVEMBER-1977  
MAINTAINER: DIAGNOSTIC ENGINEERING

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION. DIGITAL EQUIPMENT CORPORATION ASSUMES NO FOR ANY ERRORS THAT MAY APPEAR IN THIS DOCUMENT.

NO RESPONSIBILITY IS ASSUMED FOR THE USE OR RELIABILITY OF SOFTWARE ON EQUIPMENT THAT IS NOT SUPPLIED BY DIGITAL OR ITS AFFILIATED COMPANIES.

COPYRIGHT (C) 1974, 1977 BY DIGITAL EQUIPMENT CORPORATION

THE FOLLOWING ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION:

DIGITAL	PDP	UNIBUS	MASSBUS
DEC	DECUS	DECTAPE	



100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121

- 7.0 TEST DESCRIPTIONS
- 7.1 TEST 1 CONTROL AND OPERATOR INTERACTION
  - 7.1.1 TEST 1 SECTION 1 PRINTER READY, TESTS POWER UP
  - 7.1.2 TEST 1 SECTION 2 MANUAL PRINT SPEED TEST
  - 7.1.3 TEST 1 SECTION 3 TOP OF FORM SWITCH TEST
  - 7.1.4 TEST 1 SECTION 4 DAVFU TESTS
- 7.2 PRINTING TESTS
  - 7.2.1 TEST 2 DATA TRANSFER PATHS TEST
  - 7.2.2 TEST 3 CHARACTER GENERATOR AND COMPARATOR TESTS
  - 7.2.3 TEST 4 OVER PRINT TEST
  - 7.2.4 TEST 5 SHUTTLE POSITIONING TEST
  - 7.2.5 TEST 6 PRINT CONTROL TEST
  - 7.2.6 TEST 7 MULTIPLE LINE ADVANCE TEST
  - 7.2.7 TEST 8 HIGH SPEED PRINT TEST
  - 7.2.8 TEST 9 SINGLE CHARACTER, ALL COLUMNS TEST
  - 7.2.9 TEST 10 DRUM PATTERN TEST
  - 7.2.10 TEST 11 RIGHT & LEFT HAND WEDGES
  - 7.2.11 TEST 12 HAMMER ALIGNMENT TEST
  - 7.2.12 TESTS D1&D2 DAVFU - LINE COUNT SLEWING TEST
  - 7.2.13 TEST D3 DAVFU - CHANNEL SLEWING TEST
- 7.3 SCOPE DRIVE TEST

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

### 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 - 70 - 17200 ARE USED BY THIS DIAGNOSTIC.

#### 2.3 PRELIMINARY PROGRAMS

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

174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219  
220  
221  
222

### 3.0 LOADING PROCEDURE

#### 3.1 METHOD

POWER DOWN THE LINE PRINTER  
POWER UP THE PROCESSOR ONLY  
LOAD THE BOOTSTRAP AND ABSOLUTE LOADERS  
LOAD THE LP11/LP05 DIAGNOSTIC PROGRAM TAPE

### 4.0 STARTING PROCEDURE

#### 4.1 CONTROL SWITCH SETTINGS

SET CONTROL SWITCHES AS DESIRED - (SEE SECTION 5.1 FOR DESCRIPTION OF SWITCH FUNCTIONS) MAKE SURE SWITCH 0 IS DOWN BEFORE STARTING THE TEST.

#### 4.2 STARTING ADDRESS OR ADDRESSES

THE INITIAL STARTING ADDRESS TO RUN THE ENTIRE LP14/LP11/LP05 DIAGNOSTIC IS LOCATION 200(8). TO SKIP THE OPERATOR INTERVENTION TESTS AND START WITH THE PRINTING TESTS, START AT LOCATION 600(8). TO RUN THE SPECIAL SCOPE DRIVER ROUTINE USE START ADDRESS 700(8) OR 720(3). TO START AT ANY OTHER TEST USE THE START ADDRESS FROM THE FOLLOWING TABLE:

START ADDRESS	TEST
300	DAVPU ILLEGAL LOAD TEST
304	DAVPU NO STOP BIT TEST
310	DAVPU LINE COUNT SLEW TEST
314	DAVPU 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

223  
224  
225  
226  
227  
228  
229  
230  
231  
232  
233  
234  
235  
236  
237  
238  
239  
240  
241  
242  
243  
244  
245  
246  
247  
248  
249  
250  
251  
252  
253  
254  
255  
256  
257  
258  
259  
260  
261  
262  
263  
264  
265

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

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

4.3 PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF THE LINE PRINTER DIAGNOSTIC TEST, THE  
HEADER MESSAGE "LP05/LP11/LP14 LINE PRINTER TEST" WILL BE TYPED OUT ON THE  
TELEPRINTER FOLLOWED BY EXECUTION OF THE PRINTER READY PORTION OF TEST  
1. PRINTING OF THE MESSAGE "POWER-UP" ON THE TELEPRINTER FOLLOWING  
THE TEST HEADER PRINT-OUT INDICATES START OF THIS TEST SEQUENCE. THIS  
TEST IS CARRIED OUT BY AN INTERACTIVE EXCHANGE BETWEEN THE OPERATOR  
AND THE TEST PROGRAM. THE OPERATIONAL DESCRIPTION OF THIS TEST  
APPEARS AS PART OF THE TEST DESCRIPTION FOR TEST 1 (SEE SECTION  
7.1.1). AFTER SUCCESSFUL COMPLETION OF THIS SECTION OF TEST 1, THE  
PRINT SPEED AND TOP OF FORM SWITCH SETTINGS TESTS WILL BE PERFORMED.  
(SEE SECTIONS 7.1.2 AND 7.1.3 RESPECTIVELY.) IF THE DAVFU IS AVAILABLE  
AND SWITCH 14 IS SET, THE DAVFU TESTS WILL ALSO BE PERFORMED. AFTER  
COMPLETION OF ALL OF TEST 1, PRESS CONTINUE TO ENTER THE PRINTING  
TESTS DIRECTLY. NO OTHER OPERATOR ACTION WILL BE REQUIRED.

266  
267  
268  
269  
270  
271  
272  
273  
274  
275  
276  
277  
278  
279  
280  
281  
282  
283  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312  
313  
314  
315  
316  
317  
318  
319  
320

### 5.0 OPERATING PROCEDURE

#### 5.1 OPERATIONAL SWITCH SETTINGS

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

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

1. SWITCH - 0  
TO START PRINTING IN THE MANUAL PRINT SPEED TEST, PLACE SWITCH 0 IN THE UP POSITION. AT THE END OF ONE MINUTE PUT SWITCH 0 DOWN. THE 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 ERROR REPORTS ON THE TTY.
3. SWITCH - 10  
SWITCH 10 SHOULD BE SET IN THE UP FOR TESTING THE LP14



722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732

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.

334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358  
359  
360  
361  
362  
363  
364  
365  
366  
367  
368  
369  
370  
371  
372  
373  
374  
375  
376  
377  
378  
379  
380  
381  
382  
383  
384  
385  
386  
387  
388  
389

4. SWITCH - 12

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

6. SWITCH - 13

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

7. SWITCH - 14

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

8. SWITCH - 15

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

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

5.2 ABSENCE OF HARDWARE SWITCH REGISTER

WHEN THE DIAGNOSTIC IS STARTED AT ADDRESS 200(8), IT WILL 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 SWR IN LOCATION 176(8).

390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500

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

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

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

SWR = XXXXXX NEW SWR =

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

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

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

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

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

5.3 IOT CHANGES

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

FOR OTHER THAN THESE, PLACE THE CORRECT STATUS LOCATION IN LOCATION 1000(8) AND THE CORRECT BUFFER LOCATION IN LOCATION 1002(8). THE CORRECT VECTOR ADDRESS IN LOCATION 1030(8) AND THE CORRECT PSW IN LOCATION 1032(8).

446  
447

448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500

## 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.

501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553

## 6.2 VISUALLY DETECTED ERRORS

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

## 7.0 TEST DESCRIPTIONS

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

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

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

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

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

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

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

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

554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604

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.

605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655

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

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

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

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

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

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

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

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

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

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



656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708

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

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

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

#### 7.2 LINE PRINTER PRINTING TESTS

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

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

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

709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763

### 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  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817

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:

```
?????------?????  
@@@@@------@@@@@  
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.

818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
856  
857  
858  
859  
860  
861  
862

7.2.11 TEST 12 - HAMMER ALIGNMENT TEST

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

7.2.12 TESTS D1 & D2 - DAVFU LINE COUNT SLEWING TESTS

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

7.2.13 TEST D3 - DAVFU CHANNEL SLEW COMMAND TEST

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

888  
889  
890  
891  
892  
893  
894  
895  
896  
897  
898  
899

### 7.3 SCOPE DRIVE ROUTINE

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

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

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

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

ENDR

890  
891  
892  
893  
894  
895  
896  
897  
898  
899  
900  
901  
902  
903  
904  
905  
906  
907  
908  
909  
910  
911  
912  
913  
914  
915  
916  
917  
918  
919  
920  
921  
922  
923  
924  
925  
926  
927  
928  
929  
930  
931  
932  
933  
934  
935  
936  
937  
938  
939  
940  
941  
942  
943  
944  
945  
946  
947  
948  
949  
950

TITLE MAINDEC-11-DZLPK-H-D  
 NLIST MC  
 COPYRIGHT (C) 1977, 1974 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.  
 \*\*\*\*\* LP14/LP11/LP05 LINE PRINTER TEST \*\*\*\*\*

LIST OF SWITCH SETTINGS USED IN THIS TEST

SWITCH NO.	DESCRIPTION
15	LOOP ON ERROR IN TEST 1 ONLY !!!
14	OPTIONAL DAVFU AVAILABLE
13	"DOWN" 64 CHAR. / "UP" - 96 CHAR OPTION
12	LOOP ON TEST
11	SEND ONLY ONE CHAR TO LINE PRINTER IN SCOPE TEST - THEN HALT
10	DOWN - LP05/LP11, UP - LP14
9	"UP" - INHIBIT ERROR REPORTS
0	USED TO TEST PRINT SPEED IN TEST 1 IF NO CLOCK IS AVAILABLE

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

946					
947		000030		. =30	
948					
949	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	: KEYBOARD INTERRUPT ROUTINE
965	000062	000300		300	
966					
967					
968		000100		. =100	
969					
970	000100	003254		LKSRV	: LINE CLOCK SERVICE ROUTINE
971	000102	000340		340	
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	NODAT
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 REG 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 001002 177516      LPB:    177516      ; DATA BUFFER REGISTER
1042                                     ; BITS 0-6=7 BIT ASCII CHARACTER BUFFER
1043                                     ; BITS 7-15=NOT USED
1044
1045
1046 001004 177570      SWR:    177570
1047 001006 177570      DISPLAY: 177570
1048 001010 177776      PSW:    177776
1049 001012 177566      TPB:    177566
1050 001014 177562      TKB:    177562
1051 001016 177564      TPS:    177564
1052 001020 177560      TKS:    177560
1053 001022 172542      CSBR:   172542
1054 001024 172540      PLKS:   172540
1055 001026 177546      LKS:    177546
1056 001030 000200      PTRVEC: . WORD    200
1057 001032 000202      PTRPSW: . WORD    202
    
```



```

1058      000240      NOP      =240
1059      000000      N        =0
1060      000002      M        =2
1061
1062      ;MACRO FOR SETTING UP ERROR COUNT
1063      .LIST ME
1064
1065      .MACR  SERROR X
1066      ERR 'X': 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    TNG'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 OR 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
1091      ;MACRO FOR ENABLING KEYBOARD INTERRUPT IF THERE IS NO
1092      ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1093      .LIST ME
1094
1095      .MACR  SENABLE
1096      CMP   #176,SWR          ;S/W SWR ?
1097      BNE   15                ;NO- CONTINUE
1098      JSR   PC,ENABL          ;ENABLE KEYBOARD INTERRUPT
1099      15:
1100      .ENDM  SENABLE
1101
1102
1103
1104
1105
1106
1107
1108
1109
1110      ;MACRO USED TO LOAD THE PSW WITH THE
1111      ;CORRECT PROCESSOR PRIORITY LEVEL
1112
1113
    
```

1114  
 1115  
 1116  
 1117  
 1118  
 1119  
 1120  
 1121  
 1122  
 1123  
 1124  
 1125  
 1126  
 1127  
 1128  
 1129  
 1130  
 1131  
 1132  
 1133  
 1134  
 1135  
 1136  
 1137  
 1138  
 1139  
 1140  
 1141  
 1142  
 1143  
 1144  
 1145  
 1146  
 1147  
 1148  
 1149  
 1150  
 1151  
 1152  
 1153  
 1154  
 1155  
 1156  
 1157  
 1158  
 1159  
 1160  
 1161  
 1162  
 1163  
 1164  
 1165  
 1166  
 1167  
 1168  
 1169

. LIST ME

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

; MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

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

; ROUTINE TO TEST THE MECH. OPERATION OF THE LPO5

```
SETUP: JSR    %4, TYPINT
        RESET
        MOV    4, -(SP)      ; CLEAR WORLD
        MOV    6, -(SP)      ; SAVE CURRENT VECTORS
        MOV    #15, 4
        TST   @SWR           ; SET UP TIMEOUT VECTOR
        BR    25            ; TRY TO ACCESS HARDWARE SWR
                                ; IF THERE, GO TO 25
15:     MOV    #SWREG, SWR    ; POINT TO SOFTWARE SWR
        MOV    #DISPREG, DISPLAY ; POINT TO SOFTWARE DISPLAY
        CMP    (SP)+, (SP)+  ; RESTORE STACK
25:     MOV    (SP)+, 6      ; RESTORE TIMEOUT VECTORS
        MOV    (SP)+, 4
        EMT    +0
        MES1
        EMT    +0
                                ; TYPE DIAGNOSTIC TITLE
```

```
001034 000000
001036 000000
001040 000000
001042 000000
001044 000000
001046 000000
001050 000000
001052 000000
001054 000000
001056 000000
001060 000000
001062 000000
001064 000000
001066 000000
001070 000000
001072 000000
001074 000000
001076 000000
001100 000000

004437 011472
001106 000005
001110 013746 000004
001114 013746 000006
001120 012737 001134 000004
001126 005777 177652
001132 000407
001134 012737 000176 001004
001142 012737 000174 001006
001150 022626
001152 012637 000006
001156 012637 000004

104000
001164 012761
104000
```

```

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
1181
1182
1183
1184
1185
1186
1187          ; GET INITIAL SWR VALUE
1188          ; IF THERE IS NO H/W SWR
1189
1190
1191 001202 022737 000176 001004  CMP      #176, SWR      ;S/W SWR ?
1192 001210 001044          BNE      SKIP          ;NO- CONTINUE
1193 001212 005037 001070  CLR      SIGNAL        ;INITIALIZE INTERRUPT ROUTINE
1194 001216 005037 001066  CLR      DIGITS
1195 001222 005037 001072  CLR      SET
1196 001226 005037 001074  CLR      CHAR
1197 001232 013746 000034  MOV      34, -(SP)      ;SAVE VECTOR
1198 001236 013746 000036  MOV      36, -(SP)      ;SAVE VECTOR
1199 001242 012737 012002 000034  MOV      #TKINT, 34     ;SET UP NEW VECTOR
1200 001250 012737 000300 000036  MOV      #300, 36       ;SET UP NEW VECTOR
1201 001256 005237 001072  INC      SET
1202 001262 104400          TRAP     +0             ;SET HEADER FLAG
1203 001264 005037 001072  CLR      SET           ;ENTER INTERRUPT ROUTINE
1204 001270 012637 000036  MOV      (SP)+, 36      ;CLEAR HEADER FLAG
1205 001274 012637 000034  MOV      (SP)+, 34      ;RESTORE VECTOR
1206 001300 012777 000100 177512  MOV      #100, @TKS     ;RESTORE VECTOR
1207 001306 000001          WT:  WAIT            ;ENABLE KEYBOARD INTERRUPT
1208 001310 000240          NOP
1209 001312 022737 000001 001070  CMP      #1, SIGNAL     ;SWR 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          MESS3
1221 001332 000000          HALT                ;POWER UP
1222
1223
1224
1225
    
```

1226											
1227	001334	005777	177440		STP1:	TST	@LPS				; TEST FOR ERROR
1228	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, STAER				; REPORT ERROR BIT SET
1232	001354	000767				BR	STP1				; GO TEST FOR ERROR
1233	001356	105777	177416		STP2:	TSTB	@LPS				; 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, STAER				; 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	177366		MOV	#14, @LPB				; 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, @LPB				; 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	@LPS				; 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, STAER				; 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	@LPS				; 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, STAER				; REPORT ERROR SET
1266	001522	000767				BR	STP5A				; LOOP ON ERROR
1267	001524	105777	177250		STP5B:	TSTB	@LPS				; 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, STAER				; 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	@LPS				; 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, STAER				; 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
1296 000007
1297 001622 004537 011722
1298 001626 000766
1299
1300
1301
1302 001630 000005
1303 001632 105777 177142
1304 001636 100406
1305 001640 012737 000007 001052
1306 000010
1307 001646 004537 011722
1308 001652 000766
1309
1310
1311
1312 001654 005037 001046
1313 001660 012777 000012 177114
1314 001666 105777 177106
1315 001672 100006
1316 001674 012737 000010 001052
1317 000011
1318 001702 004537 011722
1319 001706 000762
1320 001710 005777 177064
1321 001714 100006
1322 001716 012737 000011 001052
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 000012 001052
1331 000013
1332 001754 004537 011722
1333 001760 000735
1334
1335
1336
1337
    
```

STP7: BR STP6 ; LOOP ON ERROR  
 EMT +0 ; TYPE MESSAGE  
 MES6 ; ERROR SET OK - TURN ON LINE  
 HALT ; DEPRESS CONTINUE WHEN READY

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

TEST1: RESET ; CLEAR THE WORLD  
 TST @LPS ; IS ERROR FLAG CLEAR  
 BPL TEST1A ; ERROR IS CLEAR OK  
 ERR6: MOV #6, ERCOUNT ; SET UP ERROR COUNT 6  
 N=N+1  
 JSR %5, STAER ; REPORT ERROR SET  
 BR TEST1 ; LOOP ON ERROR

; IS READY SET (NO ERRORS EXIST)

TEST1A: RESET ; CLEAR THE WORLD  
 TSTB @LPS ; IS READY SET  
 BMI TEST1B ; READY SET! PRINTER OK  
 ERR7: MOV #7, ERCOUNT ; SET UP ERROR COUNT 7  
 N=N+1  
 JSR %5, STAER ; REPORT READY NOT SET  
 BR TEST1A ; LOOP ON ERROR

; DOES LOADING THE BUFFER RESET READY

TEST1B: CLR WORK ; CLEAR COUNTER  
 MOV #12, @LPB ; LOAD LINE FEED INTO BUFFER  
 TSTB @LPS ; IS READY CLEAR  
 BPL LP1 ; READY TO CLEAR OK!  
 ERR10: MOV #10, ERCOUNT ; SET UP ERROR COUNT 10  
 N=N+1  
 JSR %5, STAER ; REPORT READY STILL SET  
 BR TEST1B ; LOOP ON ERROR

LP1: TST @LPS ; IS THERE AN ERROR  
 BPL LP2 ; NO ERROR CONTINUE  
 ERR11: MOV #11, ERCOUNT ; SET UP ERROR COUNT 11  
 N=N+1  
 JSR %5, STAER ; REPORT ERROR OCCURRED  
 BR TEST1B ; LOOP ON ERROR

LP2: TSTB @LPS ; IS THE PRINTER STILL BUSY  
 BMI TEST1C ; NO! GO TO NEXT TEST  
 INC WORK ; YES! GO CHECK FLAGS  
 BNE LP1 ; PRINTER STILL BUSY WAIT  
 ERR12: MOV #12, ERCOUNT ; SET UP ERROR COUNT 12  
 N=N+1  
 JSR %5, STAER ; ERROR REPORT TIME OUT  
 BR TEST1B ; LOOP ON ERROR

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

```

1338
1339 ; TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
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 BR 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 ; TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
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
1377 ; TEST THAT THE PRINTER WILL NOT INT. AT
1378 ; PROCESSOR LEVEL 5
1379
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 OK
1389
1390 ; TEST THAT THE PRINTER WILL NOT INTERRUPT
1391 ; WHEN THE PROCESSOR IS AT LEVEL 4
1392
1393 002202 012737 000020 001052 ERR20: MOV #20, ERCOUNT ; SET UP ERROR COUNT 20
    
```

```

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      TEST1D    ;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
1420 002310 004537 011722          N=N+1
1421 002314 000761          JSR      %5,STAER    ;REPORT PRINTER ERROR
1422 002316 105777 176456          BR       TEST1D     ;LOOP ON ERROR
1423 002322 100406          LP4:    TSTB     @LPS    ;IS READY SET
1424 002324 012737 000022 001052  ERR22:  BMI      LP5         ;YES - PRINTER READY
1425          000023
1426 002332 004537 011722          MOV      #22,   ERCOUNT ;SET UP ERROR COUNT 22
1427 002336 000750          N=N+1
1428 002340 012746 000140          JSR      %5,STAER    ;REPORT READY NOT SET
1429 002344 010746          BR       TEST1D     ;LOOP ON ERROR
1430 002346 062716 000006          LP5:    MOV      #140,-(SP) ;SET PRIORITY TO LEVEL 3
1431 002352 000002          MOV      PC,-(SP)    ;MOVE PRESENT LOCATION TO STACK
1432 002354 052777 000100 176416  ADD      #6,(SP)     ;SET UP FOR NEXT INSTRUCTION
1433 002362 000240          RTI      ;LOAD PSW
1434 002364 012737 000023 001052  ERR23:  BIS      #100,@LPS    ;SET PRINTER INTERRUPT ENABLE
1435          000024          NOP      ;WAIT
1436 002372 004537 011722          MOV      #23,   ERCOUNT ;SET UP ERROR COUNT 23
1437 002376 000730          N=N+1
1438          JSR      %5,STAER    ;REPORT ERROR
1439          BR       TEST1D     ;LOOP ON ERROR
1440          ; INTERRUPT HANDLER FOR TEST1D
1441 002400 022626          INT1D:  CMP      (6)+,(6)+  ;RESET STACK
1442 002402 042777 000100 176370  BIC      #100,@LPS    ;CLEAR INT. ENABLE FOR PRINTER
1443 002410 012746 000000          MOV      #0,-(SP)   ;CLEAR PROCESSOR STATUS
1444 002414 010746          MOV      PC,-(SP)   ;MOVE PRESENT LOCATION TO STACK
1445 002416 062716 000006          ADD      #6,(SP)   ;SET UP FOR NEXT INSTRUCTION
1446 002422 000002          RTI      ;LOAD PSW
1447 002424 012777 012706 176376  MOV      #12706,@PTRVEC ;RESET INSTRUCTION AT 200
1448 002432 012777 001000 176372  MOV      #1000,@PTRPSW ;RESET INSTRUCTION AT 202
1449
    
```

1450  
 1451  
 1452  
 1453  
 1454  
 1455  
 1456  
 1457  
 1458  
 1459  
 1460  
 1461  
 1462  
 1463  
 1464  
 1465  
 1466  
 1467  
 1468  
 1469  
 1470  
 1471  
 1472  
 1473  
 1474  
 1475  
 1476  
 1477  
 1478  
 1479  
 1480  
 1481  
 1482  
 1483  
 1484  
 1485  
 1486  
 1487  
 1488  
 1489  
 1490  
 1491  
 1492  
 1493  
 1494  
 1495  
 1496  
 1497  
 1498  
 1499  
 1500  
 1501  
 1502  
 1503  
 1504  
 1505

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

```

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
        JSR %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
        JMP STARO ;START PRINTING
    
```

; START FOR KW11-P.....

```

KW11P: CMP #176,SWR ;S/W SWR ?
        BNE 15 ;NO- CONTINUE
        JSR 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
1507 002650 022737 000176 001004 KW11L:
1508 002656 001002 CMP #176, SWR ;S/W SWR ?
1509 002660 004737 011762 BNE 15 ;NO- CONTINUE
1510 002664 JSR PC, ENABL ;ENABLE KEYBOARD INTERRUPT
1511 002664 005037 001042 15:
1512 002670 004437 011472 CLR LINCNT ;CLEAR LINE COUNT
1513 002674 012706 001000 JSR %4, TYPINT
1514 002700 013737 003246 003250 MOV #1000, %6 ;RESET STACK
1515 002706 013737 001026 003252 MOV MINCNT, CNTR ;SET CLOCK COUNT
1516 002714 012777 000100 176104 MOV LKS, DIA ;STORE LKS ADDRESS
1517 MOV #100, @LKS ;ENABLE CLOCK INTERRUPT
1518
1519 ;PRINTING ROUTINE.....
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, CYCNT ;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 BR 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 STARED ;BRANCH IF DONE LINE
1542 003074 005337 001044 DEC CYCNT ;DECREMENT CYCLE COUNT
1543 003100 001367 BNE STAR1 ;CONTINUE IF NOT DONE GROUP
1544 003102 062737 000002 001054 ADD #2, STRCHR ;ADD 2 TO TABLE POINTER
1545 003110 000137 003016 JMP STARA ;CONTINUE
1546 003114 005237 001042 STARED: INC LINCNT ;INCREMENT LINE COUNT
1547 003120 012777 000012 175654 MOV #12, @LPB ;SEND LF
1548 003126 105777 175646 TSTB @LPS ;TEST READY
1549 003132 100375 BPL -4 ;WAIT FOR READY
1550 003134 032777 000001 175642 BIT #BIT0, @SWR ;STOP PRINT?
1551 003142 001450 BEQ CONVRT ;YES, BRANCH
1552 003144 000137 002772 JMP STAROB ;CONTINUE
1553
1554 ;LP14 PRINTING ROUTINE
1555
1556 003150 012737 000204 001036 TIMTST: MOV #132, CHRCNT ;SET CHARACTER COUNT
1557 003156 005337 001054 DEC STRCHR ;GET NEXT STARTING CHARACTER
1558 003162 023727 001054 000040 CMP STRCHR, #40 ;LEGAL CHARACTER ?
1559 003170 100003 BPL 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      ;LEGAL CHARACTER ?
1563 003214 100003                BPL      15          ;YES-CONTINUE
1564 003216 063737 001062 001040      ADD      NUMCHR,CHRGEN ;NO-MAKE LEGAL
1565 003224 013777 001040 175550 15:  MOV      CHRGEN,@LPB   ;SEND CHARACTER
1566 003232 005337 001036                DEC      CHRcnt      ;DECREMENT CHARACTER COUNT
1567 003236 001726                BEQ      STARED     ;LINE FINISHED
1568 003240 005337 001040                DEC      CHRGEN     ;GET NEXT CHARACTER
1569 003244 000760                TMTST1: BR       TMTST2 ;CONTINUE
1570
1571
1572 003246 007020                MINCNT: 7020
1573 003250 000000                CNTR:   0
1574 003252 000002                DIA:   2
1575
1576
1577
1578                ;NOTE -- PLACE 5670 (8)  IN MINCNT FOR 50 HZ. LINE FREQUENCY !!!
1579
1580                ;LINE CLOCK SERVICE ROUTINE FOR KW11-L
1581 003254 005337 003250                LKSRV: DEC      CNTR      ;DECREMENT COUNTER
1582 003260 001401                BEQ      CONVRT     ;EXIT IF 1 MINUTE
1583 003262 000002                RTI          ;RETURN
1584
1585
1586                ;ROUTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE
1587
1588 003264 042777 000100 177760  CONVRT: BIC      #100,@DIA ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
1589 003272 005037 011636                CLR      TYPDAT     ;CLEAR DIGIT COUNT
1590 003276 012703 013575                MOV      #MES12,%3  ;SET MESSAGE POINTER
1591 003302 022737 000144 001042 15:  CMP      #100,LINcnt ;GREATER THAN 100?
1592 003310 003006                BGT      25         ;NO, PRINT HUNDRED'S DIGIT
1593 003312 162737 000144 001042      SUB      #100,LINcnt ;YES, SUBTRACT 100
1594 003320 005237 011636                INC      TYPDAT     ;INCREMENT HUNDRED'S DIGIT
1595 003324 000766                BR       15         ;CONTINUE CONVERSION
1596 003326 062737 000060 011636 25:  ADD      #60,TYPDAT  ;MAKE ASCII
1597 003334 113723 011636                MOVb    TYPDAT,(%3)+ ;STORE DIGIT
1598 003340 005037 011636                CLR      TYPDAT     ;CLEAR DIGIT COUNTER
1599 003344 022737 000012 001042 35:  CMP      #10,LINcnt ;GREATER THEN 10?
1600 003352 003006                BGT      45         ;NO, PRINT DIGIT
1601 003354 162737 000012 001042      SUB      #10,LINcnt ;YES, SUBTRACT 10
1602 003362 005237 011636                INC      TYPDAT     ;INCREMENT TEN'S DIGIT
1603 003366 000766                BR       35         ;CONTINUE CONVERSION
1604 003370 062737 000060 011636 45:  ADD      #60,TYPDAT  ;MAKE ASCII
1605 003376 113723 011636                MOVb    TYPDAT,(%3)+ ;STORE DIGIT
1606 003402 013737 001042 011636      MOV      LINcnt,TYPDAT ;GET ONE'S DIGIT
1607 003410 062737 000060 011636      ADD      #60,TYPDAT  ;MAKE ASCII
1608 003416 113723 011636                MOVb    TYPDAT,(%3)+ ;STORE DIGIT
1609 003422 104000                EMT      +0         ;TYPE MESSAGE
1610 003424 013536                MES11                ;TYPE PRINT SPEED
1611 003426 012737 013534 011470      MOV      #MES11A,PRMSG ;SET PRINTER MESSAGE ADDRESS
1612 003434 004437 011452                JSR      %4,RINT    ;PRINT PRINTER SPEED ON LINE PRINTER
1613 003440 000137 003464                JMP      SLEWCK     ;NEXT TEST
1614
1615
1616
1617 003444 000040                PATTB: 40
  
```

1618	003446	000117				117		
1619	003450	000076				76		
1620	003452	000055				55		
1621	003454	000134				134		
1622	003456	000113				113		
1623	003460	000072				72		
1624	003462	000051				51		
1625								
1626								
1627								:CHECK TOP OF FORM SWITCH
1628	003464							
1629	003464	022737	000176	001004	SLEWCK:	CMP	#176, SWR	:S/W SWR ?
1630	003472	001002				BNE	15	:NO- CONTINUE
1631	003474	004737	011762			JSR	PC, ENABL	:ENABLE KEYBOARD INTERRUPT
1632	003500				15:			
1633	003500	004437	011472			JSR	%4, TYPINT	
1634	003504	004537	011332			JSR	%5, PRTINT	:INITIALIZE PRINTER
1635	003510	000406				BR	SLW	:BRANCH IF OK
1636	003512	012737	000024	001052	ERR24:	MOV	#24, ERCOUNT	:SET UP ERROR COUNT 24
1637		000025				N=N+1		
1638	003520	004537	011722			JSR	%5, STAER	:REPORT PRINTER NOT READY
1639	003524	000000				HALT		:HALT ON ERROR
1640	003526	012737	003742	001042	SLW:	MOV	#FFTAB, LINCNT	:LINE COUNT FOR SWITCH SETTING
1641	003534	012704	004020			MOV	#FFSET, %4	:INIT SWITCH SETTING TABLE POINTER
1642	003540	012703	013310		SLW0:	MOV	#MESS, %3	:INIT MESSAGE POINTER
1643	003544	012702	013423			MOV	#MES10, %2	: " " " "
1644	003550	111413			SLW1:	MOVB	(%4), (%3)	:PUT SWITCH SETTINGS INTO MESSAGES
1645	003552	111412				MOVB	(%4), (%2)	: " " " "
1646	003554	122423				CMPB	(%4)+, (%3)+	:INCREMENT POINTERS
1647	003556	105722				TSTB	(%2)+	
1648	003560	105714				TSTB	(%4)	:DONE MOVING SWITCH SETTINGS TO MSG'S?
1649	003562	001372				BNE	SLW1	:BRANCH IF NOT DONE
1650	003564	005204				INC	%4	:TABLE POINTER SET FOR NEXT SWITCH SETTING
1651	003566	104000				EMT	+0	:TYPE MESSAGE
1652	003570	013254				MES7		:SET TOP OF FORM SWITCH TO ---
1653	003572	000000				HALT		:WAIT FOR OPERATOR TO SET SWITCH
1654	003574	005777	175242		SLW11:	TST	@LINCNT	:CHECK LINE COUNT
1655	003600	001003				BNE	SLW1A	:BRANCH IF NOT ZERO
1656	003602	012737	013624	011470		MOV	#MES13, PRTMSG	:CHANGE PRINTER MESSAGE
1657	003610	005777	175164		SLW1A:	TST	@LPS	:TEST FOR ERRORS
1658	003614	100006				BPL	SLW2	:BRANCH IF NO ERROR
1659	003616	012737	000025	001052	ERR25:	MOV	#25, ERCOUNT	:SET UP ERROR COUNT 25
1660		000026				N=N+1		
1661	003624	004537	011722			JSR	%5, STAER	:REPORT ERROR SET
1662	003630	000000				HALT		:HALT ON ERROR
1663	003632	012777	000014	175142	SLW2:	MOV	#14, @LPB	:SEND FF
1664	003640	105777	175134			TSTB	@LPS	:TEST READY
1665	003644	100375				BPL	-4	:WAIT FOR READY
1666	003646	004437	011452			JSR	%4, RINT	:PRINT MESSAGE ON LINE PRINTER
1667	003652	062737	000002	001042		ADD	#2, LINCNT	:NEXT LINE COUNT
1668	003660	022737	004016	001042		CMP	#FTABE, LINCNT	:DONE TEST?
1669	003666	001410				BEQ	DAVAV	:YES, EXIT
1670	003670	005777	175146			TST	@LINCNT	:DONE CHECK OF THIS SWITCH SETTING?
1671	003674	001721				BEQ	SLW0	:YES, NEXT SWITCH SETTING
1672	003676	012737	013326	011470		MOV	#MES9, PRTMSG	:NO, CHECK THIS SETTING
1673	003704	000137	003574			JMP	SLW11	:CONTINUE

```

1674 003710 013737 014604 013310 DAVAV: MOV      TN013,MES8
1675 003716 104000                EMT      +0
1676 003720 013252                MES7A
1677 003722 000000                HALT
1678 003724 032777 040000 175052 BIT      #BIT14,DSWR
1679 003732 001060                BNE     INDAT
1680 003734 000000                HALT
1681 003736 000137 004562                JMP     TEST2
1682
1683 003742 000000                FFTAB:  0
1684 003744 000022                18.
1685 003746 000000                0
1686 003750 000025                21.
1687 003752 000000                0
1688 003754 000030                24.
1689 003756 000000                0
1690 003760 000041                33.
1691 003762 000000                0
1692 003764 000044                36.
1693 003766 000000                0
1694 003770 000052                42.
1695 003772 000000                0
1696 003774 000060                48.
1697 003776 000000                0
1698 004000 000063                51.
1699 004002 000000                0
1700 004004 000102                66.
1701 004006 000000                0
1702 004010 000110                72.
1703 004012 000000                0
1704 004014 000124                84.
1705 004016 000000                FTAB:  0
1706
1707
1708 004020 020063 000040                FFSET:  ASCIZ  /3 /
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                :CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1726 004074 022737 000176 001004 INDAT:
1727 004102 001002                CMP     #176,SWR
1728 004104 004737 011762                BNE     18
1729 004110                JSR     PC,ENABL
    
```

```

;SET MESSAGE
;TYPE MESSAGE
;RESET TOP OF FORM SWITCH
;WAIT FOR OPERATOR
;DAVFU AVAILABLE?
;YES, DO DAVFU TESTS
;DONE OPERATOR TESTS - HALT
;DEPRESS CONTINUE TO START PRINTING TESTS

;LOOP COUNTS FOR SLEW CHECKS
    
```

```

;SWITCH SETTINGS FOR MESSAGES
    
```

```

;S/W SWR ?
;NO- CONTINUE
;ENABLE KEYBOARD INTERRUPT
    
```

```

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

```

1786 004362 001405          BEQ      NODATA          ; BRANCH IF DONE
1787 004364 105777 174410   TSTB    @LPS            ; TEST READY
1788 004370 100375          BPL     -4              ; WAIT FOR READY
1789 004372 000137 004314   JMP     NODD            ;
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, ERRCOUNT ; SET UP ERROR COUNT 31
1797 000032          N=N+1
1798 004432 004537 011722          JSR    %5, STAER       ; REPORT ERROR NOT SET
1799 004436 000000          HALT   ; HALT ON ERROR
1800 004440 000137 004306          JMP    NODD            ; RETEST
1801 004444 005237 001054          NODAT1: INC   STRCHR      ; NEXT PAPER INSTRUCTION
1802 004450 022737 000214 001054   CMP    #214, STRCHR    ; DONE TEST?
1803 004456 001404          BEQ    NODAT2          ; CONTINUE IF NOT DONE
1804 004460 104000          EMT    +0              ; TYPE MESSAGE
1805 004462 012467          MESB   ; ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1806 004464 000000          HALT   ; WAIT FOR OPERATOR
1807 004466 000707          BR     NODD            ; 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          ; TEST 2
1840          ; TESTS INTERFACE AND PRINTER DATA PATHS
1841          ; WITH ALTERNATING ONES AND ZEROS
    
```

```

1842
1843 004562
1844 004562 022737 000176 001004 TEST2:
1845 004570 001002 CMP #176, SWR ;S/W SWR ?
1846 004572 004737 011762 BNE 15 ;NO- CONTINUE
1847 004576 15: JSR PC, ENABL ;ENABLE KEYBOARD INTERRUPT
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, CYCCNT ;SET UP LINE COUNT FOR 32 LINES
1860 004644 012737 177574 001036 MOV #-132, CHRCNT ;SET CHAR COUNT TO 132
1861 004652 013737 004726 001054 MOV SCHRSW, STRCHR ;SET CHAR. SWITCH TO U
1862 004660 005777 174114 T3A: TST @LPS ;TEST FOR ERROR
1863 004664 100006 BPL LP2B ;NO ERROR CONTINUE
1864 004666 012737 000033 001052 ERR33: MOV #33, ERCOUNT ;SET UP ERROR COUNT 33
1865 000034 N=N+1
1866 004674 004537 011722 JSR %5, STAER ;REPORT ERROR SET
1867 004700 000000 HALT ;HALT ON ERROR
1868 004702 000177 174146 LP2B: JMP @STRCHR ;LOAD CHAR
1869 004706 013737 004730 001054 T2A: MOV RCHRSW, STRCHR ;RESET CHAR. SWITCH
1870 004714 012737 000125 001050 MOV #125, SAVE ;STORE CHAR
1871 004722 000137 004746 JMP T5A ;LOAD CHAR
1872
1873 004726 004706 SCHRSW: T2A
1874 004730 004732 RCHRSW: T1A
1875
1876 004732 013737 004726 001054 T1A: MOV SCHRSW, STRCHR ;SET CHAR. SWITCH TO U
1877 004740 012737 000052 001050 MOV #52, SAVE ;STORE CHAR
1878 004746 013777 001050 174026 T5A: MOV SAVE, @LPB ;LOAD BUFFER
1879 004754 005237 001036 INC CHRCNT ;INC CHARACTER COUNT
1880 004760 001337 BNE T3A ;CONTINUE
1881 004762 012777 000012 174012 MOV #12, @LPB ;SEND LF
1882 004770 105777 174004 TSTB @LPS ;TEST READY
1883 004774 100375 BPL -4 ;WAIT FOR READY
1884 004776 012737 177574 001036 MOV #-132, CHRCNT ;RESET CHAR COUNT
1885 005004 005237 001044 INC CYCCNT ;INC CYCLE COUNT
1886 005010 001356 BNE T5A ;CONTINUE IF NOT DONE
1887 005012 032777 010000 173764 BIT #BIT12, @SWR ;LOOP ON TEST?
1888 005020 001260 BNE TEST2 ;LOOP
1889
1890 ;TEST 3
1891 ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1892 ;ALL CHARACTERS AND ILLEGAL CHARACTERS
1893
1894 005022 TEST3:
1895 005022 022737 000176 001004 CMP #176, SWR ;S/W SWR ?
1896 005030 001002 BNE 15 ;NO- CONTINUE
1897 005032 004737 011762 JSR PC, ENABL ;ENABLE KEYBOARD INTERRUPT
    
```

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	T2B0:		MOV	#-132, CHRCNT	; SET CHAR COUNT FOR 132
1906	005074	012737	000040	001040	T2B0A:		MOV	#40, CHRCNT	; SET FIRST CHAR.
1907	005102	005777	173672		T2B1:		TST	@LPS	; DOES THE PRINTER HAVE AN ERROR
1908	005106	100006					BPL	LP2E	; BRANCH IF NO ERROR
1909	005110	012737	000034	001052	ERR34:		MOV	#34, ERCOUNT	; SET UP ERROR 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, @LPS	; PRINT CHARACTER
1914	005132	005237	001036				INC	CHRCNT	; INC. CHAR. COUNT
1915	005136	001420					BEQ	T2B2	; BRANCH IF LINE IS FINISHED
1916	005140	005237	001040				INC	CHRCNT	; NEXT CHAR
1917	005144	032777	020000	173632			BIT	#BIT13, @SWR	; CHECK CHAR SET
1918	005152	001405					BEQ	T2B2B	; BRANCH IF 64 CHARS
1919	005154	022737	000200	001040			CMP	#200, CHRCNT	; LEGAL CHAR?
1920	005162	001744					BEQ	T2B0A	; MAKE SPACE IF ILLEGAL
1921	005164	000746					BR	T2B1	; CONTINUE IF LEGAL CHAR
1922	005166	022737	000140	001040	T2B2B:		CMP	#140, CHRCNT	; LEGAL CHAR?
1923	005174	001737					BEQ	T2B0A	; MAKE SPACE IF ILLEGAL
1924	005176	000741					BR	T2B1	; CONTINUE IF LEGAL CHAR
1925	005200	012777	000012	173574	T2B2:		MOV	#12, @LPS	; 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		T2B3:		TST	@LPS	; TEST FOR ERROR
1930	005224	100006					BPL	LDCH	; BRANCH IF NO ERROR
1931	005226	012737	000035	001052	ERR35:		MOV	#35, ERCOUNT	; SET UP ERROR COUNT 35
1932		000036					N=N+1		
1933	005234	004537	011722				JSR	%5, STAER	; REPORT ERROR SET
1934	005240	000000					HALT		; HALT ON ERROR
1935	005242	013777	001040	173532	LDCH:		MOV	CHRCNT, @LPS	; TRANSMIT CHARACTER
1936	005250	005237	001040		T2B4:		INC	CHRCNT	; NEXT CHAR
1937	005254	022737	000012	001040			CMP	#12, CHRCNT	; TEST FOR LINE FEED
1938	005262	001772					BEQ	T2B4	; SKIP IF LF
1939	005264	022737	000014	001040			CMP	#14, CHRCNT	; TEST FOR FORM FEED
1940	005272	001766					BEQ	T2B4	; SKIP IF FF
1941	005274	022737	000015	001040			CMP	#15, CHRCNT	; TEST FOR CARRIAGE RETURN
1942	005302	001762					BEQ	T2B4	; SKIP IF CR
1943	005304	023727	001040	000040			CMP	CHRCNT, #40	; CHECK IF LEGAL CHAR



1944	005312	002753		
1945	005314	032777	020000	173462
1946	005322	001007		
1947	005324	052737	000100	001040
1948	005332	032737	000200	001040
1949	005340	001740		

BLT	LDCH
BIT	#81713, @SWR
BNE	T285
BIS	#100, CHGEN
BIT	#200, CHGEN
BEG	LDCH

:CONTINUE IF STILL ILLEGAL CHAR  
:CHECK CHAR SET  
:BRANCH IF 96 CHAR SET  
:SET BIT 7 IF NOT SET  
:DONE ILLEGAL CHARS?  
:BRANCH IF NOT DONE

1950	005342	012777	000012	173432	T285:	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	CYCCNT	:INCREMENT LINE COUNT
1954	005362	001241				BNE	T280	: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								:TEST 4
1959								:OVER PRINT TEST
1960								:OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES
1961								

1962 005374  
1963 005374 022737 000176 001004  
1964 005402 001002  
1965 005404 004737 011762  
1966 005410

CHRCHK:  
  
15:

CMP #176, SWR  
BNE 15  
JSR PC, ENABL

:S/W SWR ?  
:NO- CONTINUE  
:ENABLE KEYBOARD INTERRUPT

1967 005410 004437 011472

JSR 24.TYPINT

1968 005414 013737 014566 014050  
1969 005422 004437 011406  
1970 000005

MOV TN04,MES15  
JSR %4,PRNT  
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,CYCCNT	:SET UP CYCLE COUNT
1973	005442	013737	005604	001054	MOV	CHRE,STRCHR	:SET CHAR TAG TO SPACE

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

1988 005640 001422

BEQ CR5

;BRANCH IF FINISHED OVERPRINTS



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

MOV #15, @LPB  
TSTB @LPS  
BPL .-4

; SEND CR  
; TEST READY  
; WAIT FOR READY

1992	005556	000137	005450			JMP	CR	; OVERPRINT LINE
1993	005562	013737	005602	001054	CR7:	MOV	CHRS, STRCHR	; RESET CHAR SWITCH
1994	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	173166	CR5:	MOV	#12, @LPB	; SEND LF
2000	005614	105777	173160			TSTB	@LPS	; TEST READY
2001	005620	100375				BPL	-4	; WAIT FOR READY
2002	005622	012737	177776	001044		MOV	#-2, CYCNT	; RESET CYCLE COUNT
2003	005630	012737	177574	001036		MOV	#-132, CHRCNT	; RESET CHAR COUNT
2004	005636	005237	001042			INC	LINCNT	; INCREMENT LINE COUNT
2005	005642	001326				BNE	CR3	; BRANCH IF NOT DONE
2006	005644	032777	010000	173132		BIT	#BIT12, @SWR	; LOOP ON TEST?
2007	005652	001250				BNE	CHRCHK	; YES, LOOP

2008  
2009  
2010  
2011  
2012  
2013

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

```

2014
2015 ;PAIR OF E'S TO THE LINE --- THIS IS REPEATED UNTIL A FULL LINE OF E'S
2016 ;HAVE BEEN PRINTED, THEN A FULL LINE OF M'S ARE PRINTED.
2017 005654
2018 005654 022737 000176 001004 OVRPRT:
2019 005662 001002 CMP #176,SWR ;S/W SWR ?
2020 005664 004737 011762 BNE 15 ;NO- CONTINUE
2021 005670 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
2022 005670 004437 011472 15:
2023 005674 013737 014570 014050 JSR %4,TYPINT
2024 005702 004437 011406 JSR TN05,MES15 ;SET TEST NUMBER FOR MESSAGE
2025 000006 M=M+1 JSR %4,PRNNT ;PRINT TEST NUMBER
2026 005706 012737 177760 001042 MOV #-16.,LINCNT ;SET LINE COUNT FOR 16 LINES
2027 005714 012737 177574 001036 OVR: MOV #-132.,CHRCNT ;SET CHAR COUNT
2028 005722 012737 177776 001044 OVRD: MOV #-2.,CYCCNT ;SET CYCLE COUNT FOR A PAIR OF E'S
2029 005730 013737 001036 001056 MOV CHRCNT,STRCNT ;NO. CHARS LEFT TO PRINT
2030 005736 062737 000205 001056 ADD #133.,STRCNT ;NO. SPACES +1
2031 005744 012737 000940 001040 MOV #40,CHRCNT ;SEND SPACE
2032 005752 000406 BR OVR2 ;BRANCH
2033 005754 012737 000105 001040 OVR4: MOV #105,CHRCNT ;SEND E
  
```

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

2042 006016 003361

BGT OVR1

:BRANCH IF NOT DONE SPACES

2043 006020 001755  
2044 006022 005237 001036  
2045 006026 001437  
2046 006030 005237 001044

OVR5:

BEG OVR4  
INC CHRCNT  
BEG OVR8  
INC CYCCNT

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

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



2062	006122	000137	005770			JMP	OVR2	:PRINT LINE OF M'S
2063	006126	012777	000012	172646	OVR8:	MOV	#12, @LPB	:SEND LF

2064 006134 000137 006044

JMP OVR6

; CONTINUE

```
2065 006140 032777 010000 172636 OVREXT: BIT #BIT12,@SWR ;LOOP ON TEST?  
2066 006146 001242 BNE OVRPRT ;LOOP  
2067  
2068 ;TEST 6  
2069 ;PRINT CONTROL TEST  
2070 ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET  
2071 ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED  
2072  
2073 006150 PRTCTL:  
2074 006150 022737 000176 001004 CMP #176,SWR ;S/W SWR ?  
2075 006156 001002 BNE 15 ;NO- CONTINUE  
2076 006160 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT  
2077 006164  
2078 006164 004437 011472 JSR %4,TYPINT
```

2079	006170	013737	014572	014050		MOV	TN06, MES15		
2080	006176	004437	011406			JSR	%4, PRNNT		; SET TEST NUMBER FOR MESSAGE
2081		000007				M=M+1			; PRINT TEST NUMBER
2082	006202	012737	000060	001054		MOV	#60, STRCHR		; FIRST START CHAR
2083	006210	032777	020000	172566	PRT0:	BIT	#BIT13, @SWR		; TEST FOR CHAR SET
2084	006216	001404				BEG	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	@LPS		; TEST FOR ERROR
2091	006256	100006				BPL	PRT4		; BRANCH IF NO ERROR
2092	006260	012737	000040	001052	ERR40:	MOV	#40, ERCOUNT		; SET UP ERROR COUNT 40
2093		000041				N=N+1			
2094	006266	004537	011722			JSR	%5, STAER		; REPORT ERROR SET
2095	006272	000000				HALT			; HALT ON ERROR
2096	006274	013777	001040	172500	PRT4:	MOV	CHRCNT, @LPB		; LOAD BUFFER
2097	006302	005237	001036			INC	CHRCNT		; INCREMENT CHAR COUNT
2098	006306	002761				BLT	PRT3		; BRANCH IF NOT 132 CHARS
2099	006310	001433				BEG	PRTA		; 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	PRTA: MOV	#41, CHRGEN	: GET FIRST CHAR IN SET
2115	006406	000137	006252		JMP	PRT3	: START OVERFLOW
2116	006412	012737	000066	001054	PRT6: MOV	#66, STRCHR	: SET START CHAR TO 6
2117	006420	000137	006210		JMP	PRT0	: CONTINUE
2118	006424	012737	000040	001054	PRT7: MOV	#40, STRCHR	: SET START CHAR TO SPACE
2119	006432	000137	006210		JMP	PRT0	: CONTINUE
2120	006436	032777	010000	172340	PRT8: BIT	#BIT12, @SWR	: CHECK LOOP ON TEST
2121	006444	001241			BNE	PRTCTL	: LOOP
2122							
2123							
2124							
2125							
2126							
2127							
2128	006446						
2129	006446	022737	000176	001004	MLF: CMP	#176, SWR	: S/W SWR ?
2130	006454	001002			BNE	15	: NO- CONTINUE
2131	006456	004737	011762		JSR	PC, ENABL	: ENABLE KEYBOARD INTERRUPT
2132	006462						
2133	006462	004437	011472		15: JSR	%4, TYPINT	
2134	006466	013737	014574	014050	MOV	TN07, MES15	: SET TEST NUMBER FOR MESSAGE
2135	006474	004437	011406		JSR	%4, PRNNT	: PRINT TEST NUMBER
2136		000010			M=M+1		
2137	006500	012737	006632	001054	MOV	#TABSTR, STRCHR	: FIRST CHAR
2138	006506	012737	177574	001036	MLFA: MOV	#-132, CHRCNT	: SET CHAR COUNT
2139	006514	117737	172334	001040	MOVB	@STRCHR, CHRGEN	: GET CHAR
2140	006522	001452			BEQ	MLF4	: BRANCH IF DONE
2141	006524	005777	172250		MLFO: TST	@LPS	: TEST FOR ERROR
2142	006530	100006			BPL	MLF1	: CONTINUE IF NO ERROR
2143	006532	012737	000041	001052	ERR41: MOV	#41, ERCOUNT	: SET UP ERROR COUNT 41
2144		000042			N=N+1		
2145	006540	004537	011722		JSR	%5, STAER	: REPORT ERROR
2146	006544	000000			HALT		: HALT ON ERROR
2147	006546	013777	001040	172226	MLF1: MOV	CHRGEN, @LPB	: LOAD BUFFER
2148	006554	005237	001036		INC	CHRCNT	: INCREMENT CHAR COUNT
2149	006560	001361			BNE	MLFO	: CONTINUE
2150	006562	117737	172266	001042	MOVB	@STRCHR, LINCNT	: GET ASCII LINE COUNT
2151	006570	042737	177770	001042	BIC	#177770, LINCNT	: MAKE OCTAL
2152	006576	005237	001042		INC	LINCNT	: ADD 1
2153	006602	012777	000012	172172	MLF2: MOV	#12, @LPB	: SEND LF
2154	006610	105777	172164		TSTB	@LPS	: TEST READY
2155	006614	100375			BPL	-4	: WAIT FOR READY
2156	006616	005337	001042		DEC	LINCNT	: DECREMENT LINE COUNT

: TEST 7  
 : MULTIPLE LINE ADVANCE TEST  
 : TESTS MULTIPLE LINE ADVANCES AND TIMINGS  
 : PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER

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
2170
2171          ;TEST 8
2172          ;HIGH SPEED PRINT TEST
2173
2174 006660          HSPRT:
2175 006660 022737 000176 001004      CMP      #176,SWR      ;S/W SWR ?
2176 006666 001002          BNE      15           ;NO- CONTINUE
2177 006670 004737 011762          JSR      PC,ENABL     ;ENABLE KEYBOARD INTERRUPT
2178 006674          15:
2179 006674 004437 011472          JSR      %4,TYPINT
2180 006700 013737 014576 014050      MOV      TN010,MES15  ;SET TEST NUMBER FOR MESSAGE
2181 006706 004437 011406          JSR      %4,PRNNT     ;PRINT TEST NUMBER
2182      000011          M=M+1
2183 006712 032777 002000 172064      BIT      #BIT10,@SWR  ;CHECK FOR NEW DRUM / OLD DRUM
2184 006720 001135          BNE      NHSPRT       ;BRANCH IF NEW DRUM
2185 006722 032777 020000 172054      BIT      #BIT13,@SWR  ;CHECK CHAR SET
2186 006730 001007          BNE      HS00A        ;BRANCH IF 96 CHAR SET
2187 006732 012737 000140 001060      MOV      #140,LEGCHR  ;LEGAL CHK
2188 006740 012737 000100 001062      MOV      #100,NUMCHR  ;#CHARS
2189 006746 000406          BR      HS00          ;CONTINUE
2190 006750 012737 000200 001060      HS00A: MOV      #200,LEGCHR  ;LEGAL CHECK
2191 006756 012737 000140 001062      MOV      #140,NUMCHR  ;#CHARS
2192 006764 012737 000040 001054      HS00:  MOV      #40,STRCHR ;SET UP FIRST LINE
2193 006772 012737 000177 001042      MOV      #127, LINCNT ;SET LINE COUNT FOR 2 PAGES
2194 007000 012737 177574 001036      HS0:   MOV      #-132, CHRCNT ;SET CHAR COUNT
2195 007006 012737 177757 001044      MOV      #-17, CYCCNT ;SET GROUP COUNT
2196 007014 013737 001054 001040      MOV      STRCHR,CHRGEN ;STORE START CHAR
2197 007022 005777 171752          HS1:   TST      @LPS      ;TEST FOR ERROR
2198 007026 100006          BPL      HS2          ;BRANCH IF NO ERROR
2199 007030 012737 000042 001052      ERR42: MOV      #42, ERRCOUNT ;SET UP ERROR COUNT 42
2200      000043          N=N+1
2201 007036 004537 011722          JSR      %5,STAER     ;REPORT ERROR SET
2202 007042 000000          HALT          ;HALT ON ERROR
2203 007044 013777 001040 171730      HS2:   MOV      CHRGEN,@LPB ;LOAD BUFFER
2204 007052 005237 001036          INC      CHRCNT       ;INCREMENT CHAR COUNT
2205 007056 001424          BEQ      HS4          ;BRANCH IF DONE LINE
2206 007060 005237 001040          INC      CHRGEN       ;NEXT CHAR
2207 007064 005237 001044          INC      CYCCNT       ;INCREMENT GROUP COUNT
2208 007070 001410          BEQ      HS3          ;BRANCH IF DONE GROUP
2209 007072 023737 001060 001040      CMP      LEGCHR,CHRGEN ;LEGAL CHAR?
2210 007100 001350          BNE      HS1          ;BRANCH AND CONTINUE IF LEGAL CHAR
2211 007102 163737 001062 001040      SUB      NUMCHR,CHRGEN ;MAKE LEGAL
2212 007110 006744          BR      HS1          ;CONTINUE
2213 007112 013737 001054 001040      HS3:   MOV      STRCHR,CHRGEN ;GET FIRST CHAR IN GROUP
2214 007120 012737 177757 001044      MOV      #-17, CYCCNT ;RESET CYCLE COUNT
    
```

```

2215 007126 000735          BR      HS1      ;CONTINUE
2216 007130 012777 000012 171644 HS4:  MOV      #12, @LPB ;SEND LF
2217 007136 105777 171636      TSTB    @LPS    ;TEST READY
2218 007142 100375          BPL     .-4     ;WAIT FOR READY
2219 007144 005337 001042      DEC     LINCNT ;DECREMENT LINE COUNT
2220 007150 002413          BLT     HS6     ;EXIT TEST IF DONE
2221 007152 162737 000004 001054  SUB     #4, STRCHR ;SKIP 4 LINES ON DRUM, FIND START CHAR
2222 007160 022737 000040 001054  CMP     #40, STRCHR ;START CHAR A LEGAL CHAR?
2223 007166 003704          BLE     HSO     ;CONTINUE IF LEGAL START CHAR
2224 007170 063737 001062 001054  ADD     NUMCHR, STRCHR ;MAKE LEGAL AND CONTINUE
2225 007176 000700          BR      HSO     ;CONTINUE
2226 007200 032777 010000 171576 HS6:  BIT     #BIT12, @SWR ;LOOP ON TEST?
2227 007206 001224          BNE     HSPRT  ;LOOP
2228
2229
2230 007210 000137 007460          JMP     SNGCHR ;JUMP TO TEST 9 AFTER COMPLETION
2231
2232
2233          ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
2234
2235 007214 032777 020000 171562 NHSVRT: 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 FIRSTLINE
2245 007272 012737 000177 001042      MOV     #127, LINCNT ;SET LINE COUNT FOR 2 PAGES
2246 007300 012737 177574 001036 NHS0:  MOV     #-132, CHR CNT ;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          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
2272 007450 032777 010000 171326 NHS6: BR NHSO ;CONTINUE
2273 007456 001256 BIT #BIT12,@SWR ;LOOP ON TEST
2274 BNE NHSVRT ;LOOP
2275
2276 ;TEST 9
2277 ;WORST CASE NOISE TEST
2278 ;SINGLE CHAR. ACROSS ALL COLS.
2279 007460 SNGCHR:
2280 007460 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
2281 007466 001002 BNE 15 ;NO- CONTINUE
2282 007470 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
2283 007474 15:
2284 007474 004437 011472 JSR %4,TYPINT
2285 007500 013737 014600 014050 MOV TN011,MES15 ;SET TEST NUMBER FOR MESSAGE
2286 007506 004437 011406 JSR %4,PRNNT ;PRINT TEST NUMBER
2287 000012 M=M+1
2288 007512 032777 020000 171264 BIT #BIT13,@SWR ;TEST CHAR SET
2289 007520 001404 BEQ S2 ;BRANCH IF 64
2290 007522 012737 177640 001042 MOV #-96.,LINCNT ;96 CHAR.
2291 007530 000403 BR .+10 ;BRANCH
2292 007532 012737 177700 001042 S2: MOV #-64.,LINCNT ;64 CHAR.
2293 007540 012737 000040 001040 MOV #40,CHRCNT ;SET UP SPACE
2294 007546 012737 177574 001036 S2A: MOV #-132.,CHRCNT ;SET CHAR COUNT FOR 132
2295 007554 005777 171220 S1: TST @LPS ;TEST FOR ERRORS
2296 007560 100006 BPL XS1X ;BRANCH IF NO ERRORS
2297 007562 012737 000044 001052 ERR44: MOV #44, ERCCOUNT ;SET UP ERROR COUNT 44
2298 000045 N=N+1
2299 007570 004537 011722 JSR %5,STAER ;REPORT ERROR
2300 007574 000000 HALT ;HALT ON ERROR
2301 007576 013777 001040 171176 XS1X: MOV CHRCNT,@LPB ;LOAD PRINTER BUFFER
2302 007604 005237 001036 INC CHRCNT ;INCREMENT CHAR COUNT
2303 007610 001361 BNE S1 ;CONTINUE IF NOT DONE LINE
2304 007612 012777 000012 171162 S4X2: MOV #12,@LPB ;ISSUE LINE FEED
2305 007620 105777 171154 TSTB @LPS ;TEST READY
2306 007624 100375 BPL .-4 ;WAIT FOR READY
2307 007626 005237 001040 INC CHRCNT ;+1 CHAR.
2308 007632 005237 001042 INC LINCNT ;+1 LINE COUNT
2309 007636 002743 BLT S2A ;CONTINUE IF NOT DONE
2310 007640 001764 BEQ S4X2 ;SEND BLANK LINE AT END OF TEST
2311 007642 032777 010000 171134 LPS7: BIT #BIT12,@SWR ;CHECK TO LOOP ON TEST
2312 007650 001303 BNE SNGCHR ;LOOP ON TEST
2313
2314
2315
2316 ;TEST 10
2317 ;DRUM PATTERN CHARACTER TEST
2318
2319 007652 ROTATE:
2320 007652 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
2321 007660 001002 BNE 15 ;NO- CONTINUE
2322 007662 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
2323 007666 15:
2324 007666 004437 011472 JSR %4,TYPINT
2325 007672 013737 014602 014050 MOV TN012,MES15 ;SET TEST NUMBER FOR MESSAGE
2326 007700 004437 011406 JSR %4,PRNNT ;PRINT TEST NUMBER
    
```

```

2327      000013      M=M+1
2328
2329 007704 032777 002000 171072      BIT      #BIT10,@SWR      ;CHECK FOR NEW 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      ROT0:    MOV      #177,LINCNT      ;LAST CHAR
2338 007756 012737 000200 001060      MOV      #200,LEGCHR      ;LEGAL CHK
2339 007764 012737 000140 001062      MOV      #140,NUMCHR      ;#CHARS
2340 007772 005037 001044      ROT1:    CLR      CYCCNT      ;CLEAR CYCLE COUNT
2341 007776 005237 001044      ROT2:    INC      CYCCNT      ;INC CYCLE COUNT
2342 010002 005037 001040      CLR      CHRGEN      ;CLEAR POINTER
2343 010006 005237 001040      ROT3:    INC      CHRGEN      ;INC POINTER
2344 010012 013737 001040 001054      MOV      CHRGEN,STRCHR      ;STORE POINTER
2345 010020 063737 001042 001054      ADD      LINCNT,STRCHR      ;FIND CHAR
2346 010026 023737 001054 001060      CMP      STRCHR,LEGCHR      ;LEGAL?
2347 010034 002403      BLT     ROT4      ;BRANCH IF LEGAL
2348 010036 163737 001062 001054      SUB      NUMCHR,STRCHR      ;MAKE LEGAL
2349 010044 005777 170730      ROT4:    TST     @LPS      ;TEST FOR ERRORS
2350 010050 100006      BPL     ROT5      ;BRANCH IF NO ERRORS
2351 010052 012737 000045 001052      ERR45:  MOV      #45, ERRCOUNT      ;SET UP ERROR COUNT 45
2352      000046      N=N+1
2353 010060 004537 011722      JSR     %5, STAER      ;REPORT ERROR
2354 010064 000000      HALT
2355 010066 013777 001054 170706      ROT5:    MOV      STRCHR,@LPB      ;LOAD BUFFER
2356 010074 023727 001040 000021      CMP      CHRGEN,#17      ;DONE GROUP?
2357 010102 001341      BNE     ROT3      ;NO GET NEXT CHAR
2358 010104 023727 001044 000010      CMP      CYCCNT,#8      ;DONE LINE?
2359 010112 001331      BNE     ROT2      ;NO, NEXT GROUP
2360 010114 012777 000012 170660      MOV      #12,@LPB      ;YES, SEND LF
2361 010122 105777 170652      TSTB   @LPS      ;TEST READY
2362 010126 100375      BPL     -4      ;WAIT FOR READY
2363 010130 005337 001042      DEC     LINCNT      ;DECREMENT LINE COUNT
2364 010134 023727 001042 000037      CMP      LINCNT,#37      ;DONE?
2365 010142 003313      BGT     ROT1      ;NO, NEXT LINE
2366 010144 032777 010000 170632      BIT      #BIT12,@SWR      ;LOOP ON TEST?
2367 010152 001237      BNE     ROTATE      ;LOOP
2368
2369 010154 000137 010412      JMP     LFTTR      ;JUMP TO TEST 11 AFTER COMPLETION
2370
2371
2372      ;NEW DRUM (LP14) PATTERN CHARACTER TEST
2373
2374 010160 032777 020000 170616      NROTAT: BIT      #BIT13,@SWR      ;TEST CHARACTER SET
2375 010166 001012      BNE     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       NROTO      ;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
    
```

```
2383 010236 012737 000040 001040 NROT1: MOV #40, CHGEN ;GET POINTER
2384 010244 005237 001040 NROT6: INC CHGEN ;SET POINTER
2385 010250 013737 001040 001054 MOV CHGEN, STRCHR ;STORE POINTER
2386 010256 005037 001036 CLR CHRCNT ;# CHARACTERS PRINTED
2387 010262 005237 001036 NROT2: INC CHRCNT ;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 @LPS ;TEST FOR ERRORS
2393 010316 100006 BPL NROT5 ;BRANCH IF NO ERRORS
2394 010320 012737 000046 001052 ERR46: MOV #46, ERCOUNT ;SET UP ERROR COUNT 46
2395 000047 N=N+1
2396 010326 004537 011722 JSR %5, STAER ;REPORT ERROR
2397 010332 000000 HALT
2398 010334 013777 001054 170440 NROT5: MOV STRCHR, @LPB ;LOAD BUFFER
2399 010342 023727 001036 000204 CMP CHRCNT, #132 ;LINE FINISHED?
2400 010350 001344 BNE NROT2 ;NO GET NEXT CHARACTER
2401 010352 012777 000012 170422 MOV #1, @LPB ;YES, SEND LINE FEED
2402 010360 105777 170414 TST @LPS ;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, @SWR ;LOOP ON TEST
2408 010410 001263 BNE NROTAT ;LOOP
2409
2410 ;TEST 11 ---- SPURIOUS HAMMER FIRING TEST
2411 ;LEFT AND RIGHT TRIANGLES
2412
2413 ; STARTING WITH A LEFT TRIANGLE
2414
2415 010412 LFTTR:
2416 010412 022737 000176 001004 CMP #176, SWR ;S/W SWR ?
2417 010420 001002 BNE 15 ;NO- CONTINUE
2418 010422 004737 011762 JSR PC, ENABL ;ENABLE KEYBOARD INTERRUPT
2419 010426 15
2420 010426 004437 011472 JSR %4, TYPINT
2421 010432 013737 014604 014050 MOV TN013, MES15 ;SET TEST NUMBER FOR MESSAGE
2422 010440 004437 011406 JSR %4, PRNNT ;PRINT TEST NUMBER
2423 000014 M=M+1
2424 010444 012737 000204 001042 LFT: MOV #132, LINCNT ;SET LINE COUNT
2425 010452 013737 001042 001036 LFT0: MOV LINCNT, CHRCNT ;STORE CHAR COUNT
2426 010460 012737 177757 001044 MOV #-17, CYCNT ;SET GROUP COUNT
2427 010466 013737 001036 001040 MOV CHRCNT, CHGEN ;FIND FIRST CHAR ON LINE...
2428 010474 022737 000022 001040 LFT1: CMP #18, CHGEN ;MORE THAN 17 CHARS?
2429 010502 003004 BGT LFT2 ;BRANCH IF LESS THAN 17
2430 010504 162737 000021 001040 SUB #17, CHGEN ;SUBTRACT 17, IF > 17
2431 010512 000770 BR LFT1 ;CONTINUE
2432 010514 005437 001040 LFT2: NEG CHGEN ;NEGATE CHGEN
2433 010520 062737 000100 001040 ADD #100, CHGEN ;START CHAR IN CHGEN
2434 010526 013737 001040 001054 MOV CHGEN, STRCHR ;STORE STARTING CHAR
2435 010534 005777 170240 LFT3: TST @LPS ;TEST FOR ERROR
2436 010540 100006 BPL LFT4 ;CONTINUE IF NO ERROR
2437 010542 012737 000047 001052 ERR47: MOV #47, ERCOUNT ;SET UP ERROR COUNT 47
2438 000050 N=N+1
```

```

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

Line	Address	Code	Count	Label	Instruction	Comment
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	HAMALN: CMP #176, SWR	: 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 TNO14, 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	001026	HAM1X: MOV #-132, CHRCNT	: SET CHAR COUNT
2519	011172	005777	167602		HAM2: TST @LPS	: CHECK FOR ERROR
2520	011176	100006			BPL XHAM1	: BRANCH IF NO ERROR
2521	011200	012737	000052	001052	ERP52: MOV #52, ERCOUNT	: SET UP ERROR COUNT 52
2522		000053			N=N+1	
2523	011206	004537	011722		JSR %5, STAER	: REPORT ERROR OCCURRED
2524	011212	000000			HALT	: HALT ON ERROR
2525	011214					
2526	011214	105777	167560		XHAM1: 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	XHAM1X: MOV #105, @LPB	: TRANSMIT E TO PRINTER
2530	011232	005237	001036		INC CHRCNT	: +1 CHAR COUNT
2531	011236	001355			BNE HAM2	: TRANSMIT ANOTHER CHAR.
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, @SWR	: 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		HAMX: MOV @#42, RC	
2545	011312	001405			BEQ DOAGN	
2546	011314	000005			RESET	
2547	011316					
2548	011316	004710			LOGICAL: JSR PC, (RO)	
2549	011320	000240			NOP	
2550	011322	000240			NOP	

```

2551 011324 000240
2552 011326
2553 011326 000137 004562
2554
2555
2556
2557
2558
2559
2560
2561
2562
2563
2564 011332 005777 167442
2565 011336 100403
2566 011340 105777 167434
2567 011344 100403
2568 011346 062705 000002
2569 011352 000205
2570 011354 012777 000014 167420
2571 011362 105777 167412
2572 011366 100003
2573 011370 062705 000002
2574 011374 000205
2575 011376
2576 011376 105777 167376
2577 011402 100375
2578 011404 000205
2579
2580
2581
2582
2583
2584 011406 012737 014032 011470
2585 011414 012746 000340
2586 011420 010746
2587 011422 062716 000006
2588 011426 000002
2589 011430 005777 167344
2590 011434 100006
2591 011436 012737 000053 001052
2592 000054
2593 011444 004537 011722
2594 011450 000000
2595 011452 013737 001000 001016
2596 011460 013737 001002 001012
2597 011466 104000
2598 011470 014032
2599 011472 012737 177564 001016
2600 011500 012737 177566 001012
2601 011506 012746 000000
2602 011512 010746
2603 011514 062716 000006
2604 011520 000002
2605 011522 000204
2606

DOAGN: NOP
JMP TEST2 ;RESTART

;MISC. ROUTINES

;ROUTINE TO INITIALIZE PRINTER
;ENTER FROM JSR %5, PRTINT
PRTINT: TST @LPS ;TEST FOR ERROR
        BMI PRTINO ;BRANCH IF ERROR
        TSTB @LPS ;TEST FOR READY
        BMI RDYOK ;READY SET OK
PRTINO: ADD #2,%5 ;SET UP FOR ERROR REPORT
        RTS %5 ;REPORT READY NOT SET
RDYOK: MOV #14,@LPB ;ISSUE FORM FEED
        TSTB @LPS ;TEST FOR READY NOT SET
        BPL NTRDY ;READY NOT SET OK
        ADD #2,%5 ;SET UP FOR REPORT
        RTS %5 ;EXIT AND REPORT
NTRDY: TSTB @LPS ;TEST READY
        BPL -4 ;WAIT FOR READY
        RTS %5 ;READY SET EXIT

;ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER
PRNNT: MOV #MES14,PRTMSG ;PRINT TEST NUMBER
        MOV #340,-(SP) ;LOCK OUT KEYBOARD INTERRUPTS
        MOV PC,-(SP) ;MOVE PRESENT LOCATION TO STACK
        ADD #6,(SP) ;SET UP FOR NEXT INSTRUCTION
        RTI ;LOAD PSW
TST @LPS ;TEST FOR ERROR
BPL RINT ;BRANCH IF OK
ERR53: MOV #53,ERCOUNT ;SET UP ERROR COUNT 53
        N=N+1
        JSR %5,STAER ;REPORT ERROR SET
        HALT ;HALT ON ERROR
RINT: MOV LPS,TPS ;SET VECTORS -
        MOV LPB,TPB ;TO PRINT ON LINE PRINTER
        EMT +J ;PRINT
PRTMSG: MES14 ;MESSAGE
TYPINT: MOV #177564,TPS ;RESET VECTORS
        MOV #177566,TPB ;FOR TTY
        MOV #0,-(SP) ;ALLOW KEYBOARD INTERRUPTS
        MOV PC,-(SP) ;MOVE PRESENT LOCATION TO STACK
        ADD #6,(SP) ;SET UP FOR NEXT INSTRUCTION
        RTI ;LOAD PSW
        RTS %4 ;RETURN
    
```

```

2607 ; SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
2608
2609 011524 011600 TYP: 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: MOVB (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 TYPA ; NEXT CHAR IN MESSAGE
2621 011572 113777 011636 167212 TYPD: MOVB TYPDAT,@TPB ; OUTPUT CHARACTER TO PRINTER
2622 011600 105777 167212 TYPDD: TSTB @TPS
2623 011604 100375 BPL -4
2624 011606 000207 RTS %7 ; CHAR. TYPED EXIT
2625 011610 112737 000012 011636 TYPF: MOVB #12,TYPDAT ; OUTPUT LF
2626 011616 004737 011572 JSR %7,TYPD ; GO TYPE CHAR.
2627 011622 112737 000015 011636 TYPG: MOVB #15,TYPDAT ; OUTPUT CR
2628 011630 004737 011572 JSR %7,TYPD ; GO TYPE CHAR.
2629 011634 000737 BR TYPA
2630 011636 000000 TYPDAT: 0
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
2641 011640 013537 011720 CONV: MOV @(%5)+,ACNVX ; ADDRSS OF NO. TO BE CONVERTED
2642 011644 012501 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 MOVB %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
2661 ; ROUTINE TO REPORT ERROR COUNT
2662
    
```

```

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
2675
2676
2677
2678 ;ROUTINE TO ENABLE THE KEYBOARD INTERRUPT
2679 ;AND LOWER THE PROCESSOR PRIORITY SO INTERRUPTS
2680 ;CAN BE SERVICED
2681
2682 011762 005046 ENABL: CLR -(SP) ;NEW PSW
2683 011764 012746 011772 MOV #15,-(SP) ;NEW PC
2684 011770 000002 RTI ;LOAD NEW PSW
2685 011772 052777 000100 167020 15: BIS #100,@TKS ;ENABLE KEYBOARD INTERRUPT
2686 012000 000207 ENABLX: RTS PC ;RETURN TO MAINLINE PROGRAM
2687
2688
2689
2690
2691
2692 ;KEYBOARD INTERRUPT ROUTINE
2693 ;FOR ACCESS TO THE S/W SWITCH REGISTER
2694
2695
2696 012002 010046 TKINT: MOV %0,-(SP) ;SAVE REGISTERS
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 SWR ENTRY ?
2703 012022 001130 BNE TYP5WR ;YES-PRINT HEADER
2704 012024 005737 001070 TST SIGNAL ;PREVIOUS CONTROL-G INPUT ?
2705 012030 001477 BEQ CNTRLG ;YES-CONTINUE
2706 012032 017737 166756 001074 MOV @TKB,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 DIGITS ;NEXT DIGIT OF SWR INPUT
    
```



2719	012116	022737	000006	001066		CMP	#6,DIGITS	:MORE THAN SIX DIGITS ?
2720	012124	100453				BMI	WT3	:YES-PRINT "?"
2721	012126	105777	166664		WT2:	TSTB	@TPS	:TTY PRINTER READY ?
2722	012132	100375				BPL	WT2	:NO-WAIT
2723	012134	013777	001074	166650		MOV	CHAR,@TPB	:PRINT CHARACTER
2724	012142	162737	000060	001074		SUB	#60,CHAR	:CONVERT TO OCTAL
2725	012150	022737	000001	001066		CMP	#1,DIGITS	:FIRST DIGIT ?
2726	012156	001411				BEQ	TK5	:YES-CONTINUE
2727	012160	000241				CLC		:ROTATE LEFT THREE
2728	012162	006137	001076			ROL	OCT	:TIMES
2729	012166	000241				CLC		:THIS WILL SHIFT
2730	012170	006137	001076			ROL	OCT	:SWR VALUE ONE
2731	012174	000241				CLC		:PLACE LEFT
2732	012176	006137	001076			ROL	OCT	:OCTAL.
2733	012202	063737	001074	001076	TK5:	ADD	CHAR,OCT	:NEW VALUE OF SWR
2734	012210	000464				BR	TK6	:RETURN FROM INTERRUPT
2735	012212	005737	001066		DGTS:	TST	DIGITS	:SWR VALUE CHANGED ?
2736	012216	001451				BEQ	TK3	:NO-RETURN ,NO CHANGE TO SWR
2737	012220	013777	001076	166556		MOV	OCT,@SWR	:YES-ENTER NEW SWR VALUE
2738	012226	000445				BR	TK3	:RETURN FROM INTERRUPT
2739	012230	017737	166560	001074	CNTRLG:	MOV	@TKB,CHAR	:GET CHARACTER
2740	012236	042737	177600	001074		BIC	#177600,CHAR	:STRIP OFF PARITY BIT
2741	012244	022737	000007	001074		CMP	#7,CHAR	:CONTROL-G INPUT ?
2742	012252	001414				BEQ	TYP SWR	:YES-PRINT HEADER
2743	012254	105777	166536		WT3:	TSTB	@TPS	:TTY PRINTER READY ?
2744	012260	100375				BPL	WT3	:NO-WAIT
2745	012262	013777	001074	166522		MOV	CHAR,@TPB	:PRINT CHARACTER
2746	012270	104000				EMT	+0	:PRINT "?"
2747	012272	014506				MES22		
2748	012274	005737	001070			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	TYP SWR:	MOV	#1,SIGNAL	:SET FLAG: CONTROL-G ENTERED
2752	012312	104000				EMT	+0	:PRINT HEADER
2753	012314	014512				MES23		
2754	012316	004537	011640			JSR	%5,CONV	:CONVERT SWR VALUE TO ASCII
2755	012322	000176				176		
2756	012324	014542				MES25		
2757	012326	000006				6		
2758	012330	104000				EMT	+0	:PRINT SWR VALUE
2759	012332	014542				MES25		
2760	012334	104000				EMT	+0	:PRINT HEADER
2761	012336	014523				MES24		
2762	012340	000404				BR	TK7	:RETURN FROM INTERRUPT
2763	012342	005037	001070		TK3:	CLR	SIGNAL	:CLEAR CONTROL-G FLAG
2764	012346	104000			TK4:	EMT	+0	:PRINT LINE FEED AND CARRIAGE RETURN
2765	012350	014504				MES21		
2766	012352	005037	001066		TK7:	CLR	DIGITS	:CLEAR DIGIT COUNT
2767	012356	005037	001076			CLR	OCT	:CLEAR SWR INPUT
2768	012362	012605			TK6:	MOV	(SP)+,%5	:RESTORE REGISTERS
2769	012364	012604				MOV	(SP)+,%4	
2770	012366	012603				MOV	(SP)+,%3	
2771	012370	012602				MOV	(SP)+,%2	
2772	012372	012601				MOV	(SP)+,%1	
2773	012374	012600				MOV	(SP)+,%0	
2774	012376	000002				RTI		:RETURN FROM INTERRUPT

2775  
2776  
2777

012400	045			MED0:	ASCII	/%/	
012401	040	020040	042440	MED1:	ASCIZ	/	ERROR COUNT%/
012422	051105	047522	020122	MESA:	ASCIZ	/	ERROR SET OK - CLEAR & TURN ON LINE%/
012467	105	051122	051117	MESB:	ASCIZ	/	ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/
012542	050045	044522	052116	MESC:	ASCII	/	PRINT SPEED CHECK USING MANUAL TIMING%/
012611	045	052520	020124		ASCII	/	PUT SWITCH 0 UP TO START TIMING%/
012652	050045	052125	051440		ASCIZ	/	PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
012721	045	052123	051101	MESDD:	ASCIZ	/	STARTING DAVFU PRINTING TESTS%/
012761	045	050114	032460	MES1:	ASCIZ	/	LP05-LP11-LP14 LINE PRINTER TEST%/
013024	042522	052123	051101	MES2:	ASCIZ	/	RESTART ADDRESS 600%/
013051	045	047520	042527	MES3:	ASCIZ	/	POWER ON - TURN ON LINE%/
013103	117	020116	044514	MES4:	ASCIZ	/	ON LINE OK - TRY TORN PAPER SWITCH%/
013147	122	040505	054504	MES5:	ASCIZ	/	READY SET OK - TRY DRUM GATE SWITCH%/
013214	051105	047522	020122	MES6:	ASCIZ	/	ERROR SET OK - TURN ON LINE%/
	013252						
013252	042522			MES7A:	ASCII	/RE/	
013254	042523	020124	047524	MES7:	ASCII	/	SET TOP OF FORM SWITCH TO /
013310	020040	020040	044440	MES8:	ASCIZ	/	INCHES%/
	013326						
013326	026455	026455	026455	MES9:	ASCII	/	----- THIS LINE SHOULD BE /
013423	040	020040	020040	MES10:	ASCIZ	/	INCHES FROM THE LAST LINE -----
013534	005012			MES11A:	ASCII	<12><12>	
013536	050045	044522	052116	MES11:	ASCII	/	PRINT SPEED IS APPROXIMATELY /
013575	040	020040	020040	MES12:	ASCIZ	/	LINES PER MINUTE%/
013624	026455	026455	026455	MES13:	ASCII	/	-----
013706	026455	026455	026455		ASCII	/	-----
013770	026455	026455	026455		ASCIZ	/	----- #/
014032	005012	042524	052123	MES14:	ASCII	<12><12>/	TEST NUMBER /
014050	020040	005012	000012	MES15:	ASCIZ	/	<12><12><12>
014056	044124	051511	046040	MES16:	ASCIZ	/	THIS LINE SHOULD BE PRINTED#/
014113	040	020040	020040	MES17:	ASCIZ	/	ALL ON ONE LINE --- IF SLEWED 0 LINES%/
014216	026455	026455	026455	MES18:	ASCII	/	-----
014310	020040	020040	020040	MES19:	ASCIZ	/	BLANK LINES BEFORE THIS LINE -----
014424	052040	051505	044524	MES20:	ASCII	/	TESTING CHANNEL SLEWING USING CHANNEL NO. /
014500	020040	000		MES20A:	ASCIZ	/	/
	014504						
014504	000045			MES21:	ASCIZ	/	/
014506	037440	000045		MES22:	ASCIZ	/	3%/
014512	051445	051127	036440	MES23:	ASCIZ	/	SWR = /
014523	040	020040	042516	MES24:	ASCIZ	/	NEW SWR = /
014542	020040	020040	020040	MES25:	ASCIZ	/	/
	014552						
014552	030504			TNDAV1:	ASCII	/D1/	TEST NUMBERS FOR DAVFU TESTS
014554	031104			TNDAV2:	ASCII	/D2/	
014556	031504			TNDAV3:	ASCII	/D3/	
014560	020061			TN01:	ASCII	/1/	
014562	020062			TN02:	ASCII	/2/	
014564	020063			TN03:	ASCII	/3/	
014566	020064			TN04:	ASCII	/4/	

014570 020065  
 014572 020066  
 014574 020067  
 014576 020070  
 014600 020071  
 014602 030061  
 014604 030461  
 014606 031061  
 014610 031461  
 014612 032061  
 014614 032461

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

2776  
 2777  
 2778  
 2779  
 2780  
 2781  
 2782  
 2783  
 2784  
 2785  
 2786  
 2787  
 2788  
 2789  
 2790  
 2791  
 2792  
 2793  
 2794  
 2795  
 2796  
 2797  
 2798  
 2799  
 2800  
 2801  
 2802  
 2803  
 2804  
 2805  
 2806  
 2807  
 2808  
 2809  
 2810  
 2811  
 2812  
 2813  
 2814  
 2815  
 2816  
 2817  
 2818  
 2819

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

: TESTS D1 AND D2  
 : CHECK DAVFU LINE COUNT SLEWING

```

DAVFU:
  CMP      #176, SWR          ; S/W SWR ?
  BNE     15                 ; NO- CONTINUE
  JSR     PC-ENABL          ; ENABLE KEYBOARD INTERRUPT

15:
  JSR     %4, TYPINT        ; INITIALIZE
  MOV     SPSP, MES19+2
  EMT     +0                ; TYPE MESSAGE
  MESDD
  MOV     #220, DAV11       ; STARTING DAVFU TESTS
  MOV     #221, DAV12       ; SET DAVFU INSTRUCTIONS
  MOV     TNDV1, MES15      ; SET TEST NUMBER FOR MESSAGE
  JSR     %4, PRNNT         ; PRINT TEST NUMBER
  MOV     #DAVTAB, CHRGEN   ; SET TABLE POINTER
  DAV0:   TST     @LPS        ; TEST FOR ERROR
  DAV00:  BPL     DAV1        ; BRANCH IF NO ERROR
  ERR54: MOV     #54, ERCOUNT ; SET UP ERROR COUNT 54
  N=N+1
  JSR     %5, STAER        ; REPORT ERROR SET
  HALT
  JMP     DAV0             ; RESTART TEST
  DAV1:  MOV     @CHRGEN, @LPB ; LOAD DAVFU
  ADD     #2, CHRGEN       ; INCREMENT TABLE POINTER
  TST     @CHRGEN         ; TEST IF DONE LOAD
  BEQ     D5              ; CONTINUE IF DONE
  TSTB   @LPS            ; TEST READY
  BPL     -4              ; WAIT FOR READY
  JMP     DAV00
  D5:   MOV     #2, CYCCNT   ; SET CYCLE COUNT
  D0:   MOV     #MES16, PRMSG ; SET MESSAGE ADDRESS
  JSR     %4, RINT        ; PRINT MESSAGE
  TST     @LPS            ; TEST FOR ERROR
  BPL     D1              ; CONTINUE IF NO ERROR
  ERR55: MOV     #55, ERCOUNT ; SET UP ERROR COUNT 55
  N=N+1
  JSR     %5, STAER        ; REPORT ERROR SET
  
```

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,PRTMSG	; SET PRINTER MESSAGE ADDRESS
2825	015052	004437	011452			JSR	%4,RINT	; PRINT MESSAGE
2826	015056	012737	014216	011470		MOV	#MES18,PRTMSG	; SET MESSAGE ADDRESS
2827	015064	013737	015346	001040		MOV	DAV12,CHRGEN	; 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	CHRGEN,@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	CHRGEN	; 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,@SWR	; LOOP ON TEST?
2856	015264	001002				BNE	15	; LOOP
2857	015266	000137	015350			JMP	DAV2	; NEXT TEST
2858	015272	000137	014616		15:	JMP	DAV2	; LOOP
2859								
2860								
2861	015276	000356			DAVTAB:	356		; DAVFU 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				
2904	015462	017737	000446	001040				
2905	015470	005777	163304					
2906	015474	100007						
2907	015476	012737	000057	001052				
2908		000060						
2909	015504	004537	011722					
2910	015510	000000						
2911	015512	000760						
2912	015514	012737	000002	001036				
2913	015522	013777	001040	163252				
2914	015530	105777	163244					
2915	015534	100375						
2916	015536	005777	163236					
2917	015542	100010						
2918	015544	012737	000060	001052				
2919		000061						
2920	015552	004537	011722					
2921	015556	000000						
2922	015560	000137	015454					
2923	015564	022737	000356	001040				
2924	015572	001407						
2925	015574	022737	000357	001040				
2926	015602	001403						
2927	015604	005337	001036					
2928	015610	001344						
2929	015612	062737	000002	016134				
2930	015620	017737	000310	001040				
2931	015626	022737	077777	001040				

```

; TEST D3
; CHECK DAVFU CHANNEL SLEW COMMANDS

DAV2:
CMP #176, SWR ;S/W SWR ?
BNE 15 ;NO- CONTINUE
JSR 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
LOAD: 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
DL1: MOV #2, CHRCNT ; SET PAIR COUNT
DL2: MOV CHRGEN, @LPB ; 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
DL6: 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
DL6A: 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          ; START OF CHANNEL SLEW TESTS
2935
2936 015636          DL8:
2937 015636 013777 001054 163136  MOV    STRCHR, @LPB    ; SEND DAVFU INSTRUCTION
2938 015644 105777 163130          TSTB   @LPS           ; TEST READY
2939 015650 100375          BPL    .-4            ; WAIT FOR READY
2940 015652 105777 163122          TSTB   @LPS           ; TEST READY
2941 015656 100375          BPL    .-4            ; WAIT FOR READY
2942 015660          DL8A:
2943 015660 017737 000260 014500  MOV    @HTABP, MES20A  ; SET HEADER MSSG ADDRESS
2944 015666 012737 014424 011470  MOV    #MES20, PRMSG  ; SET HEADER MSG ADDRESS
2945 015674 004437 011452          JSR    %4, RINT       ; PRINT HEADER MESSAGE
2946 015700 013777 001054 163074  DL9:  MOV    STRCHR, @LPB    ; SEND DAVFU INSTRUCTION
2947 015706 105777 163066          TSTB   @LPS           ; TEST READY
2948 015712 100375          BPL    .-4            ; WAIT FOR READY
2949 015714 005777 163060          TST    @LPS           ; TEST FOR ERROR
2950 015720 100010          BPL    DL10          ; BRANCH IF OK
2951 015722 012737 000061 001052  ERR61: MOV    #61,   ERCOUNT  ; SET UP ERROR COUNT 61
2952          000062          N=N+1
2953 015730 004537 011722          JSR    %5, STAER     ; REPORT ERROR SET
2954 015734 000000          HALT                   ; HALT ON ERROR
2955 015736 000137 015454          JMP    LOAD           ; RELOAD DAVFU
2956 015742 017737 000174 014310  DL10: MOV    @MTABP, MES19  ; SET MESSAGE
2957 015750 027727 000164 000001  CMP    @ICTABP, #1    ; CHECK IF MAX LINE SLEW
2958 015756 001004          BNE    DL10A         ; NOT, CONTINUE
2959 015760 013737 016674 014312  MOV    FS, MES19+2   ; SET MESSAGE
2960 015766 000403          BR     DL10B         ; CONTINUE
2961 015770 013737 016676 014312  DL10A: MOV    SPSP, MES19+2  ; SET MESSAGE
2962 015776 012737 014216 011470  DL10B: MOV    #MES18, 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         ; CONTINUE
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  DL12: MOV    @ICTABP, STRCNT ; GET INSTR COUNT
2974 016070 062737 000002 016136  ADD    #2, ITABP     ; INC INSTR TABLE POINTER
2975 016076 017737 000034 001054  MOV    @ITABP, STRCHR ; GET INSTRUCTION
2976 016104 001254          BNE    DL8           ; CONTINUE IF NOT DONE TEST
2977 016106 013737 016676 014312  MOV    SPSP, MES19+2  ; RESET MESSAGE
2978 016114 032777 010000 162662  BIT    #BIT12, @SWR   ; LOOP ON TEST?
2979 016122 001402          BEQ    DLEX          ; LOOP ON TEST
2980 016124 000137 015350          JMP    DAV2          ; LOOP ON TEST
2981 016130 000137 004562          DLEX: JMP    TEST2     ; RECYCLE PRINTING TESTS
2982
2983 016134 000000          DTABP: 0              ; DATA TABLE POINTER
2984 016136 000000          ITABP: 0              ; INSTRUCTION TABLE POINTER
2985 016140 000000          ICTABP: 0            ; INSTR COUNT TABLE POINTER
2986 016142 000000          MTABP: 0              ; MESSAGE TABLE POINTER
2987 016144 000000          HTABP: 0              ; HEADER MESSAGE TABLE POINTER
  
```

2988  
 2989  
 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

; DATA TABLE FOR DAVFU LOAD

DTAB: 356 ; START LOAD  
 77 ; HEADER MESSAGES  
 0  
 1  
 2  
 5  
 0  
 3  
 10  
 5  
 2  
 1  
 0  
 7  
 0  
 11  
 2  
 5  
 0  
 3  
 0  
 5  
 5  
 12  
 1  
 0  
 7  
 20  
 1  
 2  
 15  
 0  
 3  
 0  
 5  
 2  
 1  
 10  
 7  
 0  
 1  
 2  
 5  
 0  
 13  
 0  
 5  
 2  
 1  
 0  
 7  
 10  
 21

3044	016320	000005
3045	016322	000000
3046	016324	000003
3047	016326	000000
3048	016330	000015
3049	016332	000002
3050	016334	000001
3051	016336	000000
3052	016340	000007
3053	016342	000000
3054	016344	000001
3055	016346	000012
3056	016350	000005
3057	016352	000000
3058	016354	000003
3059	016356	000000
3060	016360	000005
3061	016362	000002
3062	016364	000011
3063	016366	000000
3064	016370	000007
3065	016372	000000
3066	016374	000001
3067	016376	000022
3068	016400	000005
3069	016402	000010
3070	016404	000003
3071	016406	000000
3072	016410	000005
3073	016412	000002
3074	016414	000001
3075	016416	000000
3076	016420	000017
3077	016422	000000
3078	016424	000001
3079	016426	000002
3080	016430	000005
3081	016432	000000
3082	016434	000003
3083	016436	000010
3084	016440	000005
3085	016442	000002
3086	016444	000001
3087	016446	000000
3088	016450	000007
3089	016452	000000
3090	016454	000011
3091	016456	000002
3092	016460	000025
3093	016462	000000
3094	016464	000003
3095	016466	000000
3096	016470	000005
3097	016472	000012
3098	016474	000001
3099	016476	000000

016320 016322 016324 016326 016330 016332 016334 016336 016340 016342 016344 016346 016350 016352 016354 016356 016360 016362 016364 016366 016370 016372 016374 016376 016400 016402 016404 016406 016410 016412 016414 016416 016420 016422 016424 016426 016430 016432 016434 016436 016440 016442 016444 016446 016450 016452 016454 016456 016460 016462 016464 016466 016470 016472 016474 016476



3100 016500 000007  
 3101 016502 000000  
 3102 016504 000001  
 3103 016506 000002  
 3104 016510 000015  
 3105 016512 000000  
 3106 016514 000003  
 3107 016516 000000  
 3108 016520 000005  
 3109 016522 000002  
 3110 016524 000001  
 3111 016526 000010  
 3112 016530 000007  
 3113 016532 000000  
 3114 016534 000001  
 3115 016536 000002  
 3116 016540 000005  
 3117 016542 000020  
 3118 016544 000013  
 3119 016546 000000  
 3120 016550 000005  
 3121 016552 000002  
 3122 016554 000001  
 3123 016556 000000  
 3124 016560 000007  
 3125 016562 000010  
 3126 016564 000001  
 3127 016566 000002  
 3128 016570 000005  
 3129 016572 000000  
 3130 016574 000003  
 3131 016576 000000  
 3132 016600 000001  
 3133 016602 000000  
 3134 016604 000357  
 3135 016606 077777  
 3136  
 3137  
 3138  
 3139 016610 000105  
 3140 016612 000056  
 3141 016614 000042  
 3142 016616 000023  
 3143 016620 000005  
 3144 016622 000001  
 3145 016624 000000  
 3146  
 3147  
 3148  
 3149 016626 000300  
 3150 016630 000201  
 3151 016632 000202  
 3152 016634 000203  
 3153 016636 000204  
 3154 016640 000205  
 3155 016642 000206

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

: STOP LOAD  
 : STOP !!!!!

: INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS

ICTAB: 105  
 56  
 42  
 23  
 5  
 1  
 0

: END OF TABLE

: INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS

ITAB: 200 : CHANNEL 1  
 201 : CHANNEL 2  
 202 : CHANNEL 3  
 203 : CHANNEL 4  
 204 : CHANNEL 5  
 205 : CHANNEL 6  
 206 : CHANNEL 7

3156 016644 000207  
3157 016646 000210  
3158 016650 000211  
3159 016652 000212  
3160 016654 000213  
3161 016656 000000  
3162

207  
210  
211  
212  
213  
0

: CHANNEL 8  
: CHANNEL 9  
: CHANNEL 10  
: CHANNEL 11  
: CHANNEL 12  
: END OF TABLE

:

3163  
3164  
3165 016660 030440  
3166 016662 031040  
3167 016664 031440  
3168 016666 033040  
3169 016670 032062  
3170 016672 032061  
3171 016674 020063  
3172 016676 020040  
3173  
3174  
3175  
3176  
3177  
3178  
3179  
3180

: 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  
3179 016700 022737 000176 001004  
3180 016706 001002  
3181 016710 004737 011762  
3182 016714

SCOPE:

15:

CMP #176, SWR  
BNE 15  
JSR PC, ENABL

;S/W SWR ?  
;NO- CONTINUE  
;ENABLE KEYBOARD INTERRUPT

3183	016714	004437	011472		JSR	%4, TYP INT	
3184	016720	017737	162060	001050	MOV	@SWR, SAVE	: FETCH SWITCHES

3185	016726	012737	177574	001036				
3186	016734	042737	177400	001050				
3187	016742				LDLPX.			
3188	016742	105777	162032			TSTB	@LPS	: TEST READY
3189	016746	100375				BPL	-4	: WAIT FOR READY
3190	016750	005777	162024			TST	@LPS	: TEST FOR ERROR

3191	016754	100006				BPL	LPSCOPE		: BRANCH IF NO ERROR
3192	016756	012737	000062	001052	ERR62:	MOV	#62,	ERCOUNT	: SET UP ERROR COUNT 62
3193		000063				N=N+1			
3194									
3195	016764	004537	011722			JSR	%5, STAER		: REPORT ERROR SET
3196	016770	000000				HALT			: HALT ON ERROR
3197	016772	013777	001050	162002	LPSCOPE:	MOV	SAVE, @LPB		: LOAD PRINTER BUFFER

3198	017000	032777	004000	161776		BIT	#BIT11,@SWR	:SEND ONLY ONE CHAR?
3199	017006	001402				BEQ	LSCO	:NO, BRANCH
3200	017010	000000				HALT		:HALT - WAIT FOR OPERATOR
3201	017012	000732				BR	SCOPE	:NEXT CHAR
3202	017014	000177	000024		LSCO:	JMP	@LSCOP	:SEND LF?
3203	017020	005237	001036		LSCA:	INC	CHRCNT	:INCREMENT CHAR COUNT
3204	017024	001346				BNE	LDLPX	:CONTINUE IF NOT DONE LINE
3205	017026	012777	000012	161746		MOV	#12,@LPB	:SEND LF
3206	017034	105777	161740			TSTB	@LPS	:TEST READY
3207	017040	100375				BPL	-4	:WAIT FOR READY
3208	017042	000716				BR	SCOPE	:CONTINUE
3209								
3210								
3211	017044	017020			LSCOP	LSCA		
3212								
3213								
3214								
3215		000001						END







ERR27	004212	1748#							
ERR3	001510	1263#							
ERR30	004322	1778#							
ERR31	004424	1796#							
ERR32	004610	1851#							
ERR33	004666	1864#							
ERR34	005110	1909#							
ERR35	005226	1931#							
ERR36	005464	1977#							
ERR37	005776	2037#							
ERR4	001532	1269#							
ERR40	006260	2092#							
ERR41	006532	2143#							
ERR42	007030	2199#							
ERR43	007322	2250#							
ERR44	007562	2297#							
ERR45	010052	2351#							
ERR46	010320	2394#							
ERR47	010542	2437#							
ERR5	001562	1279#							
ERR50	010734	2472#							
ERR51	011006	2484#							
ERR52	011200	2521#							
ERR53	011436	2591#							
ERR54	014712	2800#							
ERR55	015014	2817#							
ERR56	015114	2832#							
ERR57	015476	2907#							
ERR6	001614	1295#							
ERR60	015544	2918#							
ERR61	015722	2951#							
ERR62	016756	3192#							
ERR7	001640	1305#							
FFSET	004020	1641	1708#						
FFTAB	003742	1640	1683#						
FS	016674	2959	3171#						
FTABE	004016	1668	1705#						
HAMALN	011124	1018	2508#	2538					
HAMX	011306	2541	2543#						
HAM1X	011164	2518#	2536						
HAM2	011172	2519#	2531						
HEDO	012400	2670	2777#						
HED1	012401	2667	2777#						
HSPRT	006660	1014	2174#	2227					
HSO	007000	2194#	2223	2225					
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	989	1679	1725#	1738	1752			















SENABL	1101#	1473	1491	1506	1628	1725	1768	1843	1894	1962	2017	2073	2128	2174	2279
	2319	2415	2508	2784	2888	3178									
SEPPOR	1066#	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								
SPRINT	1076#	1855	1900	1968	2023	2079	2134	2180	2285	2325	2421	2514			
SEETPS	1117#	1358	1370	1383	1396	1429	1444	2586	2602						
SHAIT	1087#	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														

ABE 017046 000

ERRORS DETECTED: 0

DZLPKH BIN, DZLPKH, LST/CRF/SOL/NL, TOC=DZLPKH P11  
 RUN-TIME: 36.9 SECONDS  
 RUN-TIME RATIO: 101.11=9.2  
 CORE USED: 9K (17 PAGES)

