

LP14-LP11-LP05

LINE PRINTER TEST
MD-11-DZLPK-H

EP-DZLPK-H-DL

JAN 1978

COPYRIGHT ©74-77

digital

FICHE 1 OF 1

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
DEC

PDP
DECUS

UNIBUS
DECTAPE

MASSBUS

- 1. 0 ABSTRACT
- 2. 0 REQUIREMENTS
 - 2. 1 EQUIPMENT
 - 2. 2 STORAGE
 - 2. 3 PRELIMINARY PROGRAMS
- 3. 0 LOADING PROCEDURE
 - 3. 1 METHOD
- 4. 0 STARTING PROCEDURE
 - 4. 1 CONTROL SWITCH SETTINGS
 - 4. 2 STARTING ADDRESS OR ADDRESSES
 - 4. 3 PROGRAM AND/OR OPERATOR OPERATION
- 5. 0 OPERATING PROCEDURE
 - 5. 1 OPERATIONAL SWITCH SETTINGS
 - 5. 2 ABSENCE OF HARDWARE SWITCH REGISTER
 - 5. 3 IOT CHANGES
- 6. 0 ERRORS
 - 6. 1 COMPUTER DETECTED ERRORS
 - 6. 2 VISUALLY DETECTED ERRORS

- 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

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

1.0 ABSTRACT

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

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

2.0 REQUIREMENTS

2.1 EQUIPMENT

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

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

TELETYPE MODEL 33 OR EQUIVALENT CONSOLE UNIT

2.2 STORAGE

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

2.3 PRELIMINARY PROGRAMS

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

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

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.

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

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
321
322
323
324
325
326
327
328
329
330
331
332
333
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
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
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
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
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
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
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
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
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
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889
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
951
952
953
954
955
956
957
958
959
960
961
962
963
964
965
966
967
968
969
970
971
972
973
974
975
976
977
978
979
980
981
982
983
984
985
986
987
988
989
990
991
992
993
994
995
996
997
998
999
1000

722
723
724
725
726
727
728
729
730
731
732
733

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

4. SWITCH - 11

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

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).

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).

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

6.0 ERRORS

6.1 COMPUTER DETECTED ERRORS

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

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

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

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

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

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

6.2 VISUALLY DETECTED ERRORS

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

7.0 TEST DESCRIPTIONS

7.1 TEST 1 - CONTROL TESTS AND OPERATOR INTERACTIVE TESTS

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

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

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

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

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

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

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

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

7.1.4 TEST 1 - SECTION 4 - DAVFU ERROR TESTS

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

7.2 LINE PRINTER PRINTING TESTS

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

7.2.1 TEST 2 - DATA TRANSFER PATHS TEST

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

7.2.2 TEST 3 - CHARACTER GENERATOR AND COMPARATOR TEST

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

7.2.3 TEST 4 - OVER PRINT TEST

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.

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

7.3 SCOPE DRIVE ROUTINE

THE PURPOSE 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

864
 865
 866
 867
 868
 869
 870
 871
 872
 873
 874
 875
 876
 877
 878
 879
 880
 881
 882
 883
 884
 885
 886
 887
 888
 889

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	
965	000062	000300		300	: KEYBOARD INTERRUPT ROUTINE
966					
967					
968		000100		=100	
969					
970	000100	003254		LKSRV	
971	000102	000340		340	: LINE CLOCK SERVICE ROUTINE
972					
973	000104	003264		CONVRT	
974	000106	000340		340	
975					
976		000174		=174	
977	000174	000000		DISPREG: 0	
978	000176	000000		SWREG: 0	
979					
980		000200		=200	
981					
982	000200	012706	001000	MOV	#1000,%6
983	000204	000137	001102	JMP	SETUP
984					
985					
986		000300		=300	
987					
988					
989	000300	000137	004074	JMP	INDAT
990	000304	000137	004260	JMP	NO DAT
991	000310	000137	014616	JMP	DAVFU
992	000314	000137	015350	JMP	DAV2
993					: START FOR DAVFU TESTS
994					: ILLEGAL LOAD TEST
995					: NO STOP BIT - CHANNEL SLEW TEST
996					: LINE COUNT SLEW TEST
997					: CHANNEL SLEW TEST
998		000400		=400	
999	000400	000137	002514	JMP	SWTIME
1000	000404	000137	002650	JMP	KW11L
1001	000410	000137	002572	JMP	KW11P
1002	000414	000137	003464	JMP	SLEWCK
					: 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      MOV    #X,   ERCOUNT      ;SET UP ERROR COUNT X
1067      N=N+1
1068      .ENDM  SERROR
1069
1070
1071      ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1072      .LIST ME
1073
1074      .MACR  SPRINT Y
1075      MOV    TNO'Y',MES15      ;SET TEST NUMBER FOR MESSAGE
1076      JSR    %4,PRNT          ;PRINT TEST NUMBER
1077      M=M+1
1078      .ENDM  SPRINT
1079
1080
1081      ;MACRO FOR WAITING FOR PRINTER TO PRINT 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      ;MACRO FOR ENABLING KEYBOARD INTERRUPT IF THERE IS NO
1091      ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1092      .LIST ME
1093
1094      .MACR  SENABLE
1095      CMP    #176,SWR          ;S/W SWR ?
1096      BNE    15                ;NO- CONTINUE
1097      JSR    PC,ENABL          ;ENABLE KEYBOARD INTERRUPT
1098      .ENDM  SENABLE
1099
1100
1101      ;MACRO USED TO LOAD THE PSW WITH THE
1102      ;CORRECT PROCESSOR PRIORITY LEVEL
1103
1104
1105
1106
1107
1108
1109
1110
1111
1112
1113
  
```


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

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

001102 004437 011472
001106 000005
001110 013746 000004
001114 013746 000006
001120 012737 001134 000004
001126 005777 177652
001132 000407
001134
001134 012737 000176 001004
001142 012737 000174 001006
001150 022626
001152 012637 000006
001156 012637 000004

001162 104000
001164 012761
001166 104000

LIST ME

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

; 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 LP05
SETUP: JSR %4, TYPINT
RESET ; CLEAR WORLD
MOV 4, -(SP) ; SAVE CURRENT VECTORS
MOV 6, -(SP) ;
MOV #15, 4 ; SET UP TIMEOUT VECTOR
TST @SWR ; TRY TO ACCESS HARDWARE SWR
BR 25 ; 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 ; TYPE DIAGNOSTIC TITLE
EMT +0


```

1170 001170 013024          MES2          ;TYPE RESTART ADDRESS INFO
1171
1172
1173
1174          ;LOWER PROCESSOR PRIORITY
1175
1176
1177 001172 005046          35:  CLR      -(SP)          ;NEW PSW
1178 001174 012746 001202      MOV      #45, -(SP)      ;NEW PC
1179 001200 000002          RTI          ;LOAD NEW PSW
1180 001202
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          MESS
1221 001332 000000          HALT          ;POWER UP
1222
1223
1224
1225          ;DEPRESS CONTINUE WHEN READY TO START TEST

```



```

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 ERRO: 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

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

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

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

; IS READY SET (NO ERRORS EXIST)

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

; DOES LOADING THE BUFFER RESET READY

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

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

```



```

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

```



```

1450
1451
1452
1453
1454
1455
1456
1457
1458
1459
1460
1461 002440 012737 000002 000006 CLCKAV: MOV #RT1,@#6 ;SET TRAP TO RETURN
1462 002446 012737 000006 000004 MOV #6,@#4
1463 002454 000261 SEC
1464 002456 105777 176344 TSTB @LKS ;KW11-L AVAILABLE?
1465 002462 103404 BCS 15 ;NO, BRANCH
1466 002464 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1467 002470 000137 002650 JMP KW11L ;USE KW11L FOR TIMING
1468 002474 000261 15: SEC
1469 002476 105777 176322 TSTB @PLKS ;KW11-P AVAILABLE?
1470 002502 103404 BCS SWTIME ;NO, USE SWITCH REG FOR TIMING
1471 002504 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1472 002510 000137 002572 JMP KW11P ;USE KW11-P FOR TIMING
1473 002514 SWTIME:
1474 002514 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
1475 002522 001002 BNE 15 ;NO- CONTINUE
1476 002524 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
1477 002530 15:
1478 002530 005037 001042 CLR LINCNT ;CLEAR LINE COUNT
1479 002534 004437 011472 JSR %4,TYPINT
1480 002540 005037 000004 CLR @#4 ;RESET TRAP VECTOR TO HALT
1481 002544 104000 EMT +0 ;TYPE MESSAGE
1482 002546 012542 MESC ;PRINT SPEED CHECK USING MANUAL TIMING
1483 002550 012737 000002 003252 MOV #2,DIA ;SET DUMMY ADDRESS
1484 002556 032777 000001 176220 25: BIT #BIT0,@SWR ;START?
1485 002564 001774 BEQ 25 ;WAIT FOR START
1486 002566 000137 002722 JMP STARO ;START PRINTING
1487
1488
1489
1490 ;START FOR KW11-P.....
1491 002572 KW11P:
1492 002572 022737 000176 001004 CMP #176,SWR ;S/W SWR ?
1493 002600 001002 BNE 15 ;NO- CONTINUE
1494 002602 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
1495 002606 15:
1496 002606 005037 001042 CLR LINCNT ;CLEAR LINE COUNT
1497 002612 004437 011472 JSR %4,TYPINT
1498 002616 012706 001000 MOV #1000,%6 ;RESET STACK
1499 002622 013777 003246 176172 MOV MINCNT,@CSBR ;SET CLOCK COUNT
1500 002630 013737 001024 003252 MOV PLKS,DIA ;STORE PLKS ADDRESS
1501 002636 012777 000105 176160 MOV #105,@PLKS ;START CLOCK
1502 002644 000137 002722 JMP STARO ;START PRINTING
1503
1504 ;START FOR KW11-L....
1505

```



```

1506 002650
1507 002650 022737 000176 001004 KW11L: CMP #176, SWR ;S/W SWR ?
1508 002656 001002 BNE 15 ;NO- CONTINUE
1509 002660 004737 011762 JSR PC, ENABL ;ENABLE KEYBOARD INTERRUPT
1510 002664
1511 002664 005037 001042 15: CLR LINCNT ;CLEAR LINE COUNT
1512 002670 004437 011472 JSR %4, TYPINT
1513 002674 012706 001000 MOV #1000, %6 ;RESET STACK
1514 002700 013737 003246 003250 MOV MINCNT, CNTR ;SET CLOCK COUNT
1515 002706 013737 001026 003252 MOV LKS, DIA ;STORE LKS ADDRESS
1516 002714 012777 000100 176104 MOV #100, @LKS ;ENABLE CLOCK INTERRUPT
1517
1518 ;PRINTING ROUTINE.....
1519
1520 002722 032777 020000 176054 STARO: BIT #BIT13, @SWR ;CHECK CHAR SET
1521 002730 001007 BNE STAROA ;BRANCH IF 96
1522 002732 012737 000140 001060 MOV #140, LEGCHR ;LEGAL CHECK
1523 002740 012737 000100 001062 MOV #100, NUMCHR ;#CHARS
1524 002746 000406 BR STAROC ;CONTINUE
1525 002750 012737 000200 001060 STAROA: MOV #200, LEGCHR ;LEGAL CHECK
1526 002756 012737 000140 001062 MOV #140, NUMCHR ;#CHARS
1527 002764 013737 001060 001054 STAROC: MOV LEGCHR, STRCHR ;SET FIRST CHAR IF LP14
1528 002772 032777 002000 176004 STAROB: BIT #BIT10, @SWR ;CHECK FOR NEW DRUM(LP14)/OLD DRUM
1529 003000 001063 BNE TIMTST
1530 003002 012737 000204 001036 MOV #132, CHRCNT ;SET CHAR COUNT
1531 003010 012737 003444 001054 MOV #PATTB, STRCHR ;INITIALIZE TABLE POINTER
1532 003016 012737 000021 001044 STARA: MOV #17, CYCCNT ;SET GROUP COUNT
1533 003024 017737 176024 001040 MOV @STRCHR, 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 CYCCNT ;DECREMENT CYCCLE COUNT
1543 003100 001367 BNE STAR1 ;CONTINUE IF NOT DONE GROUP
1544 003102 062737 000002 001054 ADD #2, STRCHR ;ADD 2 TO TABLE POINTER
1545 003110 000137 003016 JMP STARA ;CONTINUE
1546 003114 005237 001042 STARED: INC LINCNT ;INCREMENT LINE COUNT
1547 003120 012777 000012 175654 MOV #12, @LPB ;SEND LF
1548 003126 105777 175646 TSTB @LPS ;TEST READY
1549 003132 100375 BPL -4 ;WAIT FOR READY
1550 003134 032777 000001 175642 BIT #BIT0, @SWR ;STOP PRINT?
1551 003142 001450 BEQ CONVRT ;YES, BRANCH
1552 003144 000137 002772 JMP STAROB ;CONTINUE
1553
1554 ;LP14 PRINTING ROUTINE
1555
1556 003150 012737 000204 001036 TIMTST: MOV #132, CHRCNT ;SET CHARACTER COUNT
1557 003156 005337 001054 DEC STRCHR ;GET NEXT STARTING CHARACTER
1558 003162 023727 001054 000040 CMP STRCHR, #40 ;LEGAL CHARACTER ?
1559 003170 100003 BPL 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						
1628	003464					
1629	003464	022737	000176	001004	SLEWCK:	
1630	003472	001002			CMP	#176, SWR
1631	003474	004737	011762		BNE	15
1632	003500				JSR	PC, ENABL
1633	003500	004437	011472		15:	
1634	003504	004537	011332		JSR	%4, TYPINT
1635	003510	000406			JSR	%5, PRTINT
1636	003512	012737	000024	001052	BR	SLW
1637		000025			MOV	#24, ERCOUNT
1638	003520	004537	011722		N=N+1	
1639	003524	000000			JSR	%5, STAER
1640	003526	012737	003742	001042	HALT	
1641	003534	012704	004020		MOV	#FFTAB, LINCNT
1642	003540	012703	013310		MOV	#FFSET, %4
1643	003544	012702	013423		MOV	#MESS, %3
1644	003550	111413			MOV	#MES10, %2
1645	003552	111412			MOVB	(%4), (%3)
1646	003554	122423			MOVB	(%4), (%2)
1647	003556	105722			CMPB	(%4)+, (%3)+
1648	003560	105714			TSTB	(%2)+
1649	003562	001372			TSTB	(%4)
1650	003564	005204			BNE	SLW1
1651	003566	104000			INC	%4
1652	003570	013254			EMT	+0
1653	003572	000000			MES7	
1654	003574	005777	175242		HALT	
1655	003600	001003			SLW11:	TST
1656	003602	012737	013624	011470		@LINCNT
1657	003610	005777	175164		BNE	SLW1A
1658	003614	100006			MOV	#MES13, PRTMSG
1659	003616	012737	000025	001052	SLW1A:	TST
1660		000026			@LPS	
1661	003624	004537	011722		BPL	SLW2
1662	003630	000000			MOV	#25, ERCOUNT
1663	003632	012777	000014	175142	N=N+1	
1664	003640	105777	175134		JSR	%5, STAER
1665	003644	100375			HALT	
1666	003646	004437	011452		MOV	#14, @LPB
1667	003652	062737	000002	001042	TSTB	@LPS
1668	003660	022737	004016	001042	BPL	-4
1669	003666	001410			JSR	%4, RINT
1670	003670	005777	175146		ADD	#2, LINCNT
1671	003674	001721			CMP	#FTAB, LINCNT
1672	003676	012737	013326	011470	BEQ	DAVAV
1673	003704	000137	003574		TST	@LINCNT
					BEQ	SLW0
					MOV	#MES9, PRTMSG
					JMP	SLW11

;CHECK TOP OF FORM SWITCH

SLEWCK:

15:

ERR24:

SLW:

SLW0:

SLW1:

SLW11:

SLW1A:

ERR25:

SLW2:

;S/W SWR ?

;NO- CONTINUE

;ENABLE KEYBOARD INTERRUPT

;INITIALIZE PRINTER

;BRANCH IF OK

;SET UP ERROR COUNT 24

;REPORT PRINTER NOT READY

;HALT ON ERROR

;LINE COUNT FOR SWITCH SETTING

;INIT SWITCH SETTING TABLE POINTER

;INIT MESSAGE POINTER

;PUT SWITCH SETTINGS INTO MESSAGES

;INCREMENT POINTERS

;DONE MOVING SWITCH SETTINGS TO MSG'S?

;BRANCH IF NOT DONE

;TABLE POINTER SET FOR NEXT SWITCH SETTING

;TYPE MESSAGE

;SET TOP OF FORM SWITCH TO ---

;WAIT FOR OPERATOR TO SET SWITCH

;CHECK LINE COUNT

;BRANCH IF NOT ZERO

;CHANGE PRINTER MESSAGE

;TEST FOR ERRORS

;BRANCH IF NO ERROR

;SET UP ERROR COUNT 25

;REPORT ERROR SET

;HALT ON ERROR

;SEND FF

;TEST READY

;WAIT FOR READY

;PRINT MESSAGE ON LINE PRINTER

;NEXT LINE COUNT

;DONE TEST?

;YES, EXIT

;DONE CHECK OF THIS SWITCH SETTING?

;YES, NEXT SWITCH SETTING

;NO, CHECK THIS SETTING

;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          EVEN
1722
1723          CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1724
1725 004074          INDAT:
1726 004074 022737 000176 001004 CMP      #176,SWR
1727 004102 001002          BNE      18
1728 004104 004737 011762          JSR      PC,ENABL
1729 004110          18:

```

```

;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 004240 000137 004260      JMP      NODAT      ; DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1757 004244 000356      INDATT: 356      ; NEXT TEST
1758 004246 000001      1      ; DATA TABLE FOR ABOVE TEST
1759 004250 000002      2
1760 004252 000003      3
1761 004254 000357      357
1762 004256 000000      0
1763 004260 022737 000176 001004  NODAT:  CMP      #176, SWR      ; S/W SWR ?
1764 004266 001002      BNE      15      ; NO- CONTINUE
1765 004270 004737 011762      JSR      PC, ENABL      ; ENABLE KEYBOARD INTERRUPT
1766 004274 004437 011472      15:  JSR      %4, TYPINT
1767 004300 012737 000200 001054  MOV      #200, STRCHR ; SET PAPER INSTRUCTION
1768 004306 012737 004502 001040  NODOA: MOV      #NODAT3, CHRGEN ; SET TABLE POINTER FOR LOAD
1769 004314 005777 174460      NODO:  TST      @LPS      ; TEST FOR ERROR
1770 004320 100007      BPL      NODATO      ; BRANCH IF NO ERROR
1771 004322 012737 000030 001052  ERR30: MOV      #30,      ERCOUNT ; SET UP ERROR COUNT 30
1772 000031      N=N+1
1773 004330 004537 011722      JSR      %5, STAER      ; REPORT ERROR SET
1774 004334 000000      HALT      ; HALT ON ERROR
1775 004336 000750      BR      NODAT      ; RESTART TEST
1776 004340 017777 174474 174434  NODATO: MOV      @CHRGEN, @LPB ; LOAD BUFFER
1777 004346 062737 000002 001040  ADD      #2, CHRGEN ; NEXT DATA
1778 004354 022737 004562 001040  CMP      #NODAT4+2, CHRGEN ; DONE LOAD?
  
```


1786	004362	001405			BEQ	NODATA		
1787	004364	105777	174410		TSTB	@LPS		; BRANCH IF DONE
1788	004370	100375			BPL	-4		; TEST READY
1789	004372	000137	004314		JMP	NODD		; WAIT FOR READY
1790	004376	013777	001054	174376	MOV	STRCHR, @LPB		; SEND DATA
1791	004404	005037	001036		CLR	CHRCNT		; DELAY
1792	004410	005237	001036		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	MOV	#31, ERCOUNT		; SET UP ERROR COUNT 31
1797		000032			N=N+1			
1798	004432	004537	011722		JSR	%5, STAER		; REPORT ERROR NOT SET
1799	004436	000000			HALT			; HALT ON ERROR
1800	004440	000137	004306		JMP	NODDA		; RETEST
1801	004444	005237	001054		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	NODDA		; RELOAD & TEST NEXT CHANNEL
1808	004470	104000			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 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
1848 004576 004437 011472 15:
1849 004602 004537 011332 JSR %4,TYPINT
1850 004606 000406 JSR %5,PRINT ;INITIALIZE PRINTER
1851 004610 012737 000032 001052 ERR32: BR TST2AX ;BRANCH IF OK
1852 000033 MOV #32, ERCOUNT ;SET UP ERROR COUNT 32
1853 004616 004537 011722 N=N+1
1854 004622 000000 JSR %5,STAER ;REPORT PRINTER NOT READY
1855 004624 HALT ;HALT ON ERROR
1856 004624 013737 014562 014050 TST2AX:
1857 004632 004437 011406 MOV TNO2,MES15 ;SET TEST NUMBER FOR MESSAGE
1858 000003 JSR %4,PRNT ;PRINT TEST NUMBER
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:	JSR	%4, TYPINT	
1899	005036	004437	011472			MOV	TN03, MES15	;SET TEST NUMBER FOR MESSAGE
1900	005042	013737	014564	014050		JSR	%4, PRNNT	;PRINT TEST NUMBER
1901	005050	004437	011406			M=M+1		
1902		000004				MOV	#-13, CYCCNT	;SET 21 LINES
1903	005054	012737	177765	001044		JMP	LP2H	;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1904	005062	000137	005214			MOV	#-132, CHRCNT	;SET CHAR COUNT FOR 132
1905	005066	012737	177574	001036	T2B0:	MOV	#40, CHRCNT	;SET FIRST CHAR.
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, @LPB	;PRINT CHARACTER
1914	005132	005237	001036			INC	CHRCNT	;INC. CHAR. COUNT
1915	005136	001420				BEQ	T2B2	;BRANCH IF LINE IS FINISHED
1916	005140	005237	001040			INC	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, @LPB	;ISSUE LINE FEED
1926	005206	105777	173566			TSTB	@LPS	;TEST READY
1927	005212	100375				BPL	-4	;WAIT FOR READY
1928	005214	005037	001040		LP2H:	CLR	CHRCNT	;FIRST ILLEGAL CHAR
1929	005220	005777	173554		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, @LPB	;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	#BIT13, @SWR
BNE	T2B5
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	T2B5:	MOV	#12, @LPB	: ISSUE LINE FEED
1951	005350	105777	173424			TSTB	@LPS	: TEST READY
1952	005354	100375				BPL	-4	: WAIT FOR READY
1953	005356	005237	001044			INC	CYCCNT	: INCREMENT LINE COUNT
1954	005362	001241				BNE	T2B0	: CONTINUE IF NOT DONE
1955	005364	032777	010000	173412		BIT	#BIT12, @SWR	: CHECK TO LOOP ON TEST
1956	005372	001213				BNE	TEST3	: LOOP
1957								
1958								: 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

CHCHK:

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
JSR
M=M+1

TN04,MES15
%4,PRNT

;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		CRO:	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	CRO	; BRANCH IF NOT DONE
1987	005534	005237	001044			INC	CYCCNT	; INCREMENT CYCLE COUNT

1988 005540 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:	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	CHCHK	; 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: CMP #176,SWR ;S/W SWR ?
2019 005662 001002 BNE 15 ;NO- CONTINUE
2020 005664 004737 011762 JSR PC,ENABL ;ENABLE KEYBOARD INTERRUPT
2021 005670 15:
2022 005670 004437 011472 JSR %4,TYPINT
2023 005674 013737 014570 014050 MOV TN05,MES15 ;SET TEST NUMBER FOR MESSAGE
2024 005702 004437 011406 JSR %4,PRNNT ;PRINT TEST NUMBER
2025 000006 M=M+1
2026 005706 012737 177760 001042 MOV #-16.,LINCNT ;SET LINE COUNT FOR 16 LINES
2027 005714 012737 177574 001036 OVR: MOV #-132.,CHRCNT ;SET CHAR COUNT
2028 005722 012737 177776 001044 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 000040 001040 MOV #40,CHRCNT ;SEND SPACE
2032 005752 000406 BR OVR2 ;BRANCH
2033 005754 012737 000105 001040 OVR4: MOV #105,CHRCNT ;SEND E

```


SEQ 0052

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

2042 006016 003361

BGT OVR1

BRANCH IF NOT DONE SPACES

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

OVR5:

BEG
INC
BEG
INC

OVR4
CHRCNT
OVR8
CYCCNT

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

2047	006034	001352				BNE	OVR1		
2048	006036	012777	000015	172736		MOV	#15, @LPB		;CONTINUE SENDING E'S IF NOT DONE
2049	006044				OVR6:				;SEND CR
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	OVR0		;NO, CONTINUE OVER PRINT
2054	006060	005237	001042			INC	LINCNT		;YES, INCREMENT LINE COUNT
2055	006064	001425				BEQ	OVR6EXT		;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							
2063	006126	012777	000012	172646	OVR8:	JMP	OVR2			
						MOV	#12, @LPB			

:PRINT LINE OF M'S
: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
2069      ;TEST 6
2070      ;PRINT CONTROL TEST
2071      ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
2072      ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
2073 006150
2074 006150 022737 000176 001004 PRTCTL:  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 15:          JSR      %4,TYPINT
  
```


2079	006170	013737	014572	014050		MOV	TN06, MES15		; SET TEST NUMBER FOR MESSAGE
2080	006176	004437	011406			JSR	%4, PRNNT		; PRINT TEST NUMBER
2081		000007				M=M+1			
2082	006202	012737	000060	001054		MOV	#60, STRCHR		; FIRST START CHAR
2083	006210	032777	020000	172566	PRT0:	BIT	#BIT13, @SWR		; TEST FOR CHAR SET
2084	006216	001404				BEQ	PRT1		; BRANCH IF 64 CHARS
2085	006220	012737	177641	001034		MOV	#-95, SEGCNT		; SET OVERFLOW COUNT
2086	006226	000403				BR	PRT2		; BRANCH
2087	006230	012737	177701	001034	PRT1:	MOV	#-63, SEGCNT		; SET OVERFLOW COUNT
2088	006236	012737	177574	001036	PRT2:	MOV	#-132, CHRCNT		; SET CHAR COUNT
2089	006244	013737	001054	001040		MOV	STRCHR, 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				BEQ	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		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

MLF:

15:

MLFA:

MLFO:

ERR41:

MLF1:

MLF2:

2157 006622 001367
2158 006624 005237 001054

BNE
INC

MLF2
STRCHR

;CONTINUE
;NEXT CHR


```

2159 006630 000726          BR      MLFA          ;CONTINUE
2160
2161 006632 033462 033062 033463 TABSTR: .ASCIZ /272637463540/
2162 006640 033064 032463 030064
2163 006646      000
2164
2165      006650          .EVEN
2166
2167 006650 032777 010000 172126 MLF4:  BIT      #BIT12,@SWR      ;CHECK LOOP ON TEST
2168 006656 001273          BNE      MLF          ;LOOP
2169          .EVEN
2170
2171          ;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,ERCOUNT      ;SET UP ERROR COUNT 42
2200      000043      N=N+1
2201 007036 004537 011722          JSR      %5,STAER      ;REPORT ERROR SET
2202 007042 000000          HALT      ;HALT ON ERROR
2203 007044 013777 001040 171730      HS2:   MOV      CHRGEN,@LPB      ;LOAD BUFFER
2204 007052 005237 001036          INC      CHRCNT      ;INCREMENT CHAR COUNT
2205 007056 001424          BEQ      HS4      ;BRANCH IF DONE LINE
2206 007060 005237 001040          INC      CHRGEN      ;NEXT CHAR
2207 007064 005237 001044          INC      CYCCNT      ;INCREMENT GROUP COUNT
2208 007070 001410          BEQ      HS3      ;BRANCH IF DONE GROUP
2209 007072 023737 001060 001040      CMP      LEGCHR,CHRGEN      ;LEGAL CHAR?
2210 007100 001350          BNE      HS1      ;BRANCH AND CONTINUE IF LEGAL CHAR
2211 007102 163737 001062 001040      SUB      NUMCHR,CHRGEN      ;MAKE LEGAL
2212 007110 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 HS0 ;CONTINUE IF LEGAL START CHAR
2224 007170 063737 001062 001054 ADD NUMCHR, STRCHR ;MAKE LEGAL AND CONTINUE
2225 007176 000700 BR HS0 ;CONTINUE
2226 007200 032777 010000 171576 HS6: BIT #BIT12, @SWR ;LOOP ON TEST?
2227 007206 001224 BNE HSPRT ;LOOP
2228
2229
2230 007210 000137 007460 JMP SNGCHR ;JUMP TO TEST 9 AFTER COMPLETION
2231
2232
2233 ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
2234
2235 007214 032777 020000 171562 NHSPT: 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, CHRCNT ;SET CHARACTER COUNT = # COLUMNS
2247 007306 013737 001054 001040 MOV STRCHR, CHRCNT ;STORE STARTING CHARACTER
2248 007314 005777 171460 NHS1: TST @LPS ;TEST FOR ERROR
2249 007320 100006 BPL NHS2 ;BRANCH IF NO ERROR
2250 007322 012737 000043 001052 ERR43: MOV #43, ERCOUNT ;SET UP ERROR COUNT 43
2251 000044 N=N+1
2252 007330 004537 011722 JSR %5, STAER ;REPORT ERROR SET
2253 007334 000000 HALT ;HALT ON ERROR
2254 007336 013777 001040 171436 NHS2: MOV CHRCNT, @LPB ;LOAD PRINTER BUFFER
2255 007344 005237 001036 INC CHRCNT ;INCREMENT CHARACTER COUNT
2256 007350 001413 BEQ NHS4 ;BRANCH IF LINE DONE
2257 007352 063737 001064 001040 ADD OFFSET, CHRCNT ;NEXT CHARACTER
2258 007360 023737 001060 001040 CMP LEGCHR, CHRCNT ;LEGAL CHARACTER
2259 007366 003352 BGT NHS1 ;BRANCH + CONTINUE IF LEGAL CHARACTER
2260 007370 163737 001062 001040 SUB NUMCHR, CHRCNT ;MAKE LEGAL
2261 007376 000746 BR NHS1 ;CONTINUE
2262 007400 012777 000012 171374 NHS4: MOV #12, @LPB ;SEND LINE FEED
2263 007406 105777 171366 TSTB @LPS ;TEST READY
2264 007412 100375 BPL -4 ;WAIT FOR READY
2265 007414 005337 001042 DEC LINCNT ;DECREMENT LINE COUNT
2266 007420 002413 BLT NHS6 ;EXIT IF TEST IS DONE
2267 007422 162737 000004 001054 SUB #4, STRCHR ;SKIP 4 LINES DOWN DRUM, FIND STARTING CHARACTER
2268 007430 022737 000040 001054 CMP #40, STRCHR ;START CHARACTER A LEGAL CHARACTER
2269 007436 003720 BLE NHS0 ;CONTINUE IF LEGAL START CHARACTER
2270 007440 063737 001062 001054 ADD NUMCHR, STRCHR ;MAKE LEGAL + CONTINUE
  
```



```

2271 007446 000714
2272 007450 032777 010000 171326 NHS6: BR      NHSO      ;CONTINUE
2273 007456 001256          BIT      #BIT12, @SWR ;LOOP ON TEST
2274          BNE      NHSPT      ;LOOP
2275
2276          ;TEST 9
2277          ;WORST CASE NOISE TEST
2278          ;SINGLE CHAR. ACROSS ALL COLS.
2279 007460
2280 007460 022737 000176 001004 SNGCHR: 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
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, ERCOUNT ;SET UP ERROR COUNT 44
2298          000045 N=N+1
2299 007570 004537 011722          JSR      %5, STAER ;REPORT ERROR
2300 007574 000000          HALT ;HALT ON ERROR
2301 007576 013777 001040 171176 XS1X: MOV      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
2320 007652 022737 000176 001004 ROTATE: 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
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      ;HALT ON ERROR
2355 010066 013777 001054 170706      ROT5: MOV      STRCHR,@LPB      ;LOAD BUFFER
2356 010074 023727 001040 000021      CMP      CHRGEN,#17      ;DONE GROUP?
2357 010102 001341      BNE      ROT3      ;NO GET NEXT CHAR
2358 010104 023727 001044 000010      CMP      CYCCNT,#8      ;DONE LINE?
2359 010112 001331      BNE      ROT2      ;NO, NEXT GROUP
2360 010114 012777 000012 170660      MOV      #12,@LPB      ;YES, SEND LF
2361 010122 105777 170652      TSTB      @LPS      ;TEST READY
2362 010126 100375      BPL      -4      ;WAIT FOR READY
2363 010130 005337 001042      DEC      LINCNT      ;DECREMENT LINE COUNT
2364 010134 023727 001042 000037      CMP      LINCNT,#37      ;DONE?
2365 010142 003313      BGT      ROT1      ;NO, NEXT LINE
2366 010144 032777 010000 170632      BIT      #BIT12,@SWR      ;LOOP ON TEST?
2367 010152 001237      BNE      ROTATE      ;LOOP
2368
2369 010154 000137 010412      JMP      LFTTR      ;JUMP TO TEST 11 AFTER COMPLETION
2370
2371
2372      ;NEW DRUM (LP14) PATTERN CHARACTER TEST
2373
2374 010160 032777 020000 170616      NROTAT: BIT      #BIT13,@SWR      ;TEST CHARACTER SET
2375 010166 001012      BNE      NROTO      ;SKIP IF 96 CHARACTERS
2376 010170 012737 000137 001042      MOV      #137,LINCNT      ;LAST CHARACTER
2377 010176 012737 000140 001060      MOV      #140,LEGCHR      ;LEGAL CHECK
2378 010204 012737 000100 001062      MOV      #100,NUMCHR      ;# OF CHARACTERS
2379 010212 000411      BR      NROT1      ;CONTINUE
2380 010214 012737 000177 001042      NROTO: MOV      #177,LINCNT      ;LAST CHARACTER
2381 010222 012737 000200 001060      MOV      #200,LEGCHR      ;LEGAL CHECK
2382 010230 012737 000140 001062      MOV      #140,NUMCHR      ;# OF CHARACTERS
  
```


2383	010236	012737	000040	001040	NROT1:	MOV	#40, CHRG	: GET POINTER
2384	010244	005237	001040		NROT6:	INC	CHRG	: SET POINTER
2385	010250	013737	001040	001054		MOV	CHRG, STRCHR	: STORE POINTER
2386	010256	005037	001036			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	ALPS	: TEST FOR ERRORS
2393	010316	100006				BPL	NROT5	: BRANCH IF NO ERRORS
2394	010320	012737	000046	001052	ERR46:	MOV	#46, ERCOUNT	: SET UP ERROR COUNT 46
2395		000047				N=N+1		
2396	010326	004537	011722			JSR	%5, STAER	: REPORT ERROR
2397	010332	000000				HALT		
2398	010334	013777	001054	170440	NROT5:	MOV	STRCHR, ALPB	: 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, ALPB	: YES, SEND LINE FEED
2402	010360	105777	170414			TSTB	ALPS	: TEST READY
2403	010364	100375				BPL		: WAIT FOR READY
2404	010366	005337	001042			DEC	LINCNT	: DECREMENT LINE COUNT
2405	010372	023727	001042	000037		CMP	LINCNT, #37	: PATTERN FINISHED
2406	010400	003321				BGT	NROT6	: NO, DO NEXT LINE
2407	010402	032777	010000	170374		BIT	#BIT12, ASWR	: LOOP ON TEST
2408	010410	001263				BNE	NROTAT	: LOOP
2409								
2410								
2411								
2412								
2413								
2414								
2415	010412							
2416	010412	022737	000176	001004	LFTTR:	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	TNO13, MES15	: SET TEST NUMBER FOR MESSAGE
2422	010440	004437	011406			JSR	%4, PRNNT	: PRINT TEST NUMBER
2423		000014				N=N+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, CHRG	: FIND FIRST CHAR ON LINE
2428	010474	022737	000022	001040	LFT1:	CMP	#18, CHRG	: MORE THAN 17 CHARS?
2429	010502	003004				BGT	LFT2	: BRANCH IF LESS THAN 17
2430	010504	162737	000021	001040		SUB	#17, CHRG	: SUBTRACT 17, IF > 17
2431	010512	000770				BR	LFT1	: CONTINUE
2432	010514	005437	001040		LFT2:	NEG	CHRG	: NEGATE CHRG
2433	010520	062737	000100	001040		ADD	#100, CHRG	: START CHAR IN CHRG
2434	010526	013737	001040	001054		MOV	CHRG, STRCHR	: STORE STARTING CHAR
2435	010534	005777	170240		LFT3:	TST	ALPS	: TEST FOR ERROR
2436	010540	100006				BPL	LFT4	: CONTINUE IF NO ERROR
2437	010542	012737	000047	001052	ERR47:	MOV	#47, ERCOUNT	: SET UP ERROR COUNT 47
2438		000050				N=N+1		

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

: STARTING WITH A LEFT TRIANGLE

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								
2461								
2462								
2463	010660	012737	000001	001042	PTTR:	MOV	#1, LINCNT	:INITIALIZE LINE
2464	010666	012737	000077	001040	RT1:	MOV	#77, CHRGEN	:FIRST CHAR IS A ?
2465	010674	013737	001042	001044		MOV	LINCNT, CYCCNT	:SAVE NO. CHARS ON LINE
2466	010702	012737	177757	001056		MOV	#-17, STRCNT	:SET GROUP COUNT
2467	010710	012737	000204	001036		MOV	#132, CHRCNT	:NO CHARS PER LINE
2468	010716	163737	001042	001036		SUB	LINCNT, CHRCNT	:SUBTRACT NO. OF CHARS ON LINE
2469	010724	001425				BEQ	RT3	:BRANCH IF NO SPACES ON THIS LINE
2470	010726	005777	170046		RT2:	TST	@LPS	:TEST FOR ERROR
2471	010732	100006				BPL	RT2A	:CONTINUE IF NO ERROR
2472	010734	012737	000050	001052	ERR50:	MOV	#50, ERCOUNT	:SET UP ERROR COUNT 50
2473		000051				N=N+1		
2474	010742	004537	011722			JSR	%5, STAER	:REPORT ERROR SET
2475	010746	000000				HALT		:HALT ON ERROR
2476	010750	012777	000040	170024	RT2A:	MOV	#40, @LPB	:LOAD BUFFER
2477	010756	005237	001056			INC	STRCNT	:INCREMENT GROUP COUNT
2478	010762	001003				BNE	RT2AA	:BRANCH IF NOT DONE GROUP
2479	010764	012737	177757	001056		MOV	#-17, STRCNT	:RESET GROUP COUNT
2480	010772	005337	001036		RT2AA:	DEC	CHRCNT	:DECREMENT SPACE COUNT
2481	010776	001353				BNE	RT2	:BRANCH IF NOT DONE SPACES
2482	011000	005777	167774		RT3:	TST	@LPS	:TEST FOR ERROR
2483	011004	100006				BPL	RT3A	:CONTINUE IF NO ERROR
2484	011006	012737	000051	001052	ERR51:	MOV	#51, ERCOUNT	:SET UP ERROR COUNT 51
2485		000052				N=N+1		
2486	011014	004537	011722			JSR	%5, STAER	:REPORT ERROR SET
2487	011020	000000				HALT		:HALT ON ERROR
2488	011022	013777	001040	167752	RT3A:	MOV	CHRGEN, @LPB	:LOAD BUFFER
2489	011030	005237	001040			INC	CHRGEN	:NEXT CHAR
2490	011034	005237	001056			INC	STRCNT	:INCREMENT GROUP COUNT
2491	011040	001006				BNE	RT3B	:BRANCH IF NOT DONE GROUP
2492	011042	012737	177757	001056		MOV	#-17, STRCNT	:RESET GROUP COUNT
2493	011050	162737	000021	001040		SUB	#17, CHRGEN	:GET FIRST GROUP CHAR
2494	011056	005337	001044		RT3B:	DEC	CYCCNT	:DECREMENT CHAR COUNT

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				
2510	011132	001002			CMP	#176, SWR		;S/W SWR ?
2511	011134	004737	011762		BNE	15		;NO- CONTINUE
2512	011140				JSR	PC, ENABL		;ENABLE KEYBOARD INTERRUPT
2513	011140	004437	011472					
2514	011144	013737	014606	014050	JSR	%4, TYPINT		
2515	011152	004437	011406		MOV	TN014, MES15		;SET TEST NUMBER FOR MESSAGE
2516		000015			JSR	%4, PRNNT		;PRINT TEST NUMBER
2517	011156	012737	177701	001042	M=M+1			
2518	011164	012737	177574	001026	MOV	#-63, LINCNT		;SET UP FOR 63 LINES
2519	011172	005777	167602		MOV	#-132, CHRCNT		;SET CHAR COUNT
2520	011176	100006			TST	@LPS		;CHECK FOR ERROR
2521	011200	012737	000052	001052	BPL	XHAM1		;BRANCH IF NO ERROR
2522		000053			MOV	#52, ERCOUNT		;SET UP ERROR COUNT 52
2523	011206	004537	011722		N=N+1			
2524	011212	000000			JSR	%5, STAER		;REPORT ERROR OCCURRED
2525	011214				HALT			;HALT ON ERROR
2526	011214	105777	167560					
2527	011220	100375			XHAM1:			
2528	011222	100375			TSTB	@LPS		;TEST READY
2529	011224	012777	000105	167550	BPL	-4		;WAIT FOR READY
2530	011232	005237	001036		BPL	-4		;WAIT FOR READY
2531	011236	001355			XHAM1X:			
2532	011240	012777	000012	167534	MOV	#105, @LPB		;TRANSMIT E TO PRINTER
2533	011246	105777	167526		INC	CHRCNT		;+1 CHAR COUNT
2534	011252	100375			BNE	HAM2		;TRANSMIT ANOTHER CHAR.
2535	011254	005237	001042		MOV	#12, @LPB		;TRANSMIT LINE FEED
2536	011260	001341			TSTB	@LPS		;TEST READY
2537	011262	032777	010000	167514	BPL	-4		;WAIT FOR READY
2538	011270	001315			INC	LINCNT		;+1 TO COUNT
2539					BNE	HAM1X		;GO DO NEXT LINE
2540	011272	032777	040000	167504	BIT	#BIT12, @SWR		;CHECK TO LOOP ON TEST
2541	011300	001402			BNE	HAMALN		;LOOP ON TEST
2542	011302	000137	014616					
2543	011306				BIT	#BIT14, @SWR		;DAVFU AVAILABLE?
2544	011306	013700	000042		BEQ	HAMX		;NO, RECYCLE PRINTING TESTS
2545	011312	001405			JMP	DAVFU		;YES, DO DAVFU PRINTING TESTS
2546	011314	000005						
2547	011316				HAMX:			
2548	011316	004710			MOV	@#42, RC		
2549	011320	000240			BEQ	DOAGN		
2550	011322	000240			RESET			
					LOGICAL:			
					JSR	PC, (R0)		
					NOP			
					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 +0 ;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
2608
2609 011524 011600
2610 011526 062716 000002
2611 011532 011000
2612 011534 112037 011636
2613 011540 001001
2614 011542 000002
2615 011544 122737 000045 011636
2616 011552 001416
2617 011554 122737 000043 011636
2618 011562 001417
2619 011564 004737 011572
2620 011570 000761
2621 011572 113777 011636 167212
2622 011600 105777 167212
2623 011604 100375
2624 011606 000207
2625 011610 112737 000012 011636
2626 011616 004737 011572
2627 011622 112737 000015 011636
2628 011630 004737 011572
2629 011634 000737
2630 011636 000000
2631
2632
2633
2634
2635
2636
2637
2638
2639
2640
2641 011640 013537 011720
2642 011644 012501
2643 011646 012502
2644 011650 060201
2645 011652 013703 011720
2646 011656 042703 177770
2647 011662 062703 000060
2648 011666 110341
2649 011670 000241
2650 011672 006037 011720
2651 011676 000241
2652 011700 006037 011720
2653 011704 000241
2654 011706 006037 011720
2655 011712 005302
2656 011714 001356
2657 011716 000205
2658
2659 011720 000000
2660
2661
2662

; SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
TYP:  MOV  @%6,%0      ; GET ADDR. THAT CONTAINS MESS.
      ADD  #2,@%6      ; SET UP EXIT
      MOV  @%0,%0      ; ADDRESS OF MESSAGE IN RO
      TYFA: MOVB (0)+,TYPDAT ; GET CHARACTER
            BNE  TYPC    ; BRANCH IF NOT DONE
            RTI         ; EXIT
      TYPC: CMPB  #45,TYPDAT ; CHECK FOR "%"
            BEQ  TYPF    ; BRANCH IF "%"
            CMPB  #43,TYPDAT ; CHECK FOR "#"
            BEQ  TYPG    ; BRANCH IF "#"
            JSR  %7,TYPD  ; TYPE CHARACTER IN TYPDAT
            BR   TYPA    ; NEXT CHAR IN MESSAGE
      TYPD: MOVB  TYPDAT,@TPB ; OUTPUT CHARACTER TO PRINTER
      TYPD: TSTB  @TPB
            BPL  -4
            RTS  %7      ; CHAR. TYPED EXIT
      TYPF: MOVB  #12,TYPDAT ; OUTPUT LF
            JSR  %7,TYPD  ; GO TYPE CHAR.
      TYPG: MOVB  #15,TYPDAT ; OUTPUT CR
            JSR  %7,TYPD  ; GO TYPE CHAR.
            BR   TYPA
      TYPDAT: 0

; ROUTINE TO CONVERT OCTAL TO ASCII
; ENTER ROUTINE AS FOLLOWS
; JSR  %5,CONV
; XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
; XXXXXX=ADDRESS OF ASCII MESSAGE
; XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
CONV:  MOV  @(%5)+,ACNVX ; ADDRSS OF NO. TO BE CONVERTED
      MOV  (5)+,%1      ; ADDRESS OF MESSAGE
      MOV  (5)+,%2      ; NUMBER OF ASCII CHARACTERS
      ADD  %2,%1        ; FIRST CHAR ADDRESS
      ACVN: MOVB ACNVX,%3 ; STORE NUMBER
            BIC  #177770,%3 ; ISOLATE LEAST SIGNIFICANT BIT
            ADD  #60,%3   ; SET UP ASCII CHARACTER
            MOVB %3,-(1)  ; STORE CHARACTER
            CLC          ; GET NEXT SIGNIFICANT BIT ...
            ROR  ACNVX
            CLC
            ROR  ACNVX
            CLC
            ROR  ACNVX
            DEC  %2
            BNE  ACVN
            RTS  %5
      ACNVX: 0 ; WORK REGISTER

; ROUTINE TO REPORT ERROR COUNT

```



```

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
2693 ; KEYBOARD INTERRUPT ROUTINE
2694 ; FOR ACCESS TO THE S/W SWITCH REGISTER
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 TYPWR ; 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 DOTS ; 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				ENT	+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				ENT	+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				ENT	+0	: PRINT SWR VALUE
2759	012332	014542				MES25		
2760	012334	104000				ENT	+0	: PRINT HEADER
2761	012336	014523				MES24		
2762	012340	000404				BR	TK7	: RETURN FROM INTERRUPT
2763	012342	005037	001070		TK3:	CLR	SIGNAL	: CLEAR CONTROL-G FLAG
2764	012346	104000			TK4:	ENT	+0	: PRINT LINE FEED AND CARRIAGE RETURN
2765	012350	014504				MES21		
2766	012352	005037	001066		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:	ASCII	/	ERROR COUNT % /
012422	051105	047522	020122	MESA:	ASCII	/	ERROR SET OK - CLEAR & TURN ON LINE % /
012467	105	051122	051117	MESB:	ASCII	/	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		ASCII	/	PUT SWITCH 0 DOWN AT END OF 1 MINUTE % /
012721	045	052123	051101	MESDD:	ASCII	/	STARTING DAVFU PRINTING TESTS % /
012761	045	050114	032460	MES1:	ASCII	/	LP05-LP11-LP14 LINE PRINTER TEST % /
013024	042522	052123	051101	MES2:	ASCII	/	RESTART ADDRESS 600 % /
013051	045	047520	042527	MES3:	ASCII	/	POWER ON - TURN ON LINE % /
013103	117	020116	044514	MES4:	ASCII	/	ON LINE OK - TRY TORN PAPER SWITCH % /
013147	122	040505	054504	MES5:	ASCII	/	READY SET OK - TRY DRUM GATE SWITCH % /
013214	051105	047522	020122	MES6:	ASCII	/	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:	ASCII	/	INCHES % /
	013326						
013326	026455	026455	026455	MES9:	ASCII	/	----- THIS LINE SHOULD BE /
013423	040	020040	020040	MES10:	ASCII	/	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:	ASCII	/	LINES PER MINUTE % /
013624	026455	026455	026455	MES13:	ASCII	/	-----
013706	026455	026455	026455		ASCII	/	-----
013770	026455	026455	026455		ASCII	/	----- # /
014032	005012	042524	052123	MES14:	ASCII	/	<12><12> / TEST NUMBER /
014050	020040	005012	000012	MES15:	ASCII	/	/ <12><12><12>
014056	044124	051511	046040	MES16:	ASCII	/	THIS LINE SHOULD BE PRINTED # /
014113	040	020040	020040	MES17:	ASCII	/	ALL ON ONE LINE --- IF SLEWED 0 LINES % /
014216	026455	026455	026455	MES18:	ASCII	/	----- THERE SHOULD BE /
014310	020040	020040	020040	MES19:	ASCII	/	BLANK LINES BEFORE THIS LINE -----
014424	052040	051505	044524	MES20:	ASCII	/	TESTING CHANNEL SLEWING USING CHANNEL NO. /
014500	020040	000		MES20A:	ASCII	/	/
	014504						
014504	000045			MES21:	ASCII	/	/
014506	037440	000045		MES22:	ASCII	/	/
014512	051445	051127	036440	MES23:	ASCII	/	SWR = /
014523	040	020040	042516	MES24:	ASCII	/	NEW SWR = /
014542	020040	020040	020040	MES25:	ASCII	/	/
	014552						
014552	030504			TNDAY1:	ASCII	/	TEST NUMBERS FOR DAVFU TESTS
014554	031104			TNDAY2:	ASCII	/	/
014556	031504			TNDAY3:	ASCII	/	/
014560	020061			TN01:	ASCII	/	/
014562	020062			TN02:	ASCII	/	/
014564	020063			TN03:	ASCII	/	/
014566	020064			TN04:	ASCII	/	/

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

```

2773
2774
2775
2780
2781
2782
2783
2784 014616
2785 014616 022737 000176 001004
2786 014624 001002
2787 014626 004737 011762
2788 014632
2789 014632 004437 011472
2790 014636 013737 016676 014312
2791 014644 104000
2792 014646 012721
2793 014650 012737 000220 015244
2794 014656 012737 000221 015346
2795 014664 013737 014552 014050
2796 014672 004437 011406
2797 014676 012737 015276 001040
2798 014704 005777 164070
2799 014710 100010
2800 014712 012737 000054 001052
2801 000055
2802 014720 004537 011722
2803 014724 000000
2804 014726 000137 014676
2805 014732 017777 164102 164042
2806 014740 062737 000002 001040
2807 014746 005777 164066
2808 014752 001405
2809 014754 105777 164020
2810 014760 100375
2811 014762 000137 014704
2812 014766 012737 000002 001044
2813 014774 012737 014056 011470
2814 015002 004437 011452
2815 015006 005777 163766
2816 015012 100006
2817 015014 012737 000055 001052
2818 000056
2819 015022 004537 011722
  
```

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

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

DAV0:

DAV00:

ERR54:

DAV1:

D5:

D0:

ERR55:

2820	015026	000000				HALT			
2821	015030	013777	015344	163744	D1:	MOV	DAV11, @LPB		; HALT ON ERROR
2822	015036	105777	163736			TSTB	@LPS		; SEND DAVFU INSTRUCTION, SKIP 0 LINES
2823	015042	100375				BPL	-4		; TEST READY
2824	015044	012737	014113	011470		MOV	#MES17, PRTMSG		; WAIT FOR READY
2825	015052	004437	011452			JSR	%4, RINT		; SET PRINTER MESSAGE ADDRESS
2826	015056	012737	014216	011470		MOV	#MES18, PRTMSG		; PRINT MESSAGE
2827	015064	013737	015346	001040		MOV	DAV12, CHRG		; SET MESSAGE ADDRESS
2828	015072	012737	014560	001054		MOV	#TNO1, STRCHR		; FIRST DAVFU INSTRUCTION
2829	015100	012737	000017	001036		MOV	#15, CHRCNT		; SET TABLE POINTER
2830	015106	005777	163666		D2:	TST	@LPS		; SET TABLE COUNT
2831	015112	100006				BPL	D3		; TEST FOR ERROR
2832	015114	012737	000056	001052	ERR56:	MOV	#56, ERRCOUNT		; CONTINUE IF NO ERRORS
2833		000057				N=N+1			; SET UP ERROR COUNT 56
2834	015122	004437	011722			JSR	%4, STAER		; REPORT ERROR SET
2835	015126	000000				HALT			; HALT ON ERROR
2836	015130	013777	001040	163644	D3:	MOV	CHRG, @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	CHRG		; 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	DAV11		; 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					: TEST D3		
2886					: CHECK DAVFU CHANNEL SLEW COMMANDS		
2887							
2888	015350				DAV2:		
2889	015350	022737	000176	001004	CMP	#176, SWR	: S/W SWR ?
2890	015356	001002			BNE	15	: NO- CONTINUE
2891	015360	004737	011762		JSR	PC, ENABL	: ENABLE KEYBOARD INTERRUPT
2892	015364				15:		
2893	015364	004437	011472		JSR	%4, TYPINT	: INITIALIZE
2894	015370	013737	016676	014312	MOV	SPSP, MES19+2	
2895	015376	013737	014556	014050	MOV	TNDV3, MES15	: SAT TEST NUMBER FOR MESSAGE
2896	015404	004437	011406		JSR	%4, PRNNT	: PRINT TEST NUMBER D3
2897	015410	012737	016660	016142	MOV	#MTAB, MTABP	: SET MESSAGE TABLE POINTER
2898	015416	012737	016626	016136	MOV	#ITAB, ITABP	: SET INSTRUCTION TABLE POINTER
2899	015424	017737	000506	001054	MOV	@ITABP, STRCHR	: SAT FIRST INSTRUCTION
2900	015432	012737	014560	016144	MOV	#TN01, HTABP	: SET HEADER MESSAGE TABLE POINTER
2901	015440	012737	016610	016140	MOV	#ICTAB, ICTABP	: SET INSTR COUNT TABLE POINTER
2902	015446	017737	000466	001056	MOV	@ICTABP, STRCNT	: GET FIRST INSTR COUNT
2903	015454	012737	016146	016134	LOAD: MOV	#DTAB, DTABP	: SET DATA TABLE POINTER
2904	015462	017737	000446	001040	MOV	@DTABP, CHRGEN	: SET FIRST DATA PAIR
2905	015470	005777	163304		TST	@LPS	: TEST FOR ERROR
2906	015474	100007			BPL	DL1	: BRANCH IF NO ERROR
2907	015476	012737	000057	001052	ERR57: MOV	#57, ERCOUNT	: SET UP ERROR COUNT 57
2908		000060			N=N+1		
2909	015504	004537	011722		JSR	%5, STAER	: REPORT ERROR SET
2910	015510	000000			HALT		: HALT ON ERROR
2911	015512	000760			BR	LOAD	: RESTART LOAD
2912	015514	012737	000002	001036	DL1: MOV	#2, CHRCNT	: SET PAIR COUNT
2913	015522	013777	001040	163252	DL2: MOV	CHRGEN, @LPB	: LOAD DAVFU
2914	015530	105777	163244		TSTB	@LPS	: TEST READY
2915	015534	100375			BPL	-4	: WAIT FOR READY
2916	015536	005777	163236		TST	@LPS	: TEST FOR ERROR
2917	015542	100010			BPL	DL6	: BRANCH IF NO ERROR
2918	015544	012737	000060	001052	ERR60: MOV	#60, ERCOUNT	: SET UP ERROR COUNT 60
2919		000061			N=N+1		
2920	015552	004537	011722		JSR	%5, STAER	: REPORT ERROR SET
2921	015556	000000			HALT		: HALT ON ERROR
2922	015560	000137	015454		JMP	LOAD	: RESTART LOAD
2923	015564	022737	000356	001040	DL6: CMP	#356, CHRGEN	: LOAD COMMAND?
2924	015572	001407			BEQ	DL6A	: YES, SEND ONLY ONCE
2925	015574	022737	000357	001040	CMP	#357, CHRGEN	: LOAD COMMAND?
2926	015602	001403			BEQ	DL6A	: YES, SEND ONLY ONCE
2927	015604	005337	001036		DEC	CHRCNT	: DEC PAIR COUNT
2928	015610	001344			BNE	DL2	: FINISH PAIR IF NOT DONE
2929	015612	062737	000002	016134	DL6A: ADD	#2, DTABP	: INC DATA TABLE POINTER
2930	015620	017737	000310	001040	MOV	@DTABP, CHRGEN	: SET NEXT DATA PAIR
2931	015626	022737	077777	001040	CMP	#77777, CHRGEN	: DONE LOAD?


```

2932 015634 001327          BNE    DL1
2933
2934          ; START OF CHANNEL SLEW TESTS
2935
2936 015636          DL8:
2937 015636 013777 001054 163136  MOV    STRCHR, @LPB      ; SEND DAVFU INSTRUCTION
2938 015644 105777 163130          TSTB   @LPS              ; TEST READY
2939 015650 100375          BPL     -4                ; WAIT FOR READY
2940 015652 105777 163122          TSTB   @LPS              ; TEST READY
2941 015656 100375          BPL     -4                ; WAIT FOR READY
2942 015660
2943 015660 017737 000260 014500  DL8A:  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
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
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
2980 016124 000137 015350          JMP     DAV2          ; LOOP ON TEST
2981 016130 000137 004562          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
  
```


; DATA TABLE FOR DAVFU LOAD

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

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

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
3
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
201
202
203
204
205
206

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

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

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

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
3180 016706
3181 016710
3182 016714

022737 000176 001004
001002
004737 011762

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	MOV	#-132, CHRCNT	: SET CHAR COUNT
3186	016734	042737	177400	001050	BIC	#177400, SAVE	: MASK CHARACTER
3187	016742						
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

LDLPX.

3191	016754	100006				BPL	LPSCOPE		
3192	016756	012737	000062	001052	ERR62:	MOV	#62,	ERCOUNT	:BRANCH IF NO ERROR
3193		000063				N=N+1			:SET UP ERROR COUNT 62
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		JMP	@LOSCOP	;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			LOSCOP	LSCA	
3212							
3213							
3214							
3215							
3216		000001					
					END		

ACNUX	011720	2641*	2645	2650*	2652*	2654*	2659#											
ACVN	011652	2645#	2656															
B1T0	= 000001	937#	1484	1550														
B1T1	= 000002	936#																
B1T10	= 002000	927#	1528	2183	2329													
B1T11	= 004000	926#	3198															
B1T12	= 010000	925#	1887	1955	2006	2065	2120	2167	2226	2272	2311	2366	2407	2457				
		2502	2537	2855	2978													
B1T13	= 020000	924#	1520	1917	1945	2083	2185	2235	2288	2331	2374							
B1T14	= 040000	923#	960	1678	2540													
B1T15	= 100000	922#																
B1T2	= 000004	935#																
B1T3	= 000010	934#																
B1T4	= 000020	933#																
B1T5	= 000040	932#																
B1T6	= 000100	931#																
B1T7	= 000200	930#																
B1T8	= 000400	929#																
B1T9	= 001000	928#	2663															
CHAR	001074	1146#	1196*	2706*	2707*	2708	2710	2712	2715	2723	2724*	2733	2739*	2740*				
		2741	2745															
CHRCNK	005374	1010	1962#	2007														
CHRCNT	001036	1131#	1530*	1540*	1556*	1566*	1791*	1792*	1860*	1879*	1884*	1905*	1914*	1974*				
		1985*	2003*	2027*	2029	2044*	2052	2059*	2088*	2097*	2138*	2148*	2194*	2204*				
		2246*	2255*	2294*	2302*	2386*	2387*	2399	2425*	2427	2442*	2467*	2468*	2480*				
		2518*	2530*	2829*	2841*	2912*	2927*	3185*	3203*									
CHRE	005604	1973	1982	1998#														
CHPGEN	001040	1132#	1533*	1534*	1535	1537*	1539	1561*	1562	1564*	1565	1568*	1731*	1739				
		1740*	1741	1775*	1783	1784*	1785	1906*	1913	1916*	1919	1922	1928*	1935				
		1936*	1937	1939	1941	1943	1947*	1948	2031*	2033*	2034	2058*	2089*	2096				
		2100*	2114*	2139*	2147	2196*	2203	2206*	2209	2211*	2213*	2247*	2254	2257*				
		2258	2260*	2293*	2301	2307*	2342*	2343*	2344	2356	2383*	2384*	2385	2427*				
		2428	2430*	2432*	2433*	2434	2441	2446*	2448*	2464*	2488	2489*	2493*	2797*				
		2805	2806*	2807	2827*	2836	2843*	2904*	2913	2923	2925	2930*	2931					
CHRS	005602	1993	1997#															
CLKAV	002440	1461#																
CNTR	003250	1514*	1573#	1581*														
CNTRLG	012230	2705	2739#															
CONU	011640	2641#	2665	2754														
CONVRT	003264	973	1551	1582	1588#													
CR	005450	1974#	1992															
CRO	005456	1975#	1986															
CR1	005500	1976	1981#															
CR2	005504	1982#	1997															
CR3	005520	1984#	1995	2005														
CR5	005606	1988	1999#															
CR7	005562	1993#	1998															
CSBR	001022	1053#	1499*															
CYC CNT	001044	1134#	1532*	1542*	1859*	1885*	1903*	1953*	1972*	1987*	2002*	2028*	2046*	2061*				
		2195*	2207*	2214*	2340*	2341*	2358	2426*	2444*	2449*	2465*	2494*	2812*	2846*				
DAVAV	003710	1669	1674#															
DAVU	014616	991	2542	2784#	2858													
DAV11	015344	2793*	2821	2848*	2853*	2882#												
DAV12	015346	2794*	2827	2849*	2854*	2883#												
DAVTAB	015276	2797	2861#															
DAVO	014676	2797#	2804															

DAV00	014704	2798#	2811																
DAV1	014732	2799	2805#																
DAV2	015350	992	2857	2888#	2980														
DEMO	015242	2847	2853#																
DGTS	012212	2709	2735#																
DIA	003252	1483*	1500*	1515*	1574*	1588*													
DIGITS	001066	1143#	1194*	2718*	2719	2725	2735	2766*											
DISPLA	001006	1047#	1162*																
DISPRE	000174	977#	1162																
DLEX	016130	2979	2981#																
DL1	015514	2906	2912#	2932															
DL10	015742	2950	2956#																
DL10A	015770	2958	2961#																
DL10B	015776	2960	2962#																
DL12	016062	2970	2973#																
DL2	015522	2913#	2928																
DL6	015564	2917	2923#																
DL6A	015612	2924	2926	2929#															
DL8	015636	2936#	2976																
DL8A	015660	2942#																	
DL9	015700	2946#	2965																
DOAGN	011326	2545	2552#																
DTAB	016146	2903	2991#																
DTABP	016134	2903*	2904	2929*	2930	2983#													
DO	014774	2813#	2852																
D1	015030	2816	2821#																
D2	015106	2830#	2845																
D3	015130	2831	2836#																
D4	015202	2842	2846#																
D5	014766	2808	2812#																
ENABL	011762	1476	1494	1509	1631	1728	1771	1846	1897	1965	2020	2076	2131	2177					
		2282	2322	2418	2511	2682#	2787	2891	3181										
ENABLY	012000	2686#																	
ERCOUN	001052	1137#	1229*	1235*	1253*	1263*	1269*	1279*	1295*	1305*	1316*	1322*	1330*	1344*					
		1350*	1355*	1367*	1380*	1393*	1418*	1424*	1434*	1636*	1659*	1734*	1748*	1778*					
		1796*	1851*	1864*	1909*	1931*	1977*	2037*	2092*	2143*	2199*	2250*	2297*	2351*					
		2394*	2437*	2472*	2484*	2521*	2591*	2666	2800*	2817*	2832*	2907*	2918*	2951*					
		3192*																	
ERR0	001342	1229#																	
ERR1	001364	1235#																	
ERR10	001674	1316#																	
ERR11	001716	1322#																	
ERR12	001746	1330#																	
ERR13	002004	1344#																	
ERR14	002026	1350#																	
ERR15	002042	1355#																	
ERR16	002102	1367#																	
ERR17	002142	1380#																	
ERR2	001460	1253#																	
ERR20	002202	1393#																	
ERR21	002302	1418#																	
ERR22	002324	1424#																	
ERR23	002364	1434#																	
ERR24	003512	1636#																	
ERR25	003616	1659#																	
ERR26	004130	1734#																	

ERR27	004212	1748#							
ERR3	001510	1263#							
ERR30	004322	1778#							
ERR31	004424	1796#							
ERR32	004610	1851#							
ERR33	004666	1864#							
ERR34	005110	1909#							
ERR35	005226	1931#							
ERR36	005464	1977#							
ERR37	005776	2037#							
ERR4	001532	1269#							
ERR40	006260	2092#							
ERR41	006532	2143#							
ERR42	007030	2199#							
ERR43	007322	2250#							
ERR44	007562	2297#							
ERR45	010052	2351#							
ERR46	010320	2394#							
ERR47	010542	2437#							
ERR5	001562	1279#							
ERR50	010734	2472#							
ERR51	011006	2484#							
ERR52	011200	2521#							
ERR53	011436	2591#							
ERR54	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						
HED0	012400	2670	2777#						
HED1	012401	2667	2777#						
HSPRT	006660	1014	2174#	2227					
HS0	007000	2194#	2223	2225					
HS00	006764	2189	2192#						
HS00A	006750	2186	2190#						
HS1	007022	2197#	2210	2212	2215				
HS2	007044	2198	2203#						
HS3	007112	2208	2213#						
HS4	007130	2205	2216#						
HS6	007200	2220	2226#						
HTABP	016144	2900#	2943	2967#	2987#				
ICTAB	016610	2901	2971	3139#					
ICTABP	016140	2901#	2902	2957	2968#	2969	2971#	2973	2985#
INDAT	004074	989	1679	1725#	1738	1752			

INDATT	004244	1731	1759#															
INDATO	004150	1733	1739#															
INDAT1	004232	1747	1753#															
INDO	004122	1732#	1745															
IND1	004204	1742	1746#															
INT1C	002246	1340	1407#															
INT1D	002400	1414	1441#															
ITAB	016626	2898	3149#															
ITABP	016136	2898*	2899	2974*	2975	2984#												
KH11L	002650	999	1467	1506#														
KH11P	002572	1000	1472	1491#														
LDCH	005242	1930	1935#	1944	1949													
LDLPX	016742	3187#	3204															
LEGCHR	001060	1140#	1522*	1525*	1527	1535	2187*	2190*	2209	2238*	2241*	2258	2334*	2338*				
		2346	2377*	2381*	2389													
LFT	010444	2424#																
LFTTP	010412	1017	2369	2415#	2458													
LFTO	010452	2425#	2455															
LFT1	010474	2428#	2431															
LFT2	010514	2429	2432#															
LFT3	010534	2435#	2447	2450														
LFT4	010556	2436	2441#															
LFIS	010606	2445	2448#															
LFT6	010624	2443	2451#	2456														
LINCNT	001042	1133#	1478*	1496*	1511*	1534	1546*	1591	1593*	1599	1601*	1606	1640*	1654				
		1667*	1668	1670	1971*	2004*	2026*	2054*	2056	2150*	2151*	2152*	2156*	2193*				
		2219*	2245*	2265*	2290*	2292*	2308*	2333*	2337*	2345	2363*	2364	2376*	2380*				
		2404*	2405	2424*	2425	2454*	2463*	2465	2468	2499*	2500	2517*	2535*					
LKS	001026	1055#	1464	1515	1516*													
LKSRV	003254	970	1581#															
LOAD	015454	2903#	2911	2922	2955													
LOGICA	011316	958	2547#															
LOSCOP	017044	1023*	1028*	3202	3211#													
LPB	001002	1041#	1243*	1247*	1313*	1539*	1547*	1565*	1663*	1739*	1783*	1790*	1878*	1881*				
		1913*	1925*	1935*	1950*	1984*	1989*	1999*	2034*	2048*	2063*	2096*	2103*	2147*				
		2157*	2203*	2216*	2254*	2262*	2301*	2304*	2355*	2360*	2398*	2401*	2441*	2451*				
		2476*	2488*	2496*	2529*	2532*	2570*	2596	2805*	2821*	2836*	2913*	2937*	2946*				
		3197*	3205*															
LPB	001000	1036#	1227	1233	1251	1261	1267	1277	1293	1303	1314	1320	1326	1342				
		1348	1361*	1363*	1373*	1375*	1386*	1388*	1399*	1401*	1416	1422	1432*	1442*				
		1548	1657	1664	1732	1743	1746	1776	1787	1794	1862	1882	1907	1926				
		1929	1951	1975	1990	2000	2035	2050	2090	2104	2141	2154	2197	2217				
		2248	2263	2295	2305	2349	2361	2392	2402	2435	2452	2470	2482	2497				
		2519	2526	2533	2564	2566	2571	2576	2589	2595	2798	2809	2815	2822				
		2830	2837	2905	2914	2916	2938	2940	2947	2949	3188	3190	3206					
LPSCOP	016772	3191	3197#															
LPS7	007642	2311#																
LP1	001710	1315	1320#	1329														
LP2	001732	1321	1326#															
LP2B	004702	1863	1868#															
LP2E	005124	1908	1913#															
LP2H	005214	1904	1928#															
LP3	002020	1343	1348#															
LP3X	002042	1349	1354#															
LP4	002316	1417	1422#															
LP5	002340	1423	1428#															

[illegible]

[illegible]

PSH	001010	1048#																		
PTPPSH	001032	1057#	1341#	1415*	1448*															
PTRVEC	001030	1056#	1340*	1414*	1447*															
RCHRSW	004730	1869	1874#																	
RDYOK	011354	2567	2570#																	
RINT	011452	1612	1666	2590	2595#	2814	2825	2840	2945	2963										
ROTATE	007652	1016	2319#	2367																
ROTO	007750	2332	2337#																	
POT1	007772	2336	2340#	2365																
POT2	007776	2341#	2359																	
POT3	010006	2343#	2357																	
POT4	010044	2347	2349#																	
POT5	010066	2350	2355#																	
RTTR	010660	2463#	2503																	
RT1	010666	2464#	2501																	
RT2	010726	2470#	2481																	
RT2A	010750	2471	2476#																	
RT2AA	010772	2478	2480#																	
RT3	011000	2469	2482#	2495																
RT3A	011022	2483	2488#																	
RT3B	011056	2491	2494#																	
SAVE	001050	1136#	1870*	1877*	1878	1983*	1984	1994*	3184*	3186*	3197									
SCHRSW	004726	1861	1873#	1876																
SCOPE	016700	1024	1028	1029	3178#	3201	3208													
SEGCNT	001034	1130#	2085*	2087*	2101*															
SET	001072	1145#	1195*	1201*	1203*	2702														
SETUP	001102	983	1153#																	
SIGNAL	001070	1144#	1193*	1209	2704	2748	2751*	2763*												
SKIP	001322	1192	1211#																	
SLEWCK	003464	1001	1613	1628#																
SLW	003526	1635	1640#																	
SLWO	003540	1642#	1671																	
SLW1	003550	1644#	1649																	
SLW1A	003610	1655	1657#																	
SLW11	003574	1654#	1673																	
SLW2	003632	1658	1663#																	
SNGCHR	007460	1015	2230	2279#	2312															
SPSP	016676	2790	2894	2961	2977	3172#														
STAER	011722	1231	1237	1255	1265	1271	1281	1297	1307	1318	1324	1332	1346	1352						
		1408	1420	1426	1436	1638	1661	1736	1750	1780	1798	1853	1866	1911						
		1933	1979	2039	2094	2145	2201	2252	2299	2353	2396	2439	2474	2486						
		2523	2593	2663#	2802	2819	2834	2909	2920	2953	3195									
STAER1	011750	2664	2671#																	
STARA	003016	1532#	1545																	
STARED	003114	1541	1546#	1567																
STARO	002722	1486	1502	1520#																
STAROA	002750	1521	1525#																	
STAROB	002772	1528#	1552																	
STAROC	002764	1524	1527#																	
STAR1	003060	1536	1539#	1543																
STP1	001334	1227#	1232																	
STP2	001356	1228	1233#	1238																
STP3	001400	1234	1239#																	
STP4	001406	1242#	1256																	
STP5	001474	1252	1257#																	
STP5A	001502	1261#	1266																	

[illegible]

[illegible]

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								
SPPINT	1076#	1855	1900	1968	2023	2079	2134	2180	2285	2325	2421	2514			
SSETPS	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: 3 6 . 9 SECONDS

RUN-TIME RATIO 101.11=9.2

CORE USED 9K (17 PAGES)

