LP11/LP05

LINE PRINTER TEST

MD-11-DZLPK-G

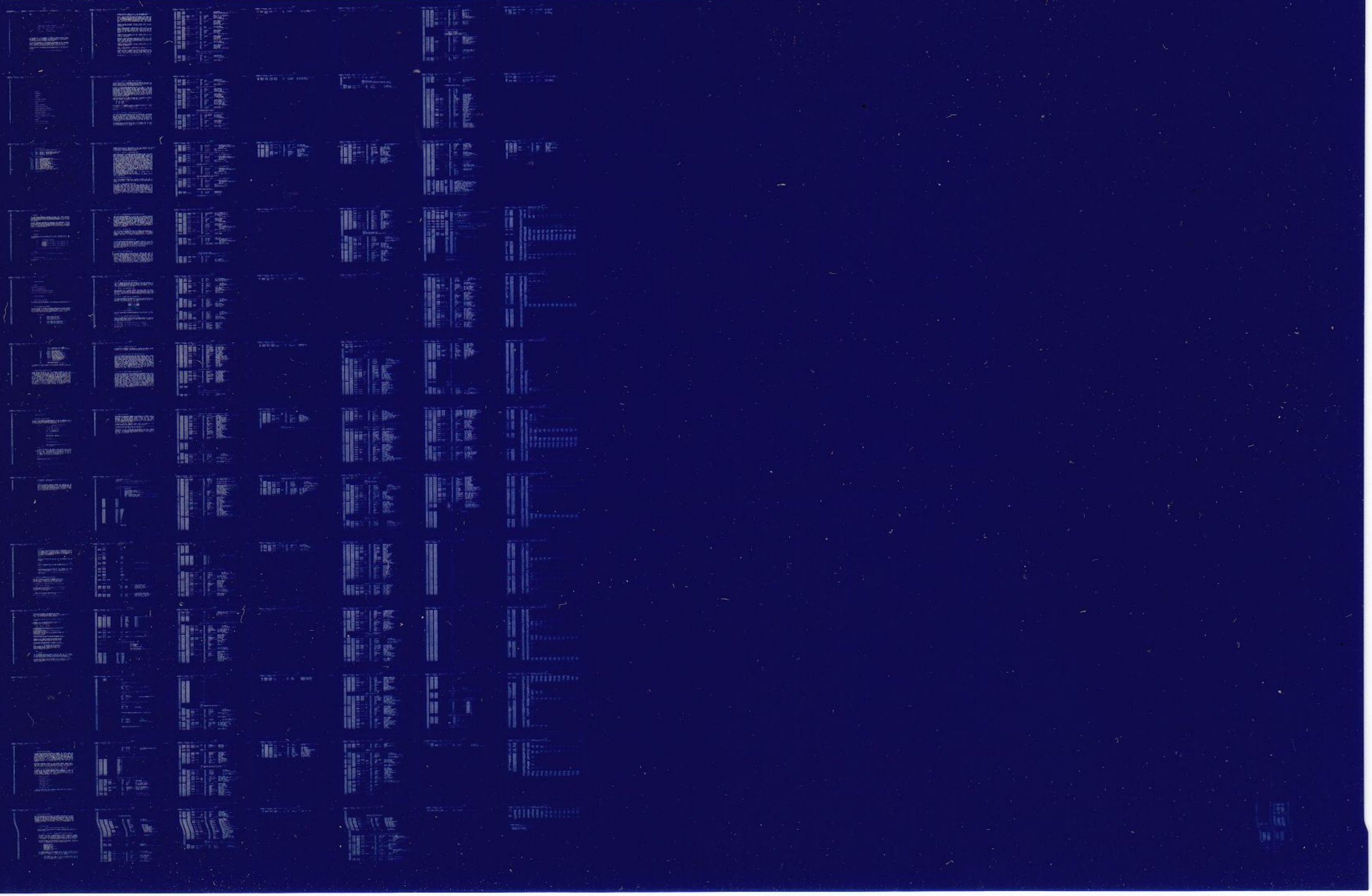
EP-DZLPK-G-DL-C

FICHE 1 OF 1

JUN 1977

digital

MADE IN USA



LP14/11/05

LINE PRINTER TEST

MD-11-DZLPK-G

EP-DZLPK-G-DL-C

FICHE 1 OF 1

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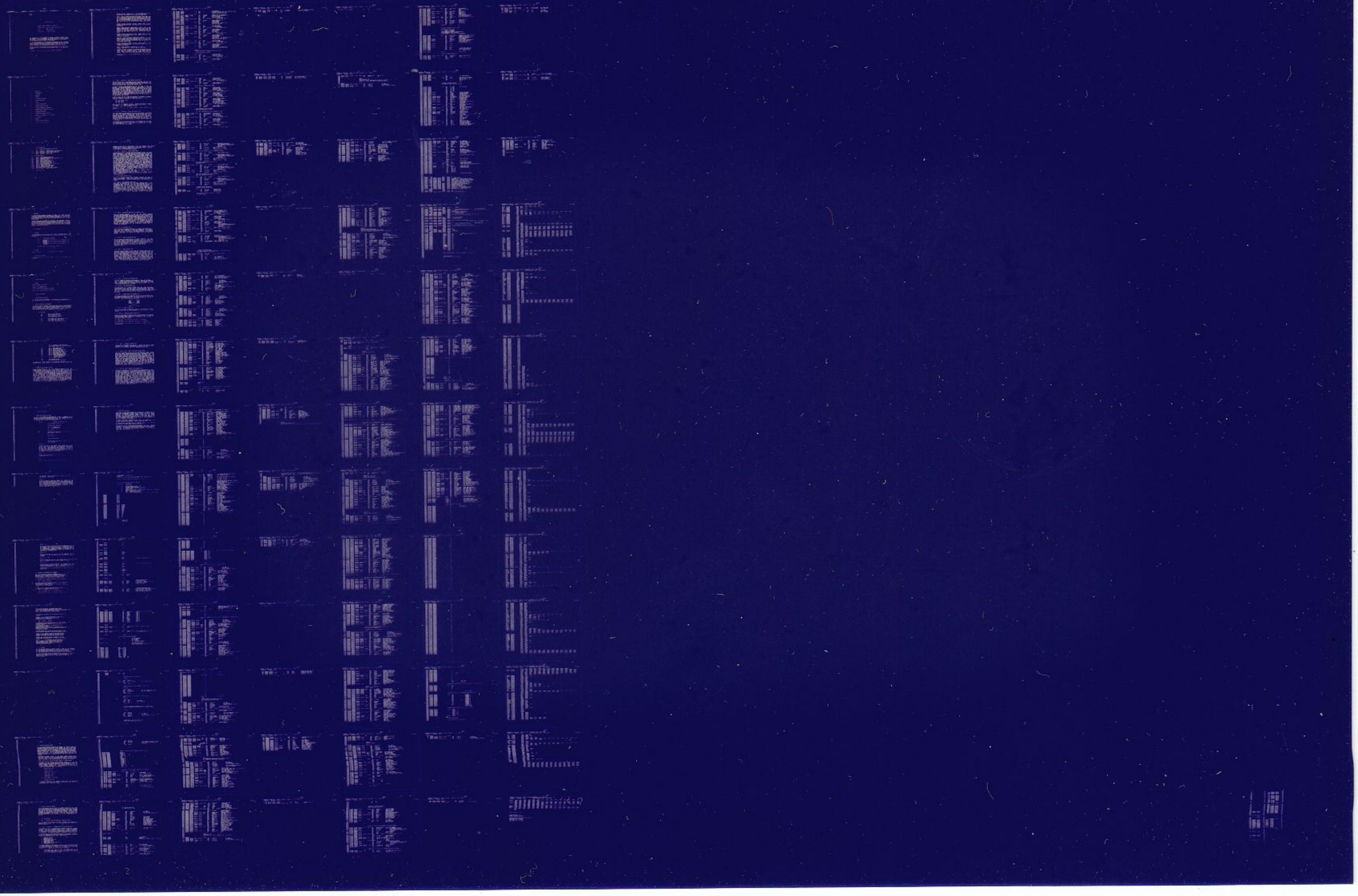

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZLPK-G-D

PRODUCT NAME: LP14/LP11/LP05 LINE PRINTER TEST

DATE : APRIL 15,1977

MAINTAINER: DIAGNOSTIC GROUP

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1.0 ABSTRACT

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

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

2.0 REQUIREMENTS

2.1 EQUIPMENT

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

LPC11	LINE PRINTER INTERFACE
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 - 17012 ARE USED BY THIS DIAGNOSTIC.

2.3 PRELIMINARY PROGRAMS

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

3.0 LOADING PROCEDURE

3.1 METHOD

POWER DOWN THE LINE PRINTER

POWER UP THE PROCESSOR ONLY

LOAD THE BOOTSTRAP AND ABSOLUTE LOADERS

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

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

```
                        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  "LPO5/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 APPORXIMATE PRINT SPEED WILL BE PRINTED ON BOTH THE LINE PRINTER AND THE TELEPRINTER. SWITCH 0 IS NOT USED IN ANY OTHER TESTS. MAKE SURE SWITCH 0 IS DOWN AT THE START OF THE TEST IF USING MANUAL TIMING OR UP IF USING AN INTERNAL CLOCK OPTION (KW11-L OR KW11-P).

2. SWITCH - 9

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

3. SWITCH - 10

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

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

4. SWITCH - 11

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

4. SWITCH - 12

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

6. SWITCH - 13

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

7. SWITCH - 14

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

8. SWITCH - 15

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

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

5.2 ABSENCE OF HARDWARE SWITCH REGISTER

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

THE DIAGNOSTIC WILL PROMPT THE OPERATOR WITH THE MESSAGE:

SWR = XXXXXX NEW SWR =

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

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

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

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

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

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

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

    SWR = XXXXXX   NEW SWR =

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

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

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

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

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

5.3 IOT CHANGES

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

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

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455
456
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6.0 ERRORS

6.1 COMPUTER DETECTED ERRORS

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

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

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

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

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

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

6.2 VISUALLY DETECTED ERRORS

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

7.0 TEST DESCRIPTIONS

7.1 TEST 1 - CONTROL TESTS AND OPERATOR INTERACTIVE TESTS

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

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

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

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

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

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

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

2. DEPRESS CONTINUE, "READY SET OK - TRY TORN PAPER SWITCH" WILL BE TYPED OUT IF PRINTER IS ON LINE AND NO ERRORS EXIST.

3. PAPER - TEAR THE PAPER OFF BELOW THE PRINTER DRUM GATE AND USE THE MANUAL TOP OF FORM SWITCH TO DRIVE ALL THE PAPER OUT OF THE PRINTER AND OBSERVE THAT THE PRINTER READY LIGHT GOES OUT AND THE PAPER ERROR LIGHT GOES ON ON THE PRINTER CONTROL PANEL. ATTEMPT TO PLACE THE PRINTER ON LINE. THE ON-LINE AND READY LIGHTS ON THE PRINTER CONTROL PANEL SHOULD REMAIN OFF.

4. DEPRESS CONTINUE, AN ERROR TYPE-OUT (ERROR COUNT 2) WILL OCCUR IF THE PRINTER READY LINE REMAINS HIGH AT THE INTERFACE ELECTRONICS.

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

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

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

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

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

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

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

618
619
620 7.1.2 TEST 1 - SECTION 2 - PRINT SPEED TIMING TEST.
621
622 THIS SECTION OF TEST 1 IS DESIGNED TO TIME THE PRINTER FOR ONE FULL
623 MINUTE. DURING THIS TIME THE PRINTER WILL PRINT THE DIAGNOL OF THE
624 DRUM PATTERN SO THAT ONLY TWO HAMMERS (MAXIMUM) WILL FIRE AT ANY GIVEN
625 INSTANT AND MAXIMUM PRINT TIME IS USED FOR EACH LINE.
626
627 IF A KW11-L OR KW11-P ARE AVAILABLE THEY WILL BE USED TO TIME THE
628 PRINTER. IF BOTH ARE AVAILABLE, THE KW11-L WILL BE USED. IF NEITHER
629 ARE AVAILABLE, MANUAL TIMING WILL BE USED. WHEN MANUAL TIMING IS USED
630 INSTRUCTIONS WILL BE TYPED ON THE TELEPRINTER. TO START THE TIMING
631 PLACE SWITCH 0 IN THE UP POSITION. AT THE END OF ONE FULL MINUTE
632 PLACE SWITCH 0 IN THE DOWN POSITION TO STOP THE TIMING. IF USING AN
633 INTERNAL CLOCK FOR TIMING, PLACE SWITCH 0 IN THE UP POSITION BEFORE
634 STARTING THE TEST. WHICH EVER METHOD OF TIMING IS USED, AT THE END OF
635 ONE FULL MINUTE THE APPROXIMATE PRINT SPEED WILL BE TYPED ON BOTH THE
636 TELEPRINTER AND LINE PRINTER.
637
638 IF BOTH A KW11-L OR KW11-P ARE AVAILABLE OR IT IS DESIRED TO MANUALLY
639 TIME THE PRINTER IF EITHER IS AVAILABLE USE THE FOLLOWING START
640 ADDRESSES TO RUN THE DESIRED PRINT SPEED TIMING TEST:
641
642 400 FOR MANUAL TIMING
643 404 FOR KW11-L
644 410 FOR KW11-P
645
646 NOTE: IF THE LINE FREQUENCY IS 50 HZ. CHANGE THE CONTENTS OF "MINCNT
647 TO 5670(8) .... REFER TO THE END OF THE PRINTING ROUTINE. (SEARCH
648 FOR "MINCNT" IN THE CROSS REFERENCE LISTING)
649
650 SECTION 3 OF TEST 1 WILL BE ENTERED DIRECTLY AFTER COMPLETION OF
651 SECTION 2.
652
653
654 7.1.3 TEST 1 - SECTION 3 - TOP OF FORM SWITCH TEST
655
656 THIS TEST CHECKS ALL POSITIONS OF THE TOP OF FORM SWITCH. THE PROGRAM
657 WILL GIVE THE CORRECT SETTINGS FOR THE TOP OF FORM SWITCH ON THE
658 TELETYPE AND THEN WAIT FOR THE OPERATOR. AFTER SETTING THE SWITCH,
659 DEPRESS CONTINUE TO TEST THAT SWITCH POSITION. AFTER CHECKING ALL
660 POSITIONS THE PRINTER OUTPUT CAN BE MANUALLY VERIFIED. A LINE OF ALL
661 DASHES IS PRINTED AS A STARTING POINT FOR EACH SETTING AND THEN A LINE
662 IS PRINTED TELLING THE PROPER SPACING (IN INCHES) FROM THE DASHED LINE
663 TO THAT LINE.
664
665 UPON COMPLETION OF THIS SECTION OF TEST 1 THE MESSAGE "TURN ON DAVFU
666 IF AVAILABLE AND RESET TOP OF FORM SWITCH TO 11 INCHES" WILL BE TYPED,
667 THEN THE PROGRAM WILL HALT. RESET THE TOP OF FORM SWITCH TO 11 INCHES
668 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.

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

```
                        7.3  SCOPE DRIVE ROUTINE

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

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

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

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

                        .ENDR
                        !
```

```
                        .TITLE MAINDEC-11-DZLPK-G-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
```

```
                        000030                  .=30
                        011524                  TYP
000030                  000340                  340
000032
                        000042                  .=42
                        000000                  0
000042
                        000046                  .=46
                        011316                  LOGICAL
000046                  000052                  .=52
                        040000                  BIT14
000052
                        000060                  .=60
                        011762                  TKINT           ;KEYBOARD INTERRUPT ROUTINE
000060                  000300                  300
000062
                        000100                  .=100
                        003220                  LKSRV           ;LINE CLOCK SERVICE ROUTINE
000100                  000340                  340
000102
                        003230                  CONVRT
000104                  000340                  340
000106
                        000174                  .=174
000174                  000000                  DISPREG: 0
000176                  000000                  SWREG:   0
                        000200                  .=200
000200                  012706  001000          MOV     #1000,%6
000204                  000137  001100          JMP     SETUP
                        000300                  .=300
                                                ;START FOR DAVFU TESTS
000300                  000137  004042          JMP     INDAT   ;ILLEGAL LOAD TEST
000304                  000137  004230          JMP     NODAT   ;NO STOP BIT - CHANNEL SLEW TEST
000310                  000137  014576          JMP     DAVFU   ;LINE COUNT SLEW TEST
000314                  000137  015332          JMP     DAV2    ;CHANNEL SLEW TEST
                        000400                  .=400
                                                ;1 MINUTE PRINT SPEED CHECK
000400                  000137  002452          JMP     SWTIME  ;START FOR USING SWITCH REG FOR TIMING
000404                  000137  002612          JMP     KW11L   ;START FOR KW11-L LINE CLOCK
000410                  000137  002532          JMP     KW11P   ;START FOR KW11-P LINE CLOCK
000414                  000137  003430          JMP     SLEWCK  ;CHECK TOP OF FORM SWITCH
```

```
                        000600                          .=600
                        
000600  012706  001000                                  MOV     #1000,%6        ;START OF PRINTING TESTS SEQUENCE
000604  000137  004534                                  JMP     TEST2           ;TEST 2
000610  000137  004776                                  JMP     TEST3           ;TEST 3
000614  000137  005352                                  JMP     CHRCHK          ;TEST 4
000620  000137  005634                                  JMP     OVRPRT          ;TEST 5
000624  000137  006132                                  JMP     PRTCTL          ;TEST 6
000630  000137  006432                                  JMP     MLF             ;TEST 7
000634  000137  006646                                  JMP     HSPRT           ;TEST 8
000640  000137  007450                                  JMP     SNGCHR          ;TEST 9
000644  000137  007644                                  JMP     ROTATE          ;TEST 10
000650  000137  010406                                  JMP     LFTTR           ;TEST 11
000654  000137  011122                                  JMP     HAMALN          ;TEST 12

                        000700                          .=700

000700  012737  017006  017032                          MOV     #LSCA,LOSCOP    ;SEND LF AFTER 132 CHARS
000706  000137  016664                                  JMP     SCOPE

                        000720                          .=720

000720  012737  016664  017032                          MOV     #SCOPE,LOSCOP   ;NO LF'S SENT IN SCOPE ROUTINE
000726  000137  016664                                  JMP     SCOPE           ;DO SCOPE ROUTINE


                        001000                          .=1000

                                                ;LINE PRINTER HARDWARE REGISTERS

001000  177514                                  LPS:    177514          ;STATUS REGISTER
                                                                        ;BIT 15=ERROR
                                                                        ;BIT 7=READY
                                                                        ;BIT 6=INTERRUPT ENABLE

001002  177516                                  LPB:    177516          ;DATA BUFFER REGISTER
                                                                        ;BITS 0-6=7 BIT ASCII CHARACTER BUFFER
                                                                        ;BITS 7-15=NOT USED

001004  177570                                  SWR:    177570
001006  177570                                  DISPLAY:177570
001010  177776                                  PSW:    177776
001012  177566                                  TPB:    177566
001014  177562                                  TKB:    177562
001016  177564                                  TPS:    177564
001020  177560                                  TKS:    177560
001022  172542                                  CSBR:   172542
001024  172540                                  PLVS:   172540
001026  177546                                  LKS:    177546
001030  000200                                  PTRVEC: .WORD   200
001032  000202                                  PTRPSW: .WORD   202
```

```
1081    000240                  NOP     =240
1082    000000                  N       =0
1083    000002                  M       =2
1084
1085                            ;MACRO FOR SETTING UP ERROR COUNT
1086
1087                            .LIST ME
1088
1089                            .MACR   $ERROP X
1090                    ERR'X': MOV     #X,     ERCOUNT         ;SET UP ERROR COUNT X
1091                            N=N+1
1092                            .ENDM   $ERROR
1093
1094
1095                            ;MACRO FOR PRINTING TEST NUMBER AT START OF TEST
1096
1097                            .LIST ME
1098
1099                            .MACR   $PRINT Y
1100                            MOV     TNO'Y',MES15            ;SET TEST NUMBER FOR MESSAGE
1101                            JSR     %4,PRINT                ;PRINT TEST NUMBER
1102                            M=M+1
1103                            .ENDM   $PRINT
1104
1105
1106                    ;MACRO FOR WAITING FOR PRINTER TO PRINT OR SLEW
1107
1108                    .LIST ME
1109
1110                    .MACR   $WAIT
1111                    TSTB    @LPS            ;TEST READY
1112                    BPL     .-4             ;WAIT FOR READY
1113                    .ENDM   $WAIT
1114
1115
1116
1117                    ;MACRO FOR ENABLING KEYBOARD INTERUPT IF THERE IS NO
1118                    ;H/W SWITCH REGISTER AND THERE IS A S/W SWITCH REGISTER
1119
1120
1121                    .LIST ME
1122
1123
1124                    .MACR   $ENABLE
1125                    CMP     #176,SWR                ;S/W SWR ?
1126                    BNE     .+10                    ;NO- CONTINUE
1127                    BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1128                    .ENDM   $ENABLE
1129
1130
1131
1132                    ;MACRO USED TO LOAD THE PSW WITH THE
1133                    ;CORRECT PROCESSOR PRIORITY LEVEL
1134
1135
1136                    .LIST ME
```

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



                        ;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS

001034  000000          SEGCNT: 0
001036  000000          CHRCNT: 0
001040  000000          CHRGEN: 0
001042  000000          LINCNT: 0
001044  000000          CYCCNT: 0
001046  000000          WORK:   0
001050  000000          SAVE:   0
001052  000000          ERCOUNT:0
001054  000000          STRCHR: 0
001056  000000          STRCNT: 0
001060  000000          LEGCHR: 0
001062  000000          NUMCHR: 0
001064  000000          OFFSET: 0
001066  000000          DIGITS: 0
001070  000000          SIGNAL: 0
001072  000000          SET:    0
001074  000000          CHAR:   0
001076  000000          OCT:    0



                        ;ROUTINE TO TEST THE MECH. OPERATION OF THE LPOS

001100  004437  011506  SETUP:  JSR     %4,TYPINT
001104  000005                  RESET                   ;CLEAR WORLD
001106  013746  000004          MOV     4,-(SP)         ;SAVE CURRENT VECTORS
001112  013746  000006          MOV     6,-(SP)         ;
001116  012737  001132  000004  MOV     #1$,4           ;SET UP TIMEOUT VECTOR
001124  005777  177654          TST     @SWR            ;TRY TO ACCESS HARDWARE SWR
001130  000407                  BR      2$              ;IF THERE, GO TO 2$
001132                  1$:
001132  012737  000176  001004  MOV     #SWREG,SWR      ;POINT TO SOFTWARE SWR
001140  012737  000174  001006  MOV     #DISPREG,DISPLAY ;POINT TO SOFTWARE DISPLAY
001146  022626                  CMP     (SP)+,(SP)+     ;RESTORE STACK
001150  012637  000006  2$:     MOV     (SP)+,6         ;RESTORE TIMEOUT VECTORS
001154  012637  000004          MOV     (SP)+,4         ;

001160  104000                  EMT     +0
001162  012741                  MES1                    ;TYPE DIAGNOSTIC TITLE
001164  104000                  EMT     +0
001166  013004                  MES2                    ;TYPE RESTART ADDRESS INFO
```

```
1193
1194
1195
1196
1197                                    ; GET INITIAL SWR VALUE
1198                                    ; IF THERE IS NO H/W  SWR
1199
1200
1201  001170  022737  000176  001004          CMP     #176,SWR        ;S/W SWR ?
1202  001176  001044                         BNE     SKIP            ;NO- CONTINUE
1203  001200  005037  001070                 CLR     SIGNAL          ;INITIALIZE INTERRUPT ROUTINE
1204  001204  005037  001066                 CLR     DIGITS          ;
1205  001210  005037  001072                 CLR     SET             ;
1206  001214  005037  001074                 CLR     CHAR            ;
1207  001220  013746  000034                 MOV     34,-(SP)        ;SAVE VECTOR
1208  001224  013746  000036                 MOV     36,-(SP)        ;SAVE VECTOR
1209  001230  012737  011762  000034         MOV     #TKINT,34       ;SET UP NEW VECTOR
1210  001236  012737  000300  000036         MOV     #300,36         ;SET UP NEW VECTOR
1211  001244  005237  001072                 INC     SET             ;SET HEADER FLAG
1212  001250  104400                         TRAP    +0              ;ENTER INTERRUPT ROUTINE
1213  001252  005037  001072                 CLR     SET             ;CLEAR HEADER FLAG
1214  001256  012637  000036                 MOV     (SP)+,36        ;RESTORE VECTOR
1215  001262  012637  000034                 MOV     (SP)+,34        ;RESTORE VECTOR
1216  001266  012777  000100  177524         MOV     #100,@TKS       ;ENABLE KEYBOARD INTERRUPT
1217  001274  000001                 WT:     WAIT
1218  001276  000240                         NOP
1219  001300  022737  000001  001070         CMP     #1,SIGNAL               ;SWR VALUE ENTERED ?
1220  001306  001772                         BEQ     WT                      ;NO- WAIT
1221  001310  000240                 SKIP:   NOP
1222
1223
1224
1225  001312  000005                         RESET
1226
1227
1228
1229  001314  104000                         EMT     +0              ;TYPE MESSAGE
1230  001316  013031                         MES3                    ;POWER UP
1231  001320  000000                         HALT                    ;DEPRESS CONTINUE WHEN READY TO START TEST
1232
1233
1234
1235
1236
1237  001322  005777  177452         STP1:  TST     @LPS            ;TEST FOR ERROR
1238  001326  100006                 BPL     STP2                    ;NO ERROR TEST FOR READY
1239  001330  012737  000000  001052 ERR0:  MOV     #0,     ERCOUNT         ;SET UP ERROR COUNT 0
 (1)            000001                 N=N+1
1240  001336  004537  011722                 JSR     %5,STAER        ;REPORT FRROR BIT SET
1241  001342  000767                         BR      STP1            ;GO TEST FOR ERROR
1242  001344  105777  177430         STP2:  TSTB    @LPS            ;TEST FOR READY
1243  001350  100406                 BMI     STP3                    ; READY SET OK
1244  001352  012737  000001  001052 EFR1:  MOV     #1,     ERCOUNT         ;SET UP ERROR COUNT 1
 (1)            000002                 N=N+1
1245  001360  004537  011722                 JSR     %5,STAER        ;REPORT READY NOT SET
1246  001364  000767                         BR      STP2            ;GO TEST FOR READY
```

```
1247  001366  104000                  STP3:   EMT     +0              ;TYPE MESSAGE
1248  001370  013063                          MES4                    ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
1249  001372  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1250  001374                          STP4:
1251  001374  012777  000014  177400          MOV     #14,@LPB        ;SEND A "FF" TO THE PRINTER
1252  001402  012777  000015  177372          MOV     #15,@LPB        ;ATTEMPT "FF" BY SENDING A "CR"
1253  001410  005777  177364                  TST     @LPS            ;TEST FOR ERROR
1254  001414  100406                          BMI     STP5            ;BRANCH IF ERROR SET
1255  001416  012737  000002  001052  ERR2:   MOV     #2,     ERCOUNT         ;SET UP ERROR COUNT 2
 (1)              000003                  N=N+1
1256  001424  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1257  001430  000761                          BR      STP4            ;LOOP ON ERROR
1258  001432  104000                  STP5:   EMT     +0              ;TYPE MESSAGE
1259  001434  013174                          MES6                    ;ERROR SET OK - TURN ON LINE
1260  001436  000000                          HALT                    ;WAIT FOR OPERATOR
1261
1262  001440  005777  177334          STP5A:  TST     @LPS            ;TEST FOR ERROR
1263  001444  100006                          BPL     STP5B           ;NO ERROR CONTINUE
1264  001446  012737  000003  001052  ERR3:   MOV     #3,     ERCOUNT         ;SET UP ERROR COUNT 3
 (1)              000004                  N=N+1
1265  001454  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1266  001460  000767                          BR      STP5A           ;LOOP ON ERROR
1267  001462  105777  177312          STP5B:  TSTB    @LPS            ;TEST READY
1268  001466  100406                          BMI     STP5C           ;READY SET OK
1269  001470  012737  000004  001052  ERR4:   MOV     #4,     ERCOUNT         ;SET UP ERROR COUNT 4
 (1)              000005                  N=N+1
1270  001476  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1271  001502  000767                          BR      STP5B           ;LOOP ON ERROR
1272  001504  104000                  STP5C:  EMT     +0              ;TYPE MESSAGE
1273  001506  013127                          MES5                    ;READY SET OK - TRY DRUM ,ATE SWITCH
1274  001510  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1275
1276  001512  005777  177262          STP6:   TST     @LPS            ;TEST FOR ERROR
1277  001516  100406                          BMI     STP7            ;BRANCH IF ERROR SET
1278  001520  012737  000005  001052  ERR5:   MOV     #5,     ERCOUNT         ;SET UP ERROR COUNT 5
 (1)              000006                  N=N+1
1279  001526  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1280  001532  000767                          BR      STP6            ;LOOP ON ERROR
1281  001534  104000                  STP7:   EMT     +0              ;TYPE MESSAGE
1282  001536  013174                          MES6                    ;ERROR SET OK - TURN ON LINE
1283  001540  000000                          HALT                    ;DEPRESS CONTINUE WHEN READY
1284
1285                                  ;TEST 1
1286                                  ;PERFORMS PRELIMINARY COMMAND AND REGISTER TESTING.
1287
1288                                  ;IS THE PRINTER FREE OF ERRORS
1289
1290  001542  000005                  TEST1:  RESET                   ;CLEAR THE WORLD
1291  001544  005777  177230                  TST     @LPS            ;IS ERROR FLAG CLEAR
1292  001550  100006                          BPL     TEST1A          ;ERROR IS CLEAR OK
1293  001552  012737  000006  001052  ERR6:   MOV     #6,     ERCOUNT         ;SET UP ERROR COUNT 6
 (1)              000007                  N=N+1
1294  001560  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1295  001564  000766                          BR      TEST1           ;LOOP ON ERROR
1296
1297                                  ;IS READY SET (NO ERRORS EXIST)
```

```
1298
1299  001566  000005                    TEST1A: RESET                   ;CLEAR THE WORLD
1300  001570  105777  177204                    TSTB    @LPS           ;IS READY SET
1301  001574  100406                          BMI     TEST1B          ;READY SET! PRINTER OK
1302  001576  012737  000007  001052  ERR7:    MOV     #7,     ERCOUNT         ;SET UP ERROR COUNT 7
 (1)          000010                          N=N+1
1303  001604  004537  011722                    JSR     %5,STAER        ;REPORT READY NOT SET
1304  001610  000766                          BR      TEST1A          ;LOOP ON ERROR
1305
1306                                    ;DOES LOADING THE BUFFER RESET READY
1307
1308  001612  005037  001046          TEST1B: CLR     WORK            ;CLEAR COUNTER
1309  001616  012777  000012  177156          MOV     #12,@LPB        ;LOAD LINE FEED INTO BUFFER
1310  001624  105777  177150                  TSTB    @LPS            ;IS READY CLEAR
1311  001630  100006                          BPL     LP1             ;READY TO CLEAR OK!
1312  001632  012737  000010  001052  ERR10:   MOV     #10,    ERCOUNT         ;SET UP ERROR COUNT 10
 (1)          000011                          N=N+1
1313  001640  004537  011722                    JSR     %5,STAER        ;REPORT READY STILL SET
1314  001644  000762                          BR      TEST1B          ;LOOP ON ERROR
1315  001646  005777  177126          LP1:    TST     @LPS            ;IS THERE AN ERROR
1316  001652  100006                          BPL     LP2             ;NO ERROR CONTINUE
1317  001654  012737  000011  001052  ERR11:   MOV     #11,    ERCOUNT         ;SET UP ERROR COUNT 11
 (1)          000012                          N=N+1
1318  001662  004537  011722                    JSR     %5,STAER        ;REPORT ERROR OCCURRED
1319  001666  000751                          BR      TEST1B          ;LOOP ON ERROR
1320  001670  105777  177104          LP2:    TSTB    @LPS            ;IS THE PRINTER STILL BUSY
1321  001674  100411                          BMI     TEST1C          ;NO! GO TO NEXT TEST
1322  001676  005237  001046                  INC     WORK            ;YES! GO CHECK FLAGS
1323  001702  001361                          BNE     LP1             ;PRINTER STILL BUSY WAIT
1324  001704  012737  000012  001052  ERR12:   MOV     #12,    ERCOUNT         ;SET UP ERROR COUNT 12
 (1)          000013                          N=N+1
1325  001712  004537  011722                    JSR     %5,STAER        ;ERROR REPORT TIME OUT
1326  001716  000735                          BR      TEST1B          ;LOOP ON ERROR
1327
1328                                    ;CHECK INTERRUPT LEVEL OF PRINTER
1329                                    ;THE PRINTER SHOULD BE AT LEVEL 4
1330
1331                                    ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 7
1332
1333  001720  012777  002204  177102  TEST1C: MOV     #INT1C,@PTRVEC  ;SET UP INT VECTOR
1334  001726  012777  000340  177076          MOV     #340,@PTRPSW    ;SET PRIORITY
1335  001734  005777  177040                  TST     @LPS            ;TEST FOR ERROR
1336  001740  100006                          BPL     LP3             ;NO ERROR CONTINUE
1337  001742  012737  000013  001052  ERR13:   MOV     #13,    ERCOUNT         ;SET UP ERROR COUNT 13
 (1)          000014                          N=N+1
1338  001750  004537  011722                    JSR     %5,STAER        ;REPORT ERROR SET
1339  001754  000761                          BR      TEST1C          ;LOOP ON ERROR
1340  001756  105777  177016          LP3:    TSTB    @LPS            ;TST FOR READY
1341  001762  100406                          BMI     LP3X            ;READY SET OK
1342  001764  012737  000014  001052  ERR14:   MOV     #14,    ERCOUNT         ;SET UP ERROR COUNT 14
 (1)          000015                          N=N+1
1343  001772  004537  011722                    JSR     %5,STAER        ;REPORT READY NOT SET
1344  001776  000750                          BR      TEST1C          ;LOOP ON ERROR
1345  002000                          LP3X:
 (1)  002000  012737  000015  001052  ERR15:   MOV     #15,    ERCOUNT         ;SET UP ERROR COUNT 15
 (1)          000016                          N=N+1
```

```
                                        MOV     #340,-(SP)      ;LOCKUP PROCESSOR, NEW PRIORITY
                                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
                                        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
                                        RTI                             ;LOAD PSW
                                        BIS     #100,@LPS       ;SET PRINTER INTO ENABLE
                                        NOP                             ;WAIT
                                        BIC     #100,@LPS       ;CLEAR PRINTER INT. ENABLE

                                ;TEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6

ERR16:  MOV     #16,    ERCOUNT         ;SET UP ERROR COUNT 16
                                        N=N+1
                                        MOV     #300,-(SP)      ;SET PROCESSOR PRIORITY LEVEL 6
                                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
                                        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
                                        RTI                             ;LOAD PSW
                                        BIS     #100,@LPS       ;SET PRINTER INT ENABLE
                                        NOP                             ;WAIT
                                        BIC     #100,@LPS       ;CLEAR PRINTER INT. ENABLE

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

ERR17:  MOV     #17,    ERCOUNT         ;SET UP ERROR COUNT 17
                                        N=N+1
                                        MOV     #240,-(SP)      ;SET UP PROCESSOR TO LEVEL 5
                                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
                                        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
                                        RTI                             ;LOAD PSW
                                        BIS     #100,@LPS       ;SET PRINTER INT ENABLE
                                        NOP                             ;WAIT
                                        BIC     #100,@LPS       ;CLEAR INT ENABLE PRINTER OK

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

ERR20:  MOV     #20,    ERCOUNT         ;SET UP ERROR COUNT 20
                                        N=N+1
                                        MOV     #200,-(SP)      ;SET PROCESSOR TO LEVEL 4
                                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
                                        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
                                        RTI                             ;LOAD PSW
                                        BIS     #100,@LPS       ;SET PRINTER INT. ENABLE
                                        NOP                             ;WAIT
                                        BIC     #100,@LPS       ;CLEAR PRINTER INT ENABLE
                                        JMP     TEST1D          ;PRINTER OK CONTINUE

                                ;INTERRUPT HANDLE FOR TEST1C
                                ;RESTORE STACK AND REPORT ERROR

INT1C:  CMP     (6)+,(6)+       ;RESTORE STACK
                                        JSR     %5,STAER        ;REPORT ERROR
                                        JMP     TEST1C          ;RE-ENTER TEST1C

                                ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
                                ;AT PRIORITY LEVEL 4
```

```
1391
1392  002216  012777  002336  176604  TEST1D: MOV     #INT1D,@PTRVEC  ;SET UP INTERRUPT VECTOR
1393  002224  012777  000340  176600          MOV     #340,@PTRPSW    ;LOCK UP PRIORITIES
1394  002232  005777  176542                  TST     @LPS            ;IS THERE A PRINTER ERROR
1395  002236  100006                          BPL     LP4             ;NO! CONTINUE
1396  002240  012737  000021  001052  ERR21:  MOV     #21,    ERCOUNT         ;SET UP ERROR COUNT 21
 (1)            000022                          N=N+1
1397  002246  004537  011722                  JSR     %5,STAER        ;REPORT PRINTER ERROR
1398  002252  000761                          BR      TEST1D          ;LOOP ON ERROR
1399  002254  105777  176520          LP4:    TSTB    @LPS            ;IS READY SET
1400  002260  100406                          BMI     LP5             ;YES - PRINTER READY
1401  002262  012737  000022  001052  ERR22:  MOV     #22,    ERCOUNT         ;SET UP ERROR COUNT 22
 (1)            000023                          N=N+1
1402  002270  004537  011722                  JSR     %5,STAER        ;REPORT READY NOT SET
1403  002274  000750                          BR      TEST1D          ;LOOP ON ERROR
1404  002276  012746  000140          LP5:    MOV     #140,-(SP)      ;SET PRIORITY TO LEVEL 3
1405  002302  010746                          MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
 (1)  002304  062716  000006                  ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
 (1)  002310  000002                          RTI                             ;LOAD PSW
1406  002312  052777  000100  176460          BIS     #100,@LPS       ;SET PRINTER INTERRUPT ENABLE
1407  002320  000240                          NOP                     ;WAIT
1408  002322  012737  000023  001052  ERR23:  MOV     #23,    ERCOUNT         ;SET UP ERROR COUNT 23
 (1)            000024                          N=N+1
1409  002330  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
1410  002334  000730                          BR      TEST1D          ;LOOP ON ERROR
1411
1412                                  ;INTERRUPT HANDLER FOR TEST1D
1413
1414  002336  022626                  INT1D:  CMP     (6)+,(6)+       ;RESET STACK
1415  002340  042777  000100  176432          BIC     #100,@LPS       ;CLEAR INT.  ENABLE FOR PRINTER
1416  002346  012746  000000                  MOV     #0,-(SP)        ;CLEAR PROCESSOR STATUS
1417  002352  010746                          MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
 (1)  002354  062716  000006                  ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
 (1)  002360  000002                          RTI                             ;LOAD PSW
1418  002362  012777  012706  176440          MOV     #12706,@PTRVEC  ;RESET INSTRUCTION AT 200
1419  002370  012777  001000  176434          MOV     #1000,@PTRPSW   ;RESET INSTRUCTION AT 202
1420
1421
1422
1423
1424
1425
1426
1427
1428                                  ;1 MINUTE PRINT SPEED CHECK
1429                                  ;IF A KW11-L OR KW11-P ARE NOT AVAILABLE,  THE SR BIT0 IS USED
1430                                  ;FOR MANUAL TIMING OF THE PRINTER.
1431
1432  002376  012737  000002  000006  CLCKAV: MOV     #RTI,@#6        ;SET TRAP TO RETURN
1433  002404  012737  000006  000004          MOV     #6,@#4
1434  002412  000261                          SEC
1435  002414  105777  176406                  TSTB    @LKS            ;KW11-L AVAILABLE?
1436  002420  103404                          BCS     1$              ;NO,  BRANCH
1437  002422  005037  000004                  CLR     @#4             ;RESET TRAP VECTOR TO HALT
1438  002426  000137  002612                  JMP     KW11L           ;USE KW11L FOR TIMING
1439  002432  000261                  1$:     SEC
```

```
1440  002434  105777  176364          TSTB    @PLKS           ;KW11-P AVAILABLE?
1441  002440  103404                  BCS     SWTIME          ;NO.  USE SWITCH REG FOR TIMING
1442  002442  005037  000004          CLR     @#4             ;RESET TRAP VECTOR TO HALT
1443  002446  000137  002532          JMP     KW11P           ;USE KW11-P FOR TIMING
1444  002452                  SWTIME:
 (1)  002452  022737  000176  001004  CMP     #176,SWR                ;S/W SWR ?
 (1)  002460  001003                  BNE     .+10                    ;NO- CONTINUE
 (1)  002462  052777  000100  176330  BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1445  002470  005037  001042          CLR     LINCNT          ;CLEAR LINE COUNT
1446  002474  004437  011506          JSR     %4,TYPINT
1447  002500  005037  000004          CLR     @#4             ;RESET TRAP VECTOR TO HALT
1448  002504  104000                  EMT     +0              ;TYPE MESSAGE
1449  002506  012522                  MESC                    ;PRINT SPEED CHECK USING MANUAL TIMING
1450  002510  012737  000002  003216  MOV     #2,DIA          ;SET DUMMY ADDRESS
1451  002516  032777  000001  176260  1$:     BIT     #BIT0,@SWR      ;START?
1452  002524  001774                  BEQ     1$              ;WAIT FOR START
1453  002526  000137  002666          JMP     STARD           ;START PRINTING
1454
1455
1456                          ;START FOR KW11-P.....
1457
1458  002532                  KW11P:
 (1)  002532  022737  000176  001004  CMP     #176,SWR                ;S/W SWR ?
 (1)  002540  001003                  BNE     .+10                    ;NO- CONTINUE
 (1)  002542  052777  000100  176250  BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1459  002550  005037  001042          CLR     LINCNT          ;CLEAR LINE COUNT
1460  002554  004437  011506          JSR     %4,TYPINT
1461  002560  012706  001000          MOV     #1000,%6        ;RESET STACK
1462  002564  013777  003212  176230  MOV     MINCNT,@CSBR    ;SET CLOCK COUNT
1463  002572  013737  001024  003216  MOV     PLKS,DIA        ;STORE PLKS ADDRESS
1464  002600  012777  000105  176216  MOV     #105,@PLKS      ;START CLOCK
1465  002606  000137  002666          JMP     STARD           ;START PRINTING
1466
1467                          ;START FOR KW11-L.....
1468
1469  002612                  KW11L:
 (1)  002612  022737  000176  001004  CMP     #176,SWR                ;S/W SWR ?
 (1)  002620  001003                  BNE     .+10                    ;NO- CONTINUE
 (1)  002622  052777  000100  176170  BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1470  002630  005037  001042          CLR     LINCNT          ;CLEAR LINE COUNT
1471  002634  004437  011506          JSR     %4,TYPINT
1472  002640  012706  001000          MOV     #1000,%6        ;RESET STACK
1473  002644  013737  003212  003214  MOV     MINCNT,CNTR     ;SET CLOCK COUNT
1474  002652  013737  001026  003216  MOV     LKS,DIA         ;STORE LKS ADDRESS
1475  002660  012777  000100  176140  MOV     #100,@LKS       ;ENABLE CLOCK INTERRUPT
1476
1477                          ;PRINTING ROUTINE.....
1478
1479  002666  032777  020000  176110  STARD:  BIT     #BIT13,@SWR     ;CHECK CHAR SET
1480  002674  001007                  BNE     STARDA          ;BRANCH IF 96
1481  002676  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHECK
1482  002704  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
1483  002712  000406                  BR      STARDC          ;CONTINUE
1484  002714  012737  000200  001060  STARDA: MOV     #200,LEGCHR     ;LEGAL CHECK
1485  002722  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
1486  002730  013737  001060  001054  STARDC: MOV     LEGCHR,STRCHR   ;SET FIRST CHAR IF LP14
```

```
 1487  002736  032777  002000  176040  STAROB: BIT     #BIT10,@SWR     ;CHECK FOR NEW DRUM(LP14)/OLD DRUM
 1488  002744  001063                          BNE     TIMTST
 1489  002746  012737  000204  001036          MOV     #132.,CHRCNT    ;SET CHAR COUNT
 1490  002754  012737  003410  001054          MOV     #PATTB,STRCHR   ;INITIALIZE TABLE POINTER
 1491  002762  012737  000021  001044  STARA:  MOV     #17.,CYCCNT     ;SET GROUP COUNT
 1492  002770  017737  176060  001040          MOV     @STRCHR,CHRGEN  ;GET CHAR FROM TABLE
 1493  002776  063737  001042  001040          ADD     LINCNT,CHRGEN   ;ADD LINE COUNT
 1494  003004  023737  001060  001040  1$:     CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
 1495  003012  003004                          BGT     STAR1           ;YES,  BRANCH
 1496  003014  163737  001052  001040          SUB     NUMCHR,CHRGEN   ;NO,  MAKE LEGAL
 1497  003022  000770                          BR      1$              ;RECHECK CHAR
 1498  003024  013777  001040  175750  STAR1:  MOV     CHRGEN,@LPB     ;LOAD BUFFER
 1499  003032  005337  001036                  DEC     CHRCNT          ;DECREMENT CHAR COUNT
 1500  003036  001410                          BEQ     STARED          ;BRANCH IF DONE LINE
 1501  003040  005337  001044                  DEC     CYCCNT          ;DECREMENT CYCCLE COUNT
 1502  003044  001367                          BNE     STAR1           ;CONTINUE IF NOT DONE GROUP
 1503  003046  062737  000002  001054          ADD     #2,STRCHR       ;ADD 2 TO TABLE POINTER
 1504  003054  000137  002762                  JMP     STARA           ;CONTINUE
 1505  003060  005237  001042          STARED: INC     LINCNT          ;INCREMENT LINE COUNT
 1506  003064  012777  000012  175710          MOV     #12,@LPB        ;SEND LF
 1507  003072  105777  175702                  TSTB    @LPS            ;TEST READY
   (1) 003076  100375                          BPL     .-4             ;WAIT FOR READY
 1508  003100  032777  000001  175676          BIT     #BIT0,@SWR      ;STOP PRINT?
 1509  003106  001450                          BEQ     CONVRT          ;YES,  BRANCH
 1510  003110  000137  002736                  JMP     STAROB          ;CONTINUE
 1511
 1512                                  ;LP14 PRINTING ROUTINE
 1513
 1514  003114  012737  000204  001036  TIMTST: MOV     #132.,CHRCNT    ;SET CHARACTER COUNT
 1515  003122  005337  001054                  DEC     STRCHR          ;GET NEXT STARTING CHARACTER
 1516  003126  023727  001054  000040          CMP     STRCHR,#40      ;LEGAL CHARACTER ?
 1517  003134  100003                          BPL     3$              ;YES-CONTINUE
 1518  003136  063737  001062  001054          ADD     NUMCHR,STRCHR   ;NO-MAKE LEGAL
 1519  003144  013737  001054  001040  3$:     MOV     STRCHR,CHRGEN   ;GET CHARACTER
 1520  003152  023727  001040  000040  TMTST2: CMP     CHRGEN,#40      ;LEGAL CHARACTER ?
 1521  003160  100003                          BPL     1$              ;YES-CONTINUE
 1522  003162  063737  001062  001040          ADD     NUMCHR,CHRGEN   ;NO-MAKE LEGAL
 1523  003170  013777  001040  175604  1$:     MOV     CHRGEN,@LPB     ;SEND CHARACTER
 1524  003176  005337  001036                  DEC     CHRCNT          ;DECREMENT CHARACTER COUNT
 1525  003202  001726                          BEQ     STARED          ;LINE FINISHED
 1526  003204  005337  001040                  DEC     CHRGEN          ;GET NEXT CHARACTER
 1527  003210  000760                  TMTST1: BR      TMTST2          ;CONTINUE
 1528
 1529
 1530  003212  007020                  MINCNT: 7020
 1531  003214  000000                  CNTR:   0
 1532  003216  000002                  DIA:    2
 1533
 1534
 1535                                  ;NOTE -- PLACE 5670 (8)   IN MINCNT FOR 50 HZ. LINE FREQUENCY !!!
 1536
 1537                                  ;LINE CLOCK SERVICE ROUTINE FOR KW11-L
 1538
 1539  003220  005337  003214          LKSRV:  DEC     CNTR            ;DECREMENT COUNTER
 1540  003224  001401                          BEQ     CONVRT          ;EXIT IF 1 MINUTE
 1541  003226  000002                          RTI                     ;RETURN
```

```
1542
1543
1544                                        ;ROUNTINE TO PRINT NUMBER OF LINES PRINTED IN 1 MINUTE
1545
1546  003230  042777  000100  177760  CONVRT: BIC     #100,@DIA       ;DISABLE CLOCK INTERRUPT IF CLOCK AVAILABLE
1547  003236  005037  011636          CLR     TYPDAT                  ;CLEAR DIGIT COUNT
1548  003242  012703  013555          MOV     #MES12,%3               ;SET MESSAGE POINTER
1549  003246  022737  000144  001042  1$:     CMP     #100.,LINCNT    ;GREATER THAN 100?
1550  003254  003006                  BGT     2$                      ;NO,  PRINT HUNDRED'S DIGIT
1551  003256  162737  000144  001042          SUB     #100.,LINCNT    ;YES, SUBTRACT 100
1552  003264  005237  011636          INC     TYPDAT                  ;INCREMENT HUNDRED'S DIGIT
1553  003270  000766                  BR      1$                      ;CONTINUE CONVERSION
1554  003272  062737  000060  011636  2$:     ADD     #60,TYPDAT      ;MAKE ASCII
1555  003300  113723  011636          MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1556  003304  005037  011636          CLR     TYPDAT                  ;CLEAR DIGIT COUNTER
1557  003310  022737  000012  001042  3$:     CMP     #10.,LINCNT     ;GREATER THEN 10?
1558  003316  003006                  BGT     4$                      ;NO,  PRINT DIGIT
1559  003320  162737  000012  001042          SUB     #10.,LINCNT     ;YES, SUBTRACT 10
1560  003326  005237  011636          INC     TYPDAT                  ;INCREMENT TEN'S DIGIT
1561  003332  000766                  BR      3$                      ;CONTINUE CONVERSION
1562  003334  062737  000060  011636  4$:     ADD     #60,TYPDAT      ;MAKE ASCII
1563  003342  113723  011636          MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1564  003346  013737  001042  011636          MOV     LINCNT,TYPDAT   ;GET ONE'S DIGIT
1565  003354  062737  000060  011636          ADD     #60,TYPDAT      ;MAKE ASCII
1566  003362  113723  011636          MOVB    TYPDAT,(%3)+            ;STORE DIGIT
1567  003366  104000                  EMT     +0                      ;TYPE MESSAGE
1568  003370  013516                  MES11                           ;TYPE PRINT SPEED
1569  003372  012737  013514  011470          MOV     #MES11A,PRTMSG  ;SET PRINTER MESSAGE ADDRESS
1570  003400  004437  011452          JSR     %4,RINT                 ;PRINT PRINTER SPEED ON LINE PRINTER
1571  003404  000137  003430          JMP     SLEWCK                  ;NEXT TEST
1572
1573
1574
1575  003410  000040                  PATTB:  40
1576  003412  000117                          117
1577  003414  000076                          76
1578  003416  000055                          55
1579  003420  000134                          134
1580  003422  000113                          113
1581  003424  000072                          72
1582  003426  000051                          51
1583
1584                                        ;CHECK TOP OF FORM SWITCH
1585
1586  003430                          SLEWCK:
 (1)  003430  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  003436  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  003440  052777  000100  175352          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1587  003446  004437  011506          JSR     %4,TYPINT
1588  003452  004537  011332          JSR     %5,PRTINT       ;INITIALIZE PRINTER
1589  003456  000406                  BR      SLW             ;BRANCH IF OK
1590  003460  012737  000024  001052  ERR24:  MOV     #24,    ERCOUNT         ;SET UP ERROR COUNT 24
 (1)          000025                  N=N+1
1591  003466  004537  011722          JSR     %5,STAER        ;REPORT PRINTER NOT READY
1592  003472  000000                  HALT                    ;HALT ON ERROR
1593  003474  012737  003710  001042  SLW:    MOV     #FFTAB,LINCNT   ;LINE COUNT FOR SWITCH SETTING
```

```
1594  003502  012704  003766            MOV     #FFSET,%4       ;INIT SWITCH SETTING TABLE POINTER
1595  003506  012703  013270  SLW0:     MOV     #MES8,%3        ;INIT MESSAGE POINTER
1596  003512  012702  013403            MOV     #MES10,%2       ;  "       "       "
1597  003516  111413          SLW1:     MOVB    (%4),(%3)       ;PUT SWITCH SETTINGS INTO MESSAGES
1598  003520  111412                    MOVB    (%4),(%2)       ;  "       "       "       "
1599  003522  122423                    CMPB    (%4)+,(%3)+     ;INCREMENT POINTERS
1600  003524  105722                    TSTB    (%2)+
1601  003526  105714                    TSTB    (%4)            ;DONE MOVING SWITCH SETTINGS TO MSG'S?
1602  003530  001372                    BNE     SLW1            ;BRANCH IF NOT DONE
1603  003532  005204                    INC     %4              ;TABLE POINTER SET FOR NEXT SWITCH SETTING
1604  003534  104000                    EMT     +0              ;TYPE MESSAGE
1605  003536  013234                    MES7                    ;SET TOP OF FORM SWITCH TO ---
1606  003540  000000                    HALT                    ;WAIT FOR OPERATOR TO SET SWITCH
1607  003542  005777  175274  SLW11:    TST     @LINCNT         ;CHECK LINE COUNT
1608  003546  001003                    BNE     SLW1A           ;BRANCH IF NOT ZERO
1609  003550  012737  013604  011470    MOV     #MES13,PRTMSG   ;CHANGE PRINTER MESSAGE
1610  003556  005777  175216  SLW1A:    TST     @LPS            ;TEST FOR ERRORS
1611  003562  100006                    BPL     SLW2            ;BRANCH IF NO ERROR
1612  003564  012737  000025  001052  ERR25:   MOV     #25,    ERCOUNT         ;SET UP ERROR COUNT 25
 (1)            000026                    N=N+1
1613  003572  004537  011722            JSR     %5,STAER        ;REPORT ERROR SET
1614  003576  000000                    HALT                    ;HALT ON ERROR
1615  003600  012777  000014  175174  SLW2:     MOV     #14,@LPB        ;SEND FF
1616  003606  105777  175166            TSTB    @LPS            ;TEST READY
 (1)  003612  100375                    BPL     .-4             ;WAIT FOR READY
1617  003614  004437  011452            JSR     %4,RINT         ;PRINT MESSAGE ON LINE PRINTER
1618  003620  062737  000002  001042    ADD     #2,LINCNT       ;NEXT LINE COUNT
1619  003626  022737  003764  001042    CMP     #FTABE,LINCNT   ;DONE TEST?
1620  003634  001410                    BEQ     DAVAV           ;YES,  EXIT
1621  003636  005777  175200            TST     @LINCNT         ;DONE CHECK OF THIS SWITCH SETTING?
1622  003642  001721                    BEQ     SLW0            ;YES,  NEXT SWITCH SETTING
1623  003644  012737  013306  011470    MOV     #MES9,PRTMSG    ;NO,  CHECK THIS SETTING
1624  003652  000137  003542            JMP     SLW11           ;CONTINUE
1625  003656  013737  014564  013270  DAVAV:   MOV     TNO13,MES8      ;SET MESSAGE
1626  003664  104000                    EMT     +0              ;TYPE MESSAGE
1627  003666  013232                    MES7A                   ;RESET TOP OF FORM SWITCH
1628  003670  000000                    HALT                    ;WAIT FOR OPERATOR
1629  003672  032777  040000  175104    BIT     #BIT14,@SWR     ;DAVFU AVAILABLE?
1630  003700  001060                    BNE     INDAT           ;YES,  DO DAVFU TESTS
1631  003702  000000                    HALT                    ;DONE OPERATOR TESTS  -  HALT
1632  003704  000137  004534            JMP     TEST2           ;DEPRESS CONTINUE TO START PRINTING TESTS
1633
1634  003710  000000          FFTAB:    0                       ;LOOP COUNTS FOR SLEW CHECKS
1635  003712  000022                    18.
1636  003714  000000                    0
1637  003716  000025                    21.
1638  003720  000000                    0
1639  003722  000030                    24.
1640  003724  000000                    0
1641  003726  000041                    33.
1642  003730  000000                    0
1643  003732  000044                    36.
1644  003734  000000                    0
1645  003736  000052                    42.
1646  003740  000000                    0
1647  003742  000060                    48.
```

```
1648  003744  000000                          0
1649  003746  000063                          51.
1650  003750  000000                          0
1651  003752  000102                          66.
1652  003754  000000                          0
1653  003756  000110                          72.
1654  003760  000000                          0
1655  003762  000124                          84.
1656  003764  000000              FTABE:      0
1657
1658
1659  003766  020063  000040      FFSET:      .ASCIZ  /3  /           ;SWITCH SETTINGS FOR MESSAGES
1660  003772  027063  000065                  .ASCIZ  /3.5/
1661  003776  020064  000040                  .ASCIZ  /4  /
1662  004002  027065  000065                  .ASCIZ  /5.5/
1663  004006  020066  000040                  .ASCIZ  /6  /
1664  004012  020067  000040                  .ASCIZ  /7  /
1665  004016  020070  000040                  .ASCIZ  /8  /
1666  004022  027070  000065                  .ASCIZ  /8.5/
1667  004026  030461  000040                  .ASCIZ  /11 /
1668  004032  031061  000040                  .ASCIZ  /12 /
1669  004036  032061  000040                  .ASCIZ  /14 /
1670
1671
1672                                          .EVEN
1673
1674                                  ;CHECK THAT VFU WILL NOT ACCEPT INCOMPLETE DATA
1675
1676  004042                          INDAT:
 (1)  004042  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  004050  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  004052  052777  000100  174740          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1677  004060  004437  011506                  JSR     %4,TYPINT
1678  004064  012737  004214  001040          MOV     #INDATT,CHRGEN  ;SET TABLE POINTER
1679  004072  005777  174702          INDO:   TST     @LPS            ;TEST FOR ERROR
1680  004076  100010                  BPL     INDATO          ;BRANCH IF NO ERROR
1681  004100  012737  000026  001052  ERR26:  MOV     #26,    ERCOUNT         ;SET UP ERROR COUNT 26
 (1)              000027                  N=N+1
1682  004106  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1683  004112  000000                          HALT                    ;HALT ON ERROR
1684  004114  000137  004042                  JMP     INDAT           ;RESTART TEST
1685  004120  017777  174714  174654  INDATO: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1686  004126  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
1687  004134  005777  174700                  TST     @CHRGEN         ;TEST CHAR
1688  004140  001405                          BEQ     IND1            ;CONTINUE IF DONE
1689  004142  105777  174632                  TSTB    @LPS            ;TEST READY
 (1)  004146  100375                          BPL     .-4             ;WAIT FOR READY
1690  004150  000137  004072                  JMP     INDO
1691  004154  005777  174620          IND1:   TST     @LPS            ;TEST FOR ERROR SET
1692  004160  100410                  BMI     INDAT1          ;BRANCH IF ERROR SET
1693  004162  012737  000027  001052  ERR27:  MOV     #27,    ERCOUNT         ;SET UP ERROR COUNT 27
 (1)              000030                  N=N+1
1694  004170  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1695  004174  000000                          HALT                    ;HALT ON ERROR
1696  004176  000137  004042                  JMP     INDAT           ;RESTART TEST
1697  004202  104000                  INDAT1: EMT     +0              ;TYPE MESSAGE
```

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1698  004204  012402                          MESA                    ;ERROR SET OK - CLEAR & TURN ON LINE
1699  004206  000000                          HALT                    ;WAIT FOR OPERATOR
1700                                                                  ;DEPRESS CONTINUE WHEN READY FOR NEXT TEST
1701  004210  000137  004230                  JMP     NODAT           ;NEXT TEST
1702
1703  004214  000356                  INDATT: 356                     ;DATA TABLE FOR ABOVE TEST
1704  004216  000001                          1
1705  004220  000002                          2
1706  004222  000003                          3
1707  004224  000357                          357
1708  004226  000000                          0
1709
1710                                  ;CHECK THAT CHANNELS WITH NO STOP BITS CAUSE ERRORS IF CHANNEL SELECTED
1711
1712  004230                          NODAT:
 (1)  004230  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  004236  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  004240  052777  000100  174552          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1713  004246  004437  011506                  JSR     %4,TYPINT
1714  004252  012737  000200  001054          MOV     #200,STRCHR     ;SET PAPER INSTRUCTION
1715  004260  012737  004454  001040  NOOOA:  MOV     #NODAT3,CHRGEN  ;SET TABLE POINTER FOR LOAD
1716  004266  005777  174506          NOOO:   TST     @LPS            ;TEST FOR ERROR
1717  004272  100007                          BPL     NOOAT0          ;BRANCH IF NO ERROR
1718  004274  012737  000030  001052  ERR30:  MOV     #30,    ERCOUNT         ;SET UP ERROR COUNT 30
 (1)              000031                      N=N+1
1719  004302  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1720  004306  000000                          HALT                    ;HALT ON ERROR
1721  004310  000747                          BR      NODAT           ;RESTART TEST
1722  004312  017777  174522  174462  NOOAT0: MOV     @CHRGEN,@LPB    ;LOAD BUFFER
1723  004320  062737  000002  001040          ADD     #2,CHRGEN       ;NEXT DATA
1724  004326  022737  004534  001040          CMP     #NODAT4+2,CHRGEN        ;DONE LOAD?
1725  004334  001405                          BEQ     NOOATA          ;BRANCH IF DONE
1726  004336  105777  17-436                  TSTB    @LPS            ;TEST READY
 (1)  004342  100375                          BPL     .-4             ;WAIT FOR READY
1727  004344  000137  004266                  JMP     NOOO
1728  004350  013777  001054  174424  NOOATA: MOV     STRCHR,@LPB     ;SEND DATA
1729  004356  005037  001036                  CLR     CHRCNT          ;DELAY
1730  004362  005237  001036          1$:     INC     CHRCNT
1731  004366  001375                          BNE     1$
1732  004370  005777  174404                  TST     @LPS            ;TEST FOR ERROR SET
1733  004374  100410                          BMI     NOOAT1          ;BRANCH IF ERROR SET
1734  004376  012737  000031  001052  ERR31:  MOV     #31,    ERCOUNT         ;SET UP ERROR COUNT 31
 (1)              000032                      N=N+1
1735  004404  004537  011722                  JSR     %5,STAER        ;REPORT ERROR NOT SET
1736  004410  000000                          HALT                    ;HALT ON ERROR
1737  004412  000137  004260                  JMP     NOOOA           ;RETEST
1738  004416  005237  001054          NOOAT1: INC     STRCHR          ;NEXT PAPER INSTRUCTION
1739  004422  022737  000214  001054          CMP     #214,STRCHR     ;DONE TEST?
1740  004430  001404                          BEQ     NOOAT2          ;CONTINUE IF NOT DONE
1741  004432  104000                          EMT     +0              ;TYPE MESSAGE
1742  004434  012447                          MESB                    ;ERROR SET OK - CLEAR & TRY NEXT CHANNEL
1743  004436  000000                          HALT                    ;WAIT FOR OPERATOR
1744  004440  000707                          BR      NOOOA           ;RELOAD & TEST NEXT CHANNEL
1745  004442  104000          NOOAT2: EMT     +0                      ;TYPE MESSAGE
1746  004444  012402                          MESA                    ;ERROR SET OK - TURN ON LINE
1747  004446  000000                          HALT
```

```
1748  004450  000137  004534                    JMP     TEST2           ;JUMP
1749
1750
1751  004454  000356                  NODAT3:   356                     ;START LOAD
1752  004456  000000                            0
1753  004460  000000                            0
1754  004462  000000                            0
1755  004464  000000                            0
1756  004466  000000                            0
1757  004470  000000                            0
1758  004472  000000                            0
1759  004474  000000                            0
1760  004476  000000                            0
1761  004500  000000                            0
1762  004502  000000                            0
1763  004504  000000                            0
1764  004506  000000                            0
1765  004510  000000                            0
1766  004512  000000                            0
1767  004514  000000                            0
1768  004516  000000                            0
1769  004520  000000                            0
1770  004522  000000                            0
1771  004524  000000                            0
1772  004526  000000                            0
1773  004530  000000                            0
1774  004532  000357                  NODAT4:   357                     ;STOP LOAD
1775
1776                                  ;TEST 2
1777                                  ;TESTS INTERFACE AND PRINTER DATA PATHS
1778                                  ;WITH ALTERNATING ONES AND ZEROS
1779
1780  004534                          TEST2:
 (1)  004534  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  004542  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  004544  052777  000100  174246          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1781  004552  004437  011506                  JSR     %4,TYPINT
1782  004556  004537  011332                  JSR     %5,PRTINT       ;INITIALIZE PRINTER
1783  004562  000406                          BR      TST2AX          ;BRANCH IF OK
1784  004564  012737  000032  001052  ERR32:  MOV     #32,    ERCOUNT         ;SET UP ERROR COUNT 32
 (1)              000033                     N=N+1
1785  004572  004537  011722                  JSR     %5,STAER        ;REPORT PRINTER NOT READY
1786  004576  000000                          HALT                    ;HALT ON ERROR
1787  004600                          TST2AX:
 (1)  004600  013737  014542  014030          MOV     TN02,MES15              ;SET TEST NUMBER FOR MESSAGE
 (1)  004606  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
 (1)              000003                     M=M+1
1788  004612  012737  177740  001044          MOV     #-32.,CYCCNT    ;SET UP LINE COUNT FOR 32 LINES
1789  004620  012737  177574  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT TO 132
1790  004626  013737  004702  001054          MOV     SCHRSW,STRCHR   ;SET CHAR. SWITCH TO U
1791  004634  005777  174140          T3A:    TST     @LPS            ;TEST FOR ERROR
1792  004640  100006                          BPL     LP28            ;NO ERROR CONTINUE
1793  004642  012737  000033  001052  ERR33:  MOV     #33,    ERCOUNT         ;SET UP ERROR COUNT 33
 (1)              000034                     N=N+1
1794  004650  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1795  004654  000000                          HALT                    ;HALT ON ERROR
```

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1796  004656  000177  174172          LP2B:   JMP     @STRCHR         ;LOAD CHAR
1797  004662  013737  004704  001054  T2A:    MOV     RCHRSW,STRCHR   ;RESET CHAR. SWITCH
1798  004670  012737  000125  001050          MOV     #125,SAVE       ;STORE CHAR
1799  004676  000137  004722                  JMP     T5A             ;LOAD CHAR
1800
1801  004702  004662                  SCHRSW: T2A
1802  004704  004706                  RCHRSW: T1A
1803
1804  004706  013737  004702  001054  T1A:    MOV     SCHRSW,STRCHR   ;SET CHAR. SWITCH TO U
1805  004714  012737  000052  001050          MOV     #52,SAVE        ;STORE CHAR
1806  004722  013777  001050  174052  T5A:    MOV     SAVE,@LPB       ;LOAD BUFFER
1807  004730  005237  001036                  INC     CHRCNT          ;INC CHARACTER COUNT
1808  004734  001337                          BNE     T3A             ;CONTINUE
1809  004736  012777  000012  174036          MOV     #12,@LPB        ;SEND LF
1810  004744  105777  174030                  TSTB    @LPS            ;TEST READY
 (1)  004750  100375                          BPL     .-4             ;WAIT FOR READY
1811  004752  012737  177574  001036          MOV     #-132.,CHRCNT   ;RESET CHAR COUNT
1812  004760  005237  001044                  INC     CYCCNT          ;INC CYCLE COUNT
1813  004764  001356                          BNE     T5A             ;CONTINUE IF NOT DONE
1814  004766  032777  010000  174010          BIT     #BIT12,@SWR     ;LOOP ON TEST?
1815  004774  001257                          BNE     TEST2           ;LOOP
1816
1817                                  ;TEST 3
1818                                  ;TEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
1819                                  ;ALL CHARACTERS AND ILLEGAL CHARACTERS
1820
1821  004776                  TEST3:
 (1)  004776  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  005004  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  005006  052777  000100  174004          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
1822  005014  004437  011506                  JSR     %4,TYPINT
1823  005020  013737  014544  014030          MOV     TN03,MES15              ;SET TEST NUMBER FOR MESSAGE
 (1)  005026  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
 (1)          000004                          M=M+1
1824  005032  012737  177765  001044          MOV     #-13,CYCCNT     ;SET 21 LINES
1825  005040  000137  005172                  JMP     LP2H            ;SEND ILLEGAL CHARS FIRST TO GIVE BLANK LINE
1826  005044  012737  177574  001036  T280:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT FOR 132
1827  005052  012737  000040  001040  T280A:  MOV     #40,CHRGEN      ;SET FIRST CHAR.
1828  005060  005777  173714          T281:   TST     @LPS            ;DOES THE PRINTER HAVE AN ERROR
1829  005064  100006                          BPL     LP2E            ;BRANCH IF NO ERROR
1830  005066  012737  000034  001052  ERR34:  MOV     #34,    ERCOUNT         ;SET UP ERROR COUNT 34
 (1)          000035                          N=N+1
1831  005074  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
1832  005100  000000                          HALT                    ;HALT ON ERROR
1833  005102  013777  001040  173672  LP2E:   MOV     CHRGEN,@LPB     ;PRINT CHARACTER
1834  005110  005237  001036                  INC     CHRCNT          ;INC. CHAR. COUNT
1835  005114  001420                          BEQ     T282            ;BRANCH IF LINE IS FINISHED
1836  005116  005237  001040                  INC     CHRGEN          ;NEXT CHAR
1837  005122  032777  020000  173654          BIT     #BIT13,@SWR     ;CHECK CHAR SET
1838  005130  001405                          BEQ     T282B           ;BRANCH IF 64 CHARS
1839  005132  022737  000200  001040          CMP     #200,CHRGEN     ;LEGAL CHAR?
1840  005140  001744                          BEQ     T280A           ;MAKE SPACE IF ILLEGAL
1841  005142  000746                          BR      T281            ;CONTINUE IF LEGAL CHAR
1842  005144  022737  000140  001040  T282B:  CMP     #140,CHRGEN     ;LEGAL CHAR?
1843  005152  001737                          BEQ     T280A           ;MAKE SPACE IF ILLEGAL
1844  005154  000741                          BR      T281            ;CONTINUE IF LEGAL CHAR
```

```
 1845  005156  012777  000012  173616  T282:   MOV     #12,@LPB        ;ISSUE LINE FEED
 1846  005164  105777  173610                  TSTB    @LPS            ;TEST READY
  (1)  005170  100375                          BPL     .-4             ;WAIT FOR READY
 1847  005172  005037  001040          LP2H:   CLR     CHRGEN          ;FIRST ILLEGAL CHAR
 1848  005176  005777  173576          T283:   TST     @LPS            ;TEST FOR ERROR
 1849  005202  100006                          BPL     LDCH            ;BRANCH IF NO ERROR
 1850  005204  01273.  000035  001052  ERR35:  MOV     #35,    ERCOUNT         ;SET UP ERROR COUNT 35
  (1)           000036                         N=N+1
 1851  005212  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
 1852  005216  000000                          HALT                    ;HALT ON ERROR
 1853  005220  013777  001040  173554  LDCH:   MOV     CHRGEN,@LPB     ;TRANSMIT CHARACTER
 1854  00[illegible]  005237  001040          T284:   INC     CHRGEN          ;NEXT CHAR
 1855  00[illegible]  022737  000012  001040          CMP     #12,CHRGEN      ;TEST FOR LINE FEED
 1856  005240  001772                          BEQ     T284            ;SKIP IF LF
 1857  00[illegible]  022737  000014  001040          CMP     #14,CHRGEN      ;TEST FOR FORM FEED
 1858  00[illegible]  001766                          BEQ     T284            ;SKIP IF FF
 1859  005252  022737  000015  001040          CMP     #15,CHRGEN      ;TEST FOR CARRIAGE RETURN
 1860  00[illegible]  001762                          BEQ     T284            ;SKIP IF CR
 1861  00[illegible]  023727  001040  000040          CMP     CHRGEN,#40      ;CHECK IF LEGAL CHAR
 1862  005270  002753                          BLT     LDCH            ;CONTINUE IF STILL ILLEGAL CHAR
 1863  005272  032777  020000  173504          BIT     #BIT13,@SWR     ;CHECK CHAR SET
 1864  005300  001007                          BNE     T285            ;BRANCH IF 96 CHAR SET
 1865  005302  052737  000100  001040          BIS     #100,CHRGEN     ;SET BIT 7 IF NOT SET
 1866  005310  032737  000200  001040          BIT     #200,CHRGEN     ;DONE ILLEGAL CHARS?
 1867  005316  001740                          BEQ     LDCH            ;BRANCH IF NOT DONE
 1868  005320  012777  000012  173454  T285:   MOV     #12,@LPB        ;ISSUE LINE FEED
 1869  005326  105777  173446                  TSTB    @LPS            ;TEST READY
  (1)  005332  100375                          BPL     .-4             ;WAIT FOR READY
 1870  005334  005237  001044                  INC     CYCCNT          ;INCREMENT LINE COUNT
 1871  005340  001241                          BNE     T280            ;CONTINUE IF NOT DONE
 1872  005342  032777  010000  173434          BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
 1673  005350  001212                          BNE     TEST3           ;LOOP
 1874
 1875                                  ;TEST 4
 1876                                  ;OVER PRINT TEST
 1877                                  ;OVER PRINT FULL LINES OF ALTERNATING E'S AND SPACES
 1878
 1879  005352                          CHRCHK:
  (1)  005352  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
  (1)  005360  001003                          BNE     .+10                    ;NO- CONTINUE
  (1)  005362  052777  000100  173430          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
 1880  005370  004437  011506                  JSR     %4,TYPINT
```

```
 1882  005374  013737  014546  014030          MOV     TN04,MES15              ;SET TEST NUMBER FOR MESSAGE
  (1)  005402  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
  (1)           000005                         M=M+1
```

```
  1884  005406  012737  177750  001042          MOV     #-24.,LINCNT    ;SET UP LINE COUNT FOR 24 LINES
  1885  005414  012737  177776  001044          MOV     #-2,CYCCNT      ;SET UP CYCLE COUNT
  1886  005422  013737  005564  001054          MOV     CHRE,STRCHR     ;SET CHAR TAG TO SPACE
```

```
 1888  005430  012737  177574  001036  CR:     MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 1889  005436  005777  173336          CR0:    TST     @LPS            ;TEST FOR ERROR
 1890  005442  100006                  BPL     CR1                     ;CONTINUE IF NO ERROR
 1891  005444  012737  000036  001052  ERR36:  MOV     #36,    ERCOUNT         ;SET UP ERROR COUNT 36
  (1)           000037                  N=N+1
 1892  005452  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
 1893  005456  000000                  HALT                            ;HALT ON ERROR
 1894  005460  000177  173370          CR1:    JMP     @STRCHR         ;OPPOSITE CHAR
 1895  005464  013737  005564  001054  CR2:    MOV     CHRE,STRCHR     ;SET CHAR SWITCH TO SPACE
 1896  005472  012737  000105  001050          MOV     #105,SAVE       ;SEND E
 1897  005500  013777  001050  173274  CR3:    MOV     SAVE,@LPB       ;LOAD BUFFER
 1898  005506  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
 1899  005512  001351                  BNE     CR0                     ;BRANCH IF NOT DONE
 1900  005514  005237  001044                  INC     CYCCNT          ;INCREMENT CYCLE COUNT
```

```
  1902  005520  001422                        BEQ     CRS             ;BRANCH IF FINISHED OVERPRINTS
```

F04


```
 1904  005522  012777  000015  173252          MOV     #15,@LPB        ;SEND CR
 1905  005530  105777  173244                  TSTB    @LPS            ;TEST READY
  (1)  005534  100375                          BPL     .-4             ;WAIT FOR READY
```

```
 1907  005536  000137  005430                  JMP     CR              ;OVERPPINT LINE
 1908  005542  013737  005562  001054  CR7:    MOV     CHRS,STRCHR     ;RESET CHAR SWITCH
 1909  005550  012737  000040  001050          MOV     #40,SAVE        ;SEND SPACE
```

```
 1911  005556  000137  005500                    JMP     CR3             ;CONTINUE
 1912
 1913  005562  005464                    CHRS:   CR2
 1914  005564  005542                    CHRE:   CR7
 1915  005566  012777  000012  173206    CRS:    MOV     #12,@LPB        ;SEND LF
 1916  005574  105777  173200                    TSTB    @LPS            ;TEST READY
  (1)  005600  100375                            BPL     .-4             ;WAIT FOR READY
 1917  005602  012737  177776  001044            MOV     #-2,CYCCNT      ;RESET CYCLE COUNT
 1918  005610  012737  177574  001036            MOV     #-132.,CHRCNT   ;RESET CHAR COUNT
 1919  005616  005237  001042                    INC     LINCNT          ;INCREMENT LINE COUNT
 1920  005622  001326                            BNE     CR3             ;BRANCH IF NOT DONE
 1921  005624  032777  010000  173152            BIT     #BIT12,@SWR     ;LOOP ON TEST?
 1922  005632  001247                            BNE     CHRCHK          ;YES,  LOOP
 1923
 1924
 1925
 1926                                    ;TEST 5
 1927                                    ;SHUTTLE POSITIONING TEST
 1928                                    ;SENDS PAIRS OF E'S,  THEN OVER PRINTS THEM WITH SPACES AND ADDS ANOTHER
```

```
                                        ;PAIR OF E'S TO THE LINE ---  THIS IS REPEATED UNTIL A FULL LINE OF E'S
                                        ;HAVE BEEN PRINTED,  THEN A FULL LINE OF M'S ARE PRINTED.

005634                                  OVRPRT:
005634  022737  000176  001004                  CMP     #176,SWR                ;S/W SWR ?
005642  001003                              (1) BNE     .+10                    ;NO- CONTINUE
005644  052777  000100  173146              (1) BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
005652  004437  011506                      1937 JSR     %4,TYPINT
005656  013737  014550  014030              1938 MOV     TNOS,MES15              ;SET TEST NUMBER FOR MESSAGE
005664  004437  011406                      (1) JSR     %4,PRNNT                ;PRINT TEST NUMBER
        000006                              (1) M=M+1
005670  012737  177760  001042              1939 MOV     #-16.,LINCNT    ;SET LINE COUNT FOR 16 LINES
005676  012737  177574  001036  OVR:       1940 MOV     #-132.,CHRCNT   ;SET CHAR COUNT
005704  012737  177776  001044  OVRO:      1941 MOV     #-2,CYCCNT      ;SET CYCLE COUNT FOR A PAIR OF E'S
005712  013737  001036  001056              1942 MOV     CHRCNT,STRCNT   ;NO.  CHARS LEFT TO PRINT
005720  062737  000205  001056              1943 ADD     #133.,STRCNT    ;NO.  SPACES +1
005726  012737  000040  001040              1944 MOV     #40,CHRGEN      ;SEND SPACE
005734  000406                              1945 BR      OVR2            ;BRANCH
005736  012737  000105  001040  OVR4:      1946 MOV     #105,CHRGEN     ;SEND E
```

```
1948  005744  013777  001040  173030  OVR1:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
1949  005752  005777  173022          OVR2:   TST     @LPS            ;TEST FOR ERROR
1950  005756  100006                  BPL     OVR3                    ;BRANCH IF NO ERROR
1951  005760  012737  000037  001052  ERR37:  MOV     #37,    ERCOUNT         ;SET UP ERROR COUNT 37
(1)             000040                  N=N+1
1952  005766  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
1953  005772  000000                  HALT
1954  005774  005337  001056          OVR3:   DEC     STRCNT          ;DECREMENT SPACE COUNTER
```

```
  1957  006000  003361                          BGT     OVR1            ;BRANCH IF NOT DONE SPACES
```

```
 1959  006002  001755                        BEQ     OVR4            ;BRANCH IF NOT FIRST E
 1960  006004  005237  001036                INC     CHRCNT          ;INCREMENT CHAR COUNT
 1961  006010  001437                        BEQ     OVR8            ;BRANCH IF DONE LINE
 1962  006012  005237  001044        OVR5:   INC     CYCCNT          ;INCREMENT CYCLE COUNT
```

```
1964  006016  001352                          BNE     OVR1            ;CONTINUE SENDING E'S IF NOT DONE
1965  006020  012777  000015  172754          MOV     #15,@LPB        ;SEND CR
1966  006026                          OVR6:
 (1)  006026  105777  172746                  TSTB    @LPS            ;TEST READY
 (1)  006032  100375                          BPL     .-4             ;WAIT FOR READY
1967  006034  005737  001036                  TST     CHRCNT          ;LINE DONE?
1968  006040  001321                          BNE     OVRO            ;NO,  CONTINUE OVER PRINT
1969  006042  005237  001042                  INC     LINCNT          ;YES,  INCREMENT LINE COUNT
1970  006046  001425                          BEQ     OVREXT          ;EXIT IF DONE TEST
1971  006050  032737  000001  001042          BIT     #1,LINCNT       ;WHICH LINE NEXT?
1972  006056  001707                          BEQ     OVR             ;BRANCH TO SEND E'S
1973  006060  012737  000115  001040          MOV     #115,CHRGEN     ;SET UP TO SEND M'S
1974  006066  012737  177573  001036          MOV     #-133.,CHRCNT   ;SET CHAR COUNT
1975  006074  005037  001056                  CLR     STRCNT          ;CLEAR SPACE COUNT
1976  006100  005037  001044                  CLR     CYCCNT          ;CLEAR CYCLE COUNT
```

```
 1978  006104  000137  005752                    JMP     OVR2            ;PRINT LINE OF M'S
 1979  006110  012777  000012  172664  OVR8:     MOV     #12,@LPB        ;SEND LF
```

```
  1982  006116  000137  006026                  JMP     OVR6            ;CONTINUE
```

```
 1984  006122  032777  010000  172654  OVREXT: BIT     #BIT12,@SWR     ;LOOP ON TEST?
 1985  006130  001241                          BNE     OVRPRT          ;LOOP
 1986
 1987                                  ;TEST 6
 1988                                  ;PRINT CONTROL TEST
 1989                                  ;SENDS FULL LINE OF SAME CHARACTER THEN FULL CHAR SET
 1990                                  ;SHOULD ONLY PRINT THE FIRST 132 CHARACTERS RECEIVED
 1991
 1992  006132                          PRTCTL:
  (1)  006132  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
  (1)  006140  001003                          BNE     .+10                    ;NO- CONTINUE
  (1)  006142  052777  000100  172650          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
 1993  006150  004437  011506                  JSR     %4,TYPINT
```

D05


```
 1995  006154  013737  014552  014030          MOV     TNO6,MES15              ;SET TEST NUMBER FOR MESSAGE
  (1)  006162  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
  (1)          000007                          M=M+1
 1996  006166  012737  000060  001054          MOV     #60,STRCHR      ;FIRST START CHAR
 1997  006174  032777  020000  172602  PRT0:   BIT     #BIT13,@SWR     ;TEST FOR CHAR SET
 1998  006202  001404                          BEQ     PRT1            ;BRANCH IF 64 CHARS
 1999  006204  012737  177641  001034          MOV     #-95.,SEGCNT    ;SET OVERFLOW COUNT
 2000  006212  000403                          BR      PRT2            ;BRANCH
 2001  006214  012737  177701  001034  PRT1:   MOV     #-63.,SEGCNT    ;SET OVERFLOW COUNT
 2002  006222  012737  177574  001036  PRT2:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 2003  006230  013737  001054  001040          MOV     STRCHR,CHRGEN   ;GET START CHAR
 2004  006236  005777  172536          PRT3:   TST     @LPS            ;TEST FOR ERROR
 2005  006242  100006                          BPL     PRT4            ;BRANCH IF NO ERROR
 2006  006244  012737  000040  001052  ERR40:  MOV     #40,    ERCOUNT         ;SET UP ERROR COUNT 40
  (1)          000041                          N=N+1
 2007  006252  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
 2008  006256  000000                          HALT                    ;HALT ON ERROR
 2009  006260  013777  001040  172514  PRT4:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
 2010  006266  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
 2011  006272  002761                          BLT     PRT3            ;BRANCH IF NOT 132 CHARS
 2012  006274  001433                          BEQ     PRTA            ;START OVERFLOW
 2013  006276  005237  001040                  INC     CHRGEN          ;NEXT CHAR
```

```
 2015  006302  005237  001034                  INC     SEGCNT          ;INCREMENT OVERFLOW COUNT
 2016  006306  001353                          BNE     PRT3            ;CONTINUE IF NOT DONE
 2017  006310  012777  000012  172464          MOV     #12,@LPB        ;SEND LF
 2018  006316  105777  172456                  TSTB    @LPS            ;TEST READY
  (1)  006322  100375                          BPL     .-4             ;WAIT FOR READY
 2019  006324  022737  000040  001054          CMP     #40,STRCHR      ;LAST START CHAR SPACE?
 2020  006332  001421                          BEQ     PRT6            ;YES,  BRANCH
 2021  006334  022737  000065  001054          CMP     #65,STRCHR      ;LAST START CHAR 5?
 2022  006342  001422                          BEQ     PRT7            ;YES,  BRANCH
 2023  006344  022737  000071  001054          CMP     #71,STRCHR      ;DONE?
 2024  006352  001423                          BEQ     PRT8            ;YES
 2025  006354  005237  001054                  INC     STRCHR          ;NO,  GET NEXT START CHAR
 2026  006360  000137  006174                  JMP     PRT0            ;CONTINUE
 2027  006364  012737  000041  001040  PRTA:   MOV     #41,CHRGEN      ;GET FIRST CHAR IN SET
 2028  006372  000137  006236                  JMP     PRT3            ;START OVERFLOW
 2029  006376  012737  000066  001054  PRT6:   MOV     #66,STRCHR      ;SET START CHAR TO 6
 2030  006404  000137  006174                  JMP     PRT0            ;CONTINUE
 2031  006410  012737  000040  001054  PRT7:   MOV     #40,STRCHR      ;SET START CHAR TO SPACE
 2032  006416  000137  006174                  JMP     PRT0            ;CONTINUE
 2033  006422  032777  010000  172354  PRT8:   BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
 2034  006430  001240                          BNE     PRTCTL          ;LOOP
 2035
 2036                                  ;TEST 7
 2037                                  ;MULTIPLE LINE ADVANCE TEST
 2038                                  ;TESTS MULTIPLE LINE ADVANCES AND TIMINGS
 2039                                  ;PRINTS THE NUMBER OF LINES SKIPPED ON THE LINE PRINTER
 2040
 2041  006432                  MLF:
  (1)  006432  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
  (1)  006440  001003                          BNE     .+10                    ;NO- CONTINUE
  (1)  006442  052777  000100  172350          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
 2042  006450  004437  011506                  JSR     %4,TYPINT
 2043  006454  013737  014554  014030          MOV     TN07,MES15              ;SET TEST NUMBER FOR MESSAGE
  (1)  006462  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
  (1)               000010                    M=M+1
 2044  006466  012737  006620  001054          MOV     #TABSTR,STRCHR  ;FIRST CHAR
 2045  006474  012737  177574  001036  MLFA:   MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 2046  006502  117737  172346  001040          MOVB    @STRCHR,CHRGEN  ;GET CHAR
 2047  006510  001452                          BEQ     MLF4            ;BRANCH IF DONE
 2048  006512  005777  172262          MLF0:   TST     @LPS            ;TEST FOR ERROR
 2049  006516  100006                          BPL     MLF1            ;CONTINUE IF NO ERROR
 2050  006520  012737  000041  001052  ERR41:  MOV     #41,    ERCOUNT         ;SET UP ERROR COUNT 41
  (1)               000042                    N=N+1
 2051  006526  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
 2052  006532  000000                          HALT                    ;HALT ON ERROR
 2053  006534  013777  001040  172240  MLF1:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
 2054  006542  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
 2055  006546  001361                          BNE     MLF0            ;CONTINUE
 2056  006550  117737  172300  001042          MOVB    @STRCHR,LINCNT  ;GET ASCII LINE COUNT
 2057  006556  042737  177770  001042          BIC     #177770,LINCNT  ;MAKE OCTAL
 2058  006564  005237  001042                  INC     LINCNT          ;ADD 1
 2059  006570  012777  000012  172204  MLF2:   MOV     #12,@LPB        ;SEND LF
 2060  006576  105777  172176                  TSTB    @LPS            ;TEST READY
  (1)  006602  100375                          BPL     .-4             ;WAIT FOR READY
 2061  006604  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 2062  006610  001367                          BNE     MLF2            ;CONTINUE
```

```
  2063  006612  005237  001054                INC     STRCHR          ;NEXT CHAR
```

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2067  006616  000726                          BR      MLFA            ;CONTINUE
2068
2069  006620  033462  033062  033463  TABSTR: .ASCIZ  /27263746354O/
      006626  033064  032463  030064
      006634     000
2070
2071          006636                          .EVEN
2072
2073  006636  032777  010000  172140  MLF4:   BIT     #BIT12,@SWR     ;CHECK LOOP ON TEST
2074  006644  001272                          BNE     MLF             ;LOOP
2075                                          .EVEN
2076
2077                                  ;TEST 8
2078                                  ;HIGH SPEED PRINT TEST
2079
2080  006646                          HSPRT:
 (1)  006646  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
 (1)  006654  001003                          BNE     .+10                    ;NO- CONTINUE
 (1)  006656  052777  000100  172134          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
2081  006664  004437  011506                  JSR     %4,TYPINT
2082  006670  013737  014556  014030          MOV     TN010,MES15             ;SET TEST NUMBER FOR MESSAGE
 (1)  006676  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
 (1)          000011                          M=M+1
2083  006702  032777  002000  172074          BIT     #BIT10,@SWR     ;CHECK FOR NEW DRUM / OLD DRUM
2084  006710  001135                          BNE     NHSPRT          ;BRANCH IF NEW DRUM
2085  006712  032777  020000  172064          BIT     #BIT13,@SWR     ;CHECK CHAR SET
2086  006720  001007                          BNE     HS00A           ;BRANCH IF 96 CHAR SET
2087  006722  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHK
2088  006730  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
2089  006736  000406                          BR      HS00            ;CONTINUE
2090  006740  012737  000200  001060  HS00A:  MOV     #200,LEGCHR     ;LEGAL CHECK
2091  006746  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
2092  006754  012737  000040  001054  HS00:   MOV     #40,STRCHR      ;SET UP FIRST LINE
2093  006762  012737  000177  001042          MOV     #127.,LINCNT    ;SET LINE COUNT FOR 2 PAGES
2094  006770  012737  177574  001036  HS0:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT
2095  006776  012737  177757  001044          MOV     #-17.,CYCCNT    ;SET GROUP COUNT
2096  007004  013737  001054  001040          MOV     STRCHR,CHRGEN   ;STORE START CHAR
2097  007012  005777  171762          HS1:    TST     @LPS            ;TEST FOR ERROR
2098  007016  100006                          BPL     HS2             ;BRANCH IF NO ERROR
2099  007020  012737  000042  001052  ERR42:  MOV     #42,    ERCOUNT         ;SET UP ERROR COUNT 42
 (1)          000043                          N=N+1
2100  007026  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2101  007032  000000                          HALT                    ;HALT ON ERROR
2102  007034  013777  001040  171740  HS2:    MOV     CHRGEN,@LPB     ;LOAD BUFFER
2103  007042  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
2104  007046  001424                          BEQ     HS4             ;BRANCH IF DONE LINE
2105  007050  005237  001040                  INC     CHRGEN          ;NEXT CHAR
2106  007054  005237  001044                  INC     CYCCNT          ;INCREMENT GROUP COUNT
2107  007060  001410                          BEQ     HS3             ;BRANCH IF DONE GROUP
2108  007062  023737  001060  001040          CMP     LEGCHR,CHRGEN   ;LEGAL CHAR?
2109  007070  001350                          BNE     HS1             ;BRANCH AND CONTINUE IF LEGAL CHAR
2110  007072  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;MAKE LEGAL
2111  007100  000744                          BR      HS1             ;CONTINUE
2112  007102  013737  001054  001040  HS3:    MOV     STRCHR,CHRGEN   ;GET FIRST CHAR IN GROUP
2113  007110  012737  177757  001044          MOV     #-17.,CYCCNT    ;RESET CYCLE COUNT
2114  007116  000735                          BR      HS1             ;CONTINUE
```

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 2115  007120  012777  000012  171654  HS4:    MOV     #12,@LPB        ;SEND LF
 2116  007126  105777  171646                  TSTB    @LPS            ;TEST READY
  (1)  007132  100375                          BPL     .-4             ;WAIT FOR READY
 2117  007134  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 2118  007140  002413                          BLT     HS6             ;EXIT TEST IF DONE
 2119  007142  162737  000004  001054          SUB     #4,STRCHR       ;SKIP 4 LINES ON DRUM, FIND START CHAR
 2120  007150  022737  000040  001054          CMP     #40,STRCHR      ;START CHAR A LEGAL CHAR?
 2121  007156  003704                          BLE     HS0             ;CONTINUE IF LEGAL START CHAR
 2122  007160  063737  001062  001054          ADD     NUMCHR,STRCHR   ;MAKE LEGAL AND CONTINUE
 2123  007166  000700                          BR      HS0             ;CONTINUE
 2124  007170  032777  010000  171606  HS6:    BIT     #BIT12,@SWR     ;LOOP ON TEST?
 2125  007176  001223                          BNE     HSPRT           ;LOOP
 2126
 2127
 2128  00720C  000137  007450                  JMP     SNGCHR          ;JUMP TO TEST 9 AFTER COMPLETION
 2129
 2130
 2131                                  ;NEW DRUM (LP14) HIGH SPEED PRINT TEST
 2132
 2133  007204  032777  020000  171572  NHSPRT: BIT     #BIT13,@SWR     ;CHECK  CHARACTER SET
 2134  007212  001007                          BNE     NHS00A          ;BRANCH IF 96 CHARACTER SET
 2135
 2136  007214  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHARACTER CHECK
 2137  007222  012737  000100  001062          MOV     #100,NUMCHR     ;# CHARACTERS = 64
 2138  007230  000406                          BR      NHS00           ;CONTINUE
 2139  007232  012737  000200  001060  NHS00A: MOV     #200,LEGCHR     ;LEGAL CHARACTER CHECK
 2140  007240  012737  000140  001062          MOV     #140,NUMCHR     ;# CHARACTERS = 96
 2141  007246  012737  000003  001064  NHS00:  MOV     #3,OFFSET       ;COLUM/CHARACTER OFFSET
 2142  007254  012737  000040  001054          MOV     #40,STRCHR      ;SET UP FIRST CHARACTER OF FIRSTLINE
 2143  007262  012737  000177  001042          MOV     #127.,LINCNT    ;SET LINE COUNT FOR 2 PAGES
 2144  007270  012737  177574  001036  NHS0:   MOV     #-132., CHRCNT  ;SET CHARACTER COUNT = # COLUMNS
 2145  007276  013737  001054  001040          MOV     STRCHR,CHRGEN   ;STORE STARTING CHARACTER
 2146  007304  005777  171470          NHS1:   TST     @LPS            ;TEST FOR ERROR
 2147  007310  100006                          BPL     NHS2            ;BRANCH IF NO ERROR
 2148  007312  012737  000043  001052  ERR43:  MOV     #43,    ERCOUNT         ;SET UP ERROR COUNT 43
  (1)          000044                          N=N+1
 2149  007320  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
 2150  007324  000000                          HALT                    ;HALT ON ERROR
 2151  007326  013777  001040  171446  NHS2:   MOV     CHRGEN,@LPB     ;LOAD PRINTER BUFFER
 2152  007334  005237  001036                  INC     CHRCNT          ;INCREMENT CHARACTER COUNT
 2153  007340  001413                          BEQ     NHS4            ;BRANCH IF LINE DONE
 2154  007342  063737  001064  001040          ADD     OFFSET,CHRGEN   ;NEXT CHARACTER
 2155  007350  023737  001060  001040          CMP     LEGCHR,CHRGEN   ;LEGAL CHARACTER
 2156  007356  003352                          BGT     NHS1            ;BRANCH + CONTINUE IF LEGAL CHARACTER
 2157  007360  163737  001062  001040          SUB     NUMCHR,CHRGEN   ;MAKE LEGAL
 2158  007366  000746                          BR      NHS1            ;CONTINUE
 2159  007370  012777  000012  171404  NHS4:   MOV     #12,@LPB        ;SEND LINE FEED.
 2160  007376  105777  171376                  TSTB    @LPS            ;TEST READY
  (1)  007402  100375                          BPL     .-4             ;WAIT FOR READY
 2161  007404  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
 2162  007410  002413                          BLT     NHS6            ;EXIT IF TEST IS DONE
 2163  007412  162737  000004  001054          SUB     #4,STRCHR       ;SKIP 4 LINES DOWN DRUM,FIND STARTING CHARACTER
 2164  007420  022737  000040  001054          CMP     #40,STRCHR      ;START CHARACTER A LEGAL CHARACTER
 2165  007426  003720                          BLE     NHS0            ;CONTINUE IF LEGAL START CHARACTER
 2166  007430  063737  001062  001054          ADD     NUMCHR, STRCHR  ;MAKE LEGAL + CONTINUE
 2167  007436  000714                          BR      NHS0            ;CONTINUE
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 2168  007440  032777  010000  171336  NHS6:   BIT     #BIT12,@SWR     ;LOOP ON TEST
 2169  007446  001256                          BNE     NHSPRT          ;LOOP
 2170
 2171                                  ;TEST 9
 2172                                  ;WORST CASE NOISE TEST
 2173                                  ;SINGLE CHAR. ACROSS ALL COLS.
 2174
 2175  007450                          SNGCHR:
  (1)  007450  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
  (1)  007456  001003                          BNE     .+10                    ;NO- CONTINUE
  (1)  007460  052777  000100  171332          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
 2176  007466  004437  011506                  JSR     %4,TYPINT
 2177  007472  013737  014560  014030          MOV     TNO11,MES15             ;SET TEST NUMBER FOR MESSAGE
  (1)  007500  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
  (1)       000012                          M=M+1
 2178  007504  032777  020000  171272          BIT     #BIT13,@SWR     ;TEST CHAR SET
 2179  007512  001404                          BEQ     S2              ;BRANCH IF 64
 2180  007514  012737  177640  001042          MOV     #-96.,LINCNT    ;96 CHAR.
 2181  007522  000403                          BR      .+10            ;BRANCH
 2182  007524  012737  177700  001042  S2:     MOV     #-64.,LINCNT    ;64 CHAR.
 2183  007532  012737  000040  001040          MOV     #40,CHRGEN      ;SET UP SPACE
 2184  007540  012737  177574  001036  S2A:    MOV     #-132.,CHRCNT   ;SET CHAR COUNT FOR 132
 2185  007546  005777  171226          S1:     TST     @LPS            ;TEST FOR ERRORS
 2186  007552  100006                          BPL     XS1X            ;BRANCH IF NO ERRORS
 2187  007554  012737  000044  001052  ERR44:  MOV     #44,    ERCOUNT         ;SET UP ERROR COUNT 44
  (1)       000045                          N=N+1
 2188  007562  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
 2189  007566  000000                          HALT                    ;HALT ON ERROR
 2190  007570  013777  001040  171204  XS1X:   MOV     CHRGEN,@LPB     ;LOAD PRINTER BUFFER
 2191  007576  005237  001036                  INC     CHRCNT          ;INCREMENT CHAR COUNT
 2192  007602  001361                          BNE     S1              ;CONTINUE IF NOT DONE LINE
 2193  007604  012777  000012  171170  S4X2:   MOV     #12,@LPB        ;ISSUE LINE FEED
 2194  007612  105777  171162          TSTB    @LPS            ;TEST READY
  (1)  007616  100375                          BPL     .-4             ;WAIT FOR READY
 2195  007620  005237  001040                  INC     CHRGEN          ;+1 CHAR.
 2196  007624  005237  001042                  INC     LINCNT          ;+1 LINE COUNT
 2197  007630  002743                          BLT     S2A             ;CONTINUE IF NOT DONE
 2198  007632  001764                          BEQ     S4X2            ;SEND BLANK LINE AT END OF TEST
 2199  007634  032777  010000  171142  LPS7:   BIT     #BIT12,@SWR     ;CHECK TO LOOP ON TEST
 2200  007642  001302                          BNE     SNGCHR          ;LOOP ON TEST
 2201
 2202
 2203
 2204                                  ;TEST 10
 2205                                  ;DRUM PATTERN CHARACTER TEST
 2206
 2207  007644                          ROTATE:
  (1)  007644  022737  000176  001004          CMP     #176,SWR                ;S/W SWR ?
  (1)  007652  001003                          BNE     .+10                    ;NO- CONTINUE
  (1)  007654  052777  000100  171136          BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
 2208  007662  004437  011506                  JSR     %4,TYPINT
 2209  007666  013737  014562  014030          MOV     TNO12,MES15             ;SET TEST NUMBER FOR MESSAGE
  (1)  007674  004437  011406                  JSR     %4,PRNNT                ;PRINT TEST NUMBER
  (1)       000013                          M=M+1
 2210
 2211  007700  032777  002000  171076          BIT     #BIT10,@SWR     ;CHECK FOR NEW DRUM/OLD DRUM
```

```
2212  007706  001122                          BNE     NROTAT          ;BRANCH IF NEW DRUM
2213  007710  032777  020000  171066          BIT     #BIT13,@SWR     ;TEST CHAR SET
2214  007716  001012                          BNE     ROT0            ;SKIP IF 96 CHAR
2215  007720  012737  000137  001042          MOV     #137,LINCNT     ;LAST CHAR
2216  007726  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHK
2217  007734  012737  000100  001062          MOV     #100,NUMCHR     ;#CHARS
2218  007742  000411                          BR      ROT1            ;CONTINUE
2219  007744  012737  000177  001042  ROT0:   MOV     #177,LINCNT     ;LAST CHAR
2220  007752  012737  000200  001060          MOV     #200,LEGCHR     ;LEGAL CHK
2221  007760  012737  000140  001062          MOV     #140,NUMCHR     ;#CHARS
2222  007766  005037  001044          ROT1:   CLR     CYCCNT          ;CLEAR CYCLE COUNT
2223  007772  005237  001044          ROT2:   INC     CYCCNT          ;INC CYCLE COUNT
2224  007776  005037  001040                  CLR     CHRGEN          ;CLEAR POINTER
2225  010002  005237  001040          ROT3:   INC     CHRGEN          ;INC POINTER
2226  010006  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE POINTER
2227  010014  063737  001042  001054          ADD     LINCNT,STRCHR   ;FIND CHAR
2228  010022  023737  001054  001060          CMP     STRCHR,LEGCHR   ;LEGAL?
2229  010030  002403                          BLT     ROT4            ;BRANCH IF LEGAL
2230  010032  163737  001062  001054          SUB     NUMCHR,STRCHR   ;MAKE LEGAL
2231  010040  005777  170734          ROT4:   TST     @LPS            ;TEST FOR ERRORS
2232  010044  100006                          BPL     ROT5            ;BRANCH IF NO ERRORS
2233  010046  012737  000045  001052  ERR45:  MOV     #45,    ERCOUNT         ;SET UP ERROR COUNT 45
 (1)            000046                  N=N+1
2234  010054  004537  011722                  JSR     %5,STAER        ;REPORT ERROR
2235  010060  000000                          HALT                    ;HALT ON ERROR
2236  010062  013777  001054  170712  ROT5:   MOV     STRCHR,@LPB     ;LOAD BUFFER
2237  010070  023727  001040  000021          CMP     CHRGEN,#17.     ;DONE GROUP?
2238  010076  001341                          BNE     ROT3            ;NO GET NEXT CHAR
2239  010100  023727  001044  000010          CMP     CYCCNT,#8.      ;DONE LINE?
2240  010106  001331                          BNE     ROT2            ;NO, NEXT GROUP
2241  010110  012777  000012  170664          MOV     #12,@LPB        ;YES, SEND LF
2242  010116  105777  170656                  TSTB    @LPS            ;TEST READY
 (1)  010122  100375                          BPL     .-4             ;WAIT FOR READY
2243  010124  005337  001042                  DEC     LINCNT          ;DECREMENT LINE COUNT
2244  010130  023727  001042  000037          CMP     LINCNT,#37      ;DONE?
2245  010136  003313                          BGT     ROT1            ;NO, NEXT LINE
2246  010140  032777  010000  170636          BIT     #BIT12,@SWR     ;LOOP ON TEST?
2247  010146  001236                          BNE     ROTATE          ;LOOP
2248
2249  010150  000137  010406                  JMP     LFTTR           ;JUMP TO TEST 11 AFTER COMPLETION
2250
2251
2252                                  ;NEW DRUM (LP14) PATTERN CHARACTER TEST
2253
2254  010154  032777  020000  170622  NROTAT: BIT     #BIT13,@SWR     ;TEST CHARACTER SET
2255  010162  001012                          BNE     NROT0           ;SKIP IF 96 CHARACTERS
2256  010164  012737  000137  001042          MOV     #137,LINCNT     ;LAST CHARACTER
2257  010172  012737  000140  001060          MOV     #140,LEGCHR     ;LEGAL CHECK
2258  010200  012737  000100  001062          MOV     #100,NUMCHR     ;# OF CHARACTERS
2259  010206  000411                          BR      NROT1           ;CONTINUE
2260  010210  012737  000177  001042  NROT0:  MOV     #177,LINCNT     ;LAST CHARACTER
2261  010216  012737  000200  001060          MOV     #200,LEGCHR     ;LEGAL CHECK
2262  010224  012737  000140  001062          MOV     #140,NUMCHR     ;# OF CHARACTERS
2263  010232  012737  000040  001040  NROT1:  MOV     #40,CHRGEN      ;GET POINTER
2264  010240  005237  001040          NROT6:  INC     CHRGEN          ;SET POINTER
2265  010244  013737  001040  001054          MOV     CHRGEN,STRCHR   ;STORE POINTER
```

```
2266  010252  005037  001036                NROT2:  CLR     CHRCNT          ;# CHARACTERS PRINTED
2267  010256  005237  001036                        INC     CHRCNT          ;INCREMENT CHARACTERS PRINTED
2268  010262  063737  001064  001054                ADD     OFFSET,STRCHR   ;INCREMENT POINTER
2269  010270  023737  001054  001060                CMP     STRCHR,LEGCHR   ;LEGAL CHARACTER?
2270  010276  002403                                BLT     NROT4           ;BRANCH IF LEGAL
2271  010300  163737  001062  001054                SUB     NUMCHR,STRCHR   ;MAKE LEGAL
2272  010306  005777  170466                NROT4:  TST     @LPS            ;TEST FOR ERRORS
2273  010312  100006                                BPL     NROT5           ;BRANCH IF NO ERRORS
2274  010314  012737  000046  001052        ERR46:  MOV     #46,    ERCOUNT         ;SET UP ERROR COUNT 46
 (1)              000047                            N=N+1
2275  010322  004537  011722                        JSR     %5,STAER        ;REPORT ERROR
2276  010326  000000                                HALT
2277  010330  013777  001054  170444        NROT5:  MOV     STRCHR,@LPB     ;LOAD BUFFER
2278  010336  023727  001036  000204                CMP     CHRCNT,#132.    ;LINE FINISHED?
2279  010344  001344                                BNE     NROT2           ;NO GET NEXT CHARACTER
2280  010346  012777  000012  170426                MOV     #12,@LPB        ;YES,SEND LINE FEED
2281  010354  105777  170420                        TSTB    @LPS            ;TEST READY
 (1)  010360  100375                                BPL     .-4             ;WAIT FOR READY
2282  010362  005337  001042                        DEC     LINCNT          ;DECREMENT LINE COUNT
2283  010366  023727  001042  000037                CMP     LINCNT,#37      ;PATTERN FINISHED
2284  010374  003321                                BGT     NROT6           ;NO, DO NEXT LINE
2285  010376  032777  010000  170400                BIT     #BIT12,@SWR     ;LOOP ON TEST
2286  010404  001263                                BNE     NROTAT          ;LOOP
2287
2288                                        ;TEST 11 ----- SPURIOUS HAMMER FIRING TEST
2289                                        ;LEFT AND RIGHT TRIANGLES
2290
2291                                        ; STARTING WITH A LEFT TRIANGLE
2292
2293  010406                                LFTTR:
 (1)  010406  022737  000176  001004                CMP     #176,SWR                ;S/W SWR ?
 (1)  010414  001003                                BNE     .+10                    ;NO- CONTINUE
 (1)  010416  052777  000100  170374                BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
2294  010424  004437  011506                        JSR     %4,TYPINT
2295  010430  013737  014564  014030                MOV     TN013,MES15             ;SET TEST NUMBER FOR MESSAGE
 (1)  010436  004437  011406                        JSR     %4,PRNNT                ;PRINT TEST NUMBER
 (1)              000014                            M=M+1
2296  010442  012737  000204  001042        LFT:    MOV     #132.,LINCNT    ;SET LINE COUNT
2297  010450  013737  001042  001036        LFT0:   MOV     LINCNT,CHRCNT   ;STORE CHAR COUNT
2298  010456  012737  177757  001044                MOV     #-17.,CYCCNT    ;SET GROUP COUNT
2299  010464  013737  001036  001040                MOV     CHRCNT,CHRGEN   ;FIND FIRST CHAR ON LINE...
2300  010472  022737  000022  001040        LFT1:   CMP     #18.,CHRGEN     ;MORE THAN 17 CHARS?
2301  010500  003004                                BGT     LFT2            ;BRANCH IF LESS THAN 17
2302  010502  162737  000021  001040                SUB     #17.,CHRGEN     ;SUBTRACT 17, IF > 17
2303  010510  000770                                BR      LFT1            ;CONTINUE
2304  010512  005437  001040        LFT2:   NEG     CHRGEN          ;NEGATE CHRGEN
2305  010516  062737  000100  001040                ADD     #100,CHRGEN     ;START CHAR IN CHRGEN
2306  010524  013737  001040  001054                MOV     CHRGEN,STRCHR   ;STORE STARTING CHAR
2307  010532  005777  170242        LFT3:   TST     @LPS            ;TEST FOR ERROR
2308  010536  100006                                BPL     LFT4            ;CONTINUE IF NO ERROR
2309  010540  012737  000047  001052        ERR47:  MOV     #47,    ERCOUNT         ;SET UP ERROR COUNT 47
 (1)              000050                            N=N+1
2310  010546  004537  011722                        JSR     %5,STAER        ;REPORT ERROR SET
2311  010552  000000                                HALT                    ;HALT ON ERROR
2312  010554  013777  001040  170220        LFT4:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
2313  010562  005337  001036                        DEC     CHRCNT          ;DECREMENT CHAR COUNT
```

```
2314  010566  001415                                  BEQ     LFT6            ;BRANCH IF DONE LINE
2315  010570  005237  001044                          INC     CYCCNT          ;INCREMENT GROUP COUNT
2316  010574  001403                                  BEQ     LFT5            ;BRANCH IF DONE GROUP
2317  010576  005237  001040                          INC     CHRGEN          ;NEXT CHAR IN GROUP
2318  010602  000753                                  BR      LFT3            ;CONTINUE
2319  010604  013737  001054  001040  LFT5:   MOV     STRCHR,CHRGEN   ;GET START CHAR AGAIN
2320  010612  012737  177757  001044                  MOV     #-17.,CYCCNT    ;RESET GROUP COUNT
2321  010620  000744                                  BR      LFT3            ;CONTINUE
2322  010622  012777  000012  170152  LFT6:   MOV     #12,@LPB        ;SEND LF
2323  010630  105777  170144                          TSTB    @LPS            ;TEST READY
 (1)  010634  100375                                  BPL     .-4             ;WAIT FOR READY
2324  010636  005337  001042                          DEC     LINCNT          ;DECREMENT LINE COUNT
2325  010642  003302                                  BGT     LFTO            ;BRANCH IF NOT DONE
2326  010644  001766                                  BEQ     LFT6            ;SEND BLANK LINE AT END OF TEST
2327  010646  032777  010000  170130                  BIT     #BIT12,@SWR     ;LOOP ON TEST?
2328  010654  001254                                  BNE     LFTTR           ;LOOP
2329
2330                                    ;TEST 11 ----- CONTINUED
2331                                    ;RIGHT TRIANGLE
2332
2333  010656  012737  000001  001042  RTTR:   MOV     #1,LINCNT       ;INITIALIZE LINE
2334  010664  012737  000077  001040  RT1:    MOV     #77,CHRGEN      ;FIRST CHAR IS A ?
2335  010672  013737  001042  001044          MOV     LINCNT,CYCCNT   ;SAVE NO.  CHARS ON LINE
2336  010700  012737  177757  001056          MOV     #-17.,STRCNT    ;SET GROUP COUNT
2337  010706  012737  000204  001036          MOV     #132.,CHRCNT    ;NO.  CHARS PER LINE
2338  010714  163737  001042  001036          SUB     LINCNT,CHRCNT   ;SUBTRACT NO.. OF CHARS ON LINE
2339  010722  001425                                  BEQ     RT3             ;BRANCH IF NO SPACES ON THIS LINE
2340  010724  005777  170050          RT2:    TST     @LPS            ;TEST FOR ERROR
2341  010730  100006                                  BPL     RT2A            ;CONTINUE IF NO ERROR
2342  010732  012737  000050  001052  ERR50:  MOV     #50,    ERCOUNT         ;SET UP ERROR COUNT 50
 (1)              000051                          N=N+1
2343  010740  004537  011722                          JSR     %5,STAER        ;REPORT ERROR SET
2344  010744  000000                                  HALT                    ;HALT ON ERROR
2345  010746  012777  000040  170026  RT2A:   MOV     #40,@LPB        ;LOAD BUFFER
2346  010754  005237  001056                          INC     STRCNT          ;INCREMENT GROUP COUNT
2347  010760  001003                                  BNE     RT2AA           ;BRANCH IF NOT DONE GROUP
2348  010762  012737  177757  001056                  MOV     #-17.,STRCNT    ;RESET GROUP COUNT
2349  010770  005337  001036          RT2AA:  DEC     CHRCNT          ;DECREMENT SPACE COUNT
2350  010774  001353                                  BNE     RT2             ;BRANCH IF NOT DONE SPACES
2351  010776  005777  167776          RT3:    TST     @LPS            ;TEST FOR ERROR
2352  011002  100006                                  BPL     RT3A            ;CONTINUE IF NO ERROR
2353  011004  012737  000051  001052  ERR51:  MOV     #51,    ERCOUNT         ;SET UP ERROR COUNT 51
 (1)              000052                          N=N+1
2354  011012  004537  011722                          JSR     %5,STAER        ;REPORT ERROR SET
2355  011016  000000                                  HALT                    ;HALT ON ERROR
2356  011020  013777  001040  167754  RT3A:   MOV     CHRGEN,@LPB     ;LOAD BUFFER
2357  011026  005237  001040                          INC     CHRGEN          ;NEXT CHAR
2358  011032  005237  001056                          INC     STRCNT          ;INCREMENT GROUP COUNT
2359  011036  001006                                  BNE     RT3B            ;BRANCH IF NOT DONE GROUP
2360  011040  012737  177757  001056                  MOV     #-17.,STRCNT    ;RESET GROUP COUNT
2361  011046  162737  000021  001040                  SUB     #17.,CHRGEN     ;GET FIRST GROUP CHAR
2362  011054  005337  001044          RT3B:   DEC     CYCCNT          ;DECREMENT CHAR COUNT
2363  011060  001346                                  BNE     RT3             ;CONTINUE
2364  011062  012777  000012  167712                  MOV     #12,@LPB        ;SEND LF
2365  011070  105777  167704                          TSTB    @LPS            ;TEST READY
 (1)  011074  100375                                  BPL     .-4             ;WAIT FOR READY
```

```
                                                ;INCREMENT LINE COUNT
                                                ;DONE?
                                                ;BRANCH IF NOT DONE
                                                ;LOOP ON TEST?
                                                ;LOOP

                        ;TEST 12
                        ;HAMMER ALIGMENT

                        HAMALN:
                                                ;S/W SWR ?
                                                ;NO- CUNTINUE
                                                ;ENABLE KEYBOARD INTERRUPT
                                                ;SET TEST NUMBER FOR MESSAGE
                                                ;PRINT TEST NUMBER
                                                ;SET UP FOR 63 LINES
                        HAM1X:                  ;SET CHAR COUNT
                        HAM2:                   ;CHECK FOR ERROR
                                                ;BRANCH IF NO ERROR
                        ERR52:                  ;SET UP ERROR COUNT 52
                                                ;REPORT ERROR OCCURRED
                                                ;HALT ON ERROR
                        XHAM1:
                                                ;TEST READY
                                                ;WAIT FOR READY
                                                ;WAIT FOR READY
                        XHAM1X:                 ;TRANSMIT E TO PRINTER
                                                ;+1 CHAR COUNT
                                                ;TRANSMIT ANOTHER CHAR.
                                                ;TRANSMIT LINE FEED
                                                ;TEST READY
                                                ;WAIT FOR READY
                                                ;+1 TO COUNT
                                                ;GO DO NEXT LINE
                                                ;CHECK TO LOOP ON TEST
                                                ;LOOP ON TEST

                                                ;DAVFU AVAILABLE?
                                                ;NO,  RECYCLE PRINTING TESTS
                                                ;YES,  DO DAVFU PRINTING TESTS
                        HAMX:

                        LOGICAL:

                        DOAGN:
                                                ;RESTART

                        ;MISC. ROUTINES
```

```
                                        ;ROUTINE TO INITIALIZE PRINTER
                                        ;ENTER FROM JSR %5, PRTINT
                                
011332  005777  167442        PRTINT: TST     @LPS            ;TEST FOR ERROR
011336  100403                        BMI     PRTINO          ;BRANCH IF ERROR
011340  105777  167434                TSTB    @LPS            ;TEST FOR READY
011344  100403                        BMI     RDYOK           ;READY SET OK
011346  062705  000002        PRTINO: ADD     #2,%5           ;SET UP FOR ERROR REPORT
011352  000205                        RTS     %5              ;REPORT READY NOT SET
011354  012777  000014  167420 RDYOK:  MOV     #14,@LPB        ;ISSUE FORM FEED
011362  105777  167412                TSTB    @LPS            ;TEST FOR READY NOT SET
011366  100003                        BPL     NTRDY           ;READY NOT SET OK
011370  062705  000002                ADD     #2,%5           ;SET UP FOR REPORT
011374  000205                        RTS     %5              ;EXIT AND REPORT
011376                          NTRDY:
 (1)    011376  105777  167376        TSTB    @LPS            ;TEST READY
 (1)    011402  100375                BPL     .-4             ;WAIT FOR READY
011404  000205                        RTS     %5              ;READY SET EXIT
                                
                                
                                        ;ROUTINE TO OUTPUT ASCII MESSAGES ON THE LINE PRINTER
                                
011406  012737  014012  011470 PRNNT:  MOV     #MES14,PRTMSG   ;PRINT TEST NUMBER
011414  012746  000340                MOV     #340,-(SP)      ;LOCK OUT KEYBOARD INTERRUPTS
011420  010746                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
 (1)    011422  062716  000006        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
 (1)    011426  000002                RTI                             ;LOAD PSW
011430  005777  167344                TST     @LPS            ;TEST FOR ERROR
011434  100006                        BPL     RINT            ;BRANCH IF OK
011436  012737  000053  001052 ERR53:  MOV     #53,    ERCOUNT         ;SET UP ERROR COUNT 53
 (1)            000054                N=N+1
011444  004537  011722                JSR     %5,STAER        ;REPORT ERROR SET
011450  000000                        HALT                    ;HALT ON ERROR
011452  013737  001000  001016 RINT:   MOV     LPS,TPS ;SET VECTORS -
011460  013737  001002  001012        MOV     LPB,TPB ;TO PRINT ON LINE PRINTER
011466  104000                        EMT     +0              ;PRINT
011470  014012                PRTMSG: MES14                   ;MESSAGE
011472  012746  000140                MOV     #140,-(SP)      ;ALLOW KEYBOARD INTERRUPTS
011476  010746                        MOV     PC,-(SP)                ;MOVE PRESENT LOCATION TO STACK
 (1)    011500  062716  000006        ADD     #6,(SP)                 ;SET UP FOR NEXT INSTRUCTION
 (1)    011504  000002                RTI                             ;LOAD PSW
011506  012737  177564  001016 TYPINT: MOV     #177564,TPS     ;RESET VECTORS
011514  012737  177566  001012        MOV     #177566,TPB     ;FOR TTY
011522  000204                        RTS     %4              ;RETURN
                                
                                        ;SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
                                
011524  011600                TYP:    MOV     @%6,%0          ;GET ADDR. THAT CONTAINS MESS.
011526  062716  000002                ADD     #2,@%6          ;SET UP EXIT
011532  011000                        MOV     @%0,%0          ;ADDRESS OF MESSAGE IN R0
```

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2462  011534  112037  011636          TYPA:   MOVB    (0)+,TYPDAT     ;GET CHARACTER
2463  011540  001001                          BNE     TYPC            ;BRANCH IF NOT DONE
2464  011542  000002                          RTI                     ;EXIT
2465  011544  122737  000045  011636  TYPC:   CMPB    #45,TYPDAT      ;CHECK FOR "%"
2466  011552  001416                          BEQ     TYPF            ;BRANCH IF "%"
2467  011554  122737  000043  011636          CMPB    #43,TYPDAT      ;CHECK FOR "#"
2468  011562  001417                          BEQ     TYPG            ;BRANCH IF "#"
2469  011564  004737  011572                  JSR     %7,TYPD         ;TYPE CHARACTER IN TYPDAT
2470  011570  000761                          BR      TYPA            ;NEXT CHAR IN MESSAGE
2471  011572  113777  011636  167212  TYPD:   MOVB    TYPDAT,@TPB     ;OUTPUT CHARACTER TO PRINTER
2472  011600  105777  167212  TYPDO:  TSTB    @TPS
2473  011604  100375                          BPL     .-4
2474  011606  000207                          RTS     %7              ;CHAR. TYPED EXIT
2475  011610  112737  000012  011636  TYPF:   MOVB    #12,TYPDAT      ;OUTPUT LF
2476  011616  004737  011572                  JSR     %7,TYPD         ;GO TYPE CHAR.
2477  011622  112737  000015  011636  TYPG:   MOVB    #15,TYPDAT      ;OUTPUT CR
2478  011630  004737  011572                  JSR     %7,TYPD         ;GO TYPE CHAR.
2479  011634  000737                          BR      TYPA
2480  011636  000000          TYPDAT: 0
2481
2482
2483                          ;ROUTINE TO CONVERT OCTAL TO ASCII
2484
2485                          ;ENTER ROUTINE AS FOLLOWS
2486                          ;       JSR     %5,CONV
2487                          ;XXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
2488                          ;XXXXXX=ADDRESS OF ASCII MESSAGE
2489                          ;XXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
2490
2491  011640  013537  011720  CONV:   MOV     @(5)+,ACNVX     ;ADDRSS OF NO. TO BE CONVERTED
2492  011644  012501                  MOV     (5)+,%1         ;ADDRESS OF MESSAGE
2493  011646  012502                  MOV     (5)+,%2         ;NUMBER OF ASCII CHARACTERS
2494  011650  060201                  ADD     %2,%1           ;FIRST CHAR ADDRESS
2495  011654  013703  011720  ACVN:   MOV     ACNVX,%3        ;STORE NUMBER
2496  011660  042703  177770          BIC     #177770,%3      ;ISOLATE LEAST SIGNIFICANT BIT
2497  011664  062703  000060          ADD     #60,%3          ;SET UP ASCII CHARACTER
2498  011670  110341                  MOVB    %3,-(1)         ;STORE CHARACTER
2499  011672  000241                  CLC                     ;GET NEXT SIGNIFICANT BIT ...
2500  011674  006037  011720          ROR     ACNVX
2501  011700  000241                  CLC
2502  011702  006037  011720          ROR     ACNVX
2503  011706  000241                  CLC
2504  011710  006037  011720          ROR     ACNVX
2505  011714  005302                  DEC     %2              ;-1 FROM ASCII CHAR. CNT
2506  011716  001356                  BNE     ACVN            ;CONVERT NEXT CHARACTER
2507  011720  000205                  RTS     %5              ;EXIT! CONVERSION DONE
2508
2509  011722  000000          ACNVX:  0                       ;WORK REGISTER
2510
2511                          ;ROUTINE TO REPORT ERROR COUNT
2512
2513  011724  032777  001000  167054  STAER:  BIT     #BIT9,@SWR      ;INHIBIT ERROR REPORTS ?
2514  011732  001007                  BNE     STAER1          ;YES
2515  011734  004537  011640          JSR     %5,CONV         ;CONVERT OCTAL TO ASCII
2516  011740  001052                  ERCOUNT
2517  011742  012361                  MED1
```

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2518  011742  000003                          3
2519  011744  104000                          EMT     +0              ;TYPE ERROR MESSAGE
2520  011746  012360                          MEDO
2521  011750  005777  167030        STAER1:   TST     @SWR            ;TEST FOR HALT ON ERROR
2522  011754  100401                          BMI     .+4             ;BRANCH IF NO HALT WANTED
2523  011756  000000                          HALT                    ;HALT ON ERROR
2524  011760  000205                          RTS     %5              ;RETURN
2525
2526
2527                                  ;KEYBOARD INTERRUPT ROUTINE
2528                                  ;FOR ACCESS TO THE S/W SWITCH REGISTER
2529
2530
2531  011762  010046        TKINT:    MOV     %0,-(SP)        ;SAVE REGISTERS
2532  011764  010146                  MOV     %1,-(SP)        ;
2533  011766  010246                  MOV     %2,-(SP)        ;
2534  011770  010346                  MOV     %3,-(SP)        ;
2535  011772  010446                  MOV     %4,-(SP)        ;
2536  011774  010546                  MOV     %5,-(SP)        ;
2537  011776  005737  001072          TST     SET             ;INITIAL SWR ENTRY ?
2538  012002  001130                  BNE     TYPSWR          ;YES-PRINT HEADER
2539  012004  005737  001070          TST     SIGNAL          ;PREVIOUS CONTROL-G INPUT ?
2540  012010  001477                  BEQ     CNTRLG          ;YES-CONTINUE
2541  012012  017737  166776  001074  MOV     @TKB,CHAR       ;GET INPUT CHARACTER
2542  012020  042737  177600  001074  BIC     #177600,CHAR    ;STRIP OFF PARITY BIT
2543  012026  022737  000015  001074  CMP     #15,CHAR        ;CARRIAGE RETURN ?
2544  012034  001456                  BEQ     DGTS            ;YES-CONTINUE
2545  012036  022737  000025  001074  CMP     #25,CHAR        ;CONTROL-U INPUT ?
2546  012044  001530                  BEQ     TK4             ;YES-CONTINUE
2547  012046  023727  001074  000060  CMP     CHAR,#60        ;LEGAL CHECK: LESS THAN 60 ?
2548  012054  100001                  BPL     TK1             ;NO-CONTINUE
2549  012056  000466                  BR      WT3             ;YES-PRINT "?"
2550  012060  022737  000067  001074  TK1:    CMP     #67,CHAR        ;LEGAL CHECK: GREATER THAN 67 ?
2551  012066  100001                  BPL     TK2             ;NO-CONTINUE
2552  012070  000461                  BR      WT3             ;YES-PRINT "?"
2553  012072  005237  001066          TK2:    INC     DIGITS          ;NEXT DIGIT OF SWR INPUT
2554  012076  022737  000006  001066  CMP     #6,DIGITS       ;MORE THAN SIX DIGITS ?
2555  012104  100453                  BMI     WT3             ;YES-PRINT "?"
2556  012106  105777  166704  WT2:    TSTB    @TPS            ;TTY PRINTER READY ?
2557  012112  100375                  BPL     WT2             ; NO-WAIT
2558  012114  013777  001074  166670  MOV     CHAR,@TPB       ;PRINT CHARACTER
2559  012122  162737  000060  001074  SUB     #60,CHAR        ;CONVERT TO OCTAL
2560  012130  022737  000001  001066  CMP     #1,DIGITS       ;FIRST DIGIT ?
2561  012136  001411                  BEQ     TK5             ;YES-CONTINUE
2562  012140  000241                  CLC                     ;ROTATE LEFT THREE
2563  012142  006137  001076          ROL     OCT             ;TIMES
2564  012146  000241                  CLC                     ;THIS WILL SHIFT
2565  012150  006137  001076          ROL     OCT             ;SWR VALUE ONE
2566  012154  000241                  CLC                     ;PLACE LEFT
2567  012156  006137  001076          ROL     OCT             ;OCTAL.
2568  012162  063737  001074  001076  TK5:    ADD     CHAR,OCT        ;NEW VALUE OF SWR
2569  012170  000464                  BR      TK6             ;RETURN FROM INTERRUPT
2570  012172  005737  001066          DGTS:   TST     DIGITS          ;SWR VALUE CHANGED ?
2571  012176  001451                  BEQ     TK3             ;NO-RETURN ,NO CHANGE TO SWR
2572  012200  013777  001076  166576  MOV     OCT,@SWR        ;YES-ENTER NEW SWR VALUE
2573  012206  000445                  BR      TK3             ;RETURN FROM INTERRUPT
```

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 2574  012210  017737  166600  001074  CNTRLG: MOV     @TKB,CHAR       ;GET CHARACTER
 2575  012216  042737  177600  001074          BIC     #177600,CHAR    ;STRIP OFF PARITY BIT
 2576  012224  022737  000007  001074          CMP     #7,CHAR         ;CONTROL-G INPUT ?
 2577  012232  001414                          BEQ     TYPSWR          ;YES-PRINT HEADER
 2578  012234  105777  166556          WT3:    TSTB    @TPS            ;TTY PRINTER READY ?
 2579  012240  100375                          BPL     WT3             ;NO-WAIT
 2580  012242  013777  001074  166542          MOV     CHAR,@TPB       ;PRINT CHARACTER
 2581  012250  104000                          EMT     +0              ;PRINT "?"
 2582  012252  014466                          MES22
 2583  012254  005737  001070                  TST     SIGNAL          ;BAD VALUE ?
 2584  012260  001001                          BNE     TYPSWR          ;YES-PRINT HEADER
 2585  012262  000427                          BR      TK6             ;RETURN FROM INTERRUPT
 2586  012264  012737  000001  001070  TYPSWR: MOV     #1,SIGNAL       ;SET FLAG: CONTROL-G ENTERED
 2587  012272  104000                          EMT     +0              ;PRINT HEADER
 2588  012274  014472                          MES23
 2589  012276  004537  011640                  JSR     %5,CONV         ;CONVERT SWR VALUE TO ASCII
 2590  012302  000176                          176
 2591  012304  014522                          MES25
 2592  012306  000006                          6
 2593  012310  104000                          EMT     +0              ;PRINT SWR VALUE
 2594  012312  014532                          MES25
 2595  012314  104000                          EMT     +0              ;PRINT HEADER
 2596  012316  014503                          MES24
 2597  012320  000404                          BR      TK7             ;RETURN FROM INTERRUPT
 2598  012322  005037  001070          TK3:    CLR     SIGNAL          ;CLEAR CONTROL-G FLAG
 2599  012326  104000                  TK4:    EMT     +0              ; PRINT LINE FEED AND CARRIAGE RETURN
 2600  012330  014464                          MES21
 2601  012332  005037  001066          TK7:    CLR     DIGITS          ;CLEAR DIGIT COUNT
 2602  012336  005037  001076                  CLR     OCT             ;CLEAR SWR INPUT
 2603  012342  012605                  TK6:    MOV     (SP)+,%5        ;RESTORE REGISTERS
 2604  012344  012604                          MOV     (SP)+,%4        ;
 2605  012346  012603                          MOV     (SP)+,%3        ;
 2606  012350  012602                          MOV     (SP)+,%2        ;
 2607  012352  012601                          MOV     (SP)+,%1        ;
 2608  012354  012600                          MOV     (SP)+,%0        ;
 2609  012356  000002                          RTI                     ; RETURN FROM INTERRUPT
 2610
 2611
 2615
 2616  012360     045                  MED0:   .ASCII  /%/
 2617  012361     040  020040  042440  MED1:   .ASCIZ  /     ERROR COUNT%/
 2618  012402  051105  047522  020122  MESA:   .ASCIZ  /ERROR SET OK - CLEAR & TURN ON LINE%/
 2619  012447     105  051122  051117  MESB:   .ASCIZ  /ERROR SET OK - CLEAR AND TRY NEXT CHANNEL%/
 2620  012522  050045  044522  052116  MESC:   .ASCII  /%PRINT SPEED CHECK USING MANUAL TIMING%/
 2621  012571     045  052520  020124          .ASCII  /%PUT SWITCH 0 UP TO START TIMING%/
 2622  012632  050045  052125  051440          .ASCIZ  /%PUT SWITCH 0 DOWN AT END OF 1 MINUTE%/
 2623  012701     045  052123  051101  MESDD:  .ASCIZ  /%STARTING DAVFU PRINTING TESTS%/
 2624  012741     045  050114  032460  MES1:   .ASCIZ  /%LPDS-LP11-LP14 LINE PRINTER TEST%/
 2625  013004  042522  052123  051101  MES2:   .ASCIZ  /RESTART ADDRESS 600%/
 2626  013031     045  047520  042527  MES3:   .ASCIZ  /%POWER ON - TURN ON LINE%/
 2627  013063     117  020116  044514  MES4:   .ASCIZ  /ON LINE OK - TRY TORN PAPER SWITCH%/
 2628  013127     122  040505  054504  MES5:   .ASCIZ  /READY SET OK - TRY DRUM GATE SWITCH%/
 2629  013174  051105  047522  020122  MES6:   .ASCIZ  /ERROR SET OK - TURN ON LINE%/
 2630          013232                  .EVEN
 2631  013232  042522                  MES7A:  .ASCII  /RE/
 2632  013234  042523  020124  047524  MES7:   .ASCII  /SET TOP OF FORM SWITCH TO   /
```

```
2633  013270  020040  020040  044440  MES8:   .ASCIZ  /     INCHES%/
2634          013306                  .EVEN
2635  013306  026455  026455  026455  MES9:   .ASCII  /------------------------------------     THIS LINE SHOULD BE /
2636  013403      040  020040  020040  MES10:  .ASCIZ  /     INCHES FROM THE LAST LINE     ----------------------------------
2637  013514  005012                  MES11A: .ASCII  <12><12>
2638  013516  050045  044522  052116  MES11:  .ASCII  /%PRINT SPEED IS APPROXIMATELY  /
2639  013555      040  020040  020040  MES12:  .ASCIZ  /     LINES PER MINUTE%/
2640  013604  026455  026455  026455  MES13:  .ASCII  /-------------------------------------------------/
2641  013666  026455  026455  026455          .ASCII  /-------------------------------------------------/
2642  013750  026455  026455  026455          .ASCIZ  /----------------------------------#/
2643                                          .EVEN
2644  014012  005012  042524  052123  MES14:  .ASCII  <12><12>/TEST NUMBER /
2645  014030  020040  005012  000012  MES15:  .ASCIZ  /  /<12><12><12>
2646                                  .EVEN
2647  014036  044124  051511  046040  MES16:  .ASCIZ  /THIS LINE SHOULD BE PRINTED#/
2648  014073      040  020040  020040  MES17:  .ASCIZ  /                                   ALL ON ONE LINE --- IF SLEWED 0 LINES%/
2649                                  .EVEN
2650  014176  026455  026455  026455  MES18:  .ASCII  /------------------------------------     THERE SHOULD BE  /
2651  014270  020040  020040  020040  MES19:  .ASCIZ  /      BLANK LINES BEFORE THIS LINE    ------------------------------
2652                                  .EVEN
2653  014404  052040  051505  044524  MES20:  .ASCII  / TESTING CHANNEL SLEWING USING CHANNEL NO.  /
2654  014460  020040      000         MES20A: .ASCIZ  /  /
2655          014464                  .EVEN
2656  014464  000045                  MES21:  .ASCIZ  /%/
2657  014466  037440  000045          MES22:  .ASCIZ  / ?%/
2658  014472  051445  051127  036440  MES23:  .ASCIZ  /%SWR =  /
2659  014503      040  020040  042516  MES24:  .ASCIZ  /   NEW SWR =  /
2660  014522  020040  020040  020040  MES25:  .ASCIZ  /      /
2661          014532                  .EVEN
2662  014532  030504                  TNDAV1: .ASCII  /D1/            ;TEST NUMBERS FOR DAVFU TESTS
2663  014534  031104                  TNDAV2: .ASCII  /D2/
2664  014536  031504                  TNDAV3: .ASCII  /D3/
2665  014540  020061                  TN01:   .ASCII  /1 /
2666  014542  020062                  TN02:   .ASCII  /2 /
2667  014544  020063                  TN03:   .ASCII  /3 /
2668  014546  020064                  TN04:   .ASCII  /4 /
2669  014550  020065                  TN05:   .ASCII  /5 /
2670  014552  020066                  TN06:   .ASCII  /6 /
2671  014554  020067                  TN07:   .ASCII  /7 /
2672  014556  020070                  TN010:  .ASCII  /8 /
2673  014560  020071                  TN011:  .ASCII  /9 /
2674  014562  030061                  TN012:  .ASCII  /10/
2675  014564  030461                  TN013:  .ASCII  /11/
2676  014566  031061                  TN014:  .ASCII  /12/
2677  014570  031461                  TN015:  .ASCII  /13/
2678  014572  032061                  TN016:  .ASCII  /14/
2679  014574  032461                  TN017:  .ASCII  /15/
2680                                          .EVEN
2681
2685
2686                                  ;DAVFU PRINTING TESTS IF DAVFU IS AVAILABLE -- SET SWITCH 14
2687
2688
2689                                  ;TESTS D1 AND D2
2690                                  ;CHECK DAVFU LINE COUNT SLEWING
2691
```

```
2692  014576                          DAVFU:
 (1)  014576  022737  000176  001004        CMP     #176,SWR                ;S/W SWR ?
 (1)  014604  001003                        BNE     .+10                    ;NO- CONTINUE
 (1)  014606  052777  000100  164204        BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
2693  014614  004437  011506                JSR     %4,TYPINT       ;INITIALIZE
2694  014620  013737  016662  014272        MOV     SP$P,MES19+2
2695  014626  104000                        EMT     +0              ;TYPE MESSAGE
2696  014630  012701                        MESDD                   ;STARTING DAVFU TESTS
2697  014632  012737  000220  015326        MOV     #220,DAVI1      ;SET DAVFU INSTRUCTIONS
2698  014640  012737  000221  015330        MOV     #221,DAVI2
2699  014646  013737  014532  014030        MOV     TNDAV1,MES15    ;SET TEST NUMBER FOR MESSAGE
2700  014654  004437  011406                JSR     %4,PRNNT        ;PRINT TEST NUMBER
2701  014660  012737  015260  001040  DAVD:  MOV     #DAVTAB,CHRGEN  ;SET TABLE POINTER
2702  014666  005777  164106        DAVDD:  TST     @LPS            ;TEST FOR ERROR
2703  014672  100010                        BPL     DAVI            ;BRANCH IF NO ERROR
2704  014674  012737  000054  001052  ERR54:  MOV     #54,    ERCOUNT         ;SET UP ERROR COUNT 54
 (1)              000055                    N=N+1
2705  014702  004537  011722                JSR     %5,STAER        ;REPORT ERROR SET
2706  014706  000000                        HALT                    ;HALT ON ERROR
2707  014710  000137  014660                JMP     DAVD            ;RESTART TEST
2708  014714  017777  164120  164060  DAVI:  MOV     @CHRGEN,@LPB    ;LOAD DAVFU
2709  014722  062737  000002  001040        ADD     #2,CHRGEN       ;INCREMENT TABLE POINTER
2710  014730  005777  164104                TST     @CHRGEN         ;TEST IF DONE LOAD
2711  014734  001405                        BEQ     D5              ;CONTINUE IF DONE
2712  014736  105777  164036                TSTB    @LPS            ;TEST READY
 (1)  014742  100375                        BPL     .-4             ;WAIT FOR READY
2713  014744  000137  014666                JMP     DAVDD
2714  014750  012737  000002  001044  D5:    MOV     #2,CYCCNT       ;SET CYCLE COUNT
2715  014756  012737  014036  011470  D0:    MOV     #MES16,PRTMSG   ;SET MESSAGE ADDRESS
2716  014764  004437  011452                JSR     %4,RINT         ;PRINT MESSAGE
2717  014770  005777  164004                TST     @LPS            ;TEST FOR ERROR
2718  014774  100006                        BPL     D1              ;CONTINUE IF NO ERROR
2719  014776  012737  000055  001052  ERR55:  MOV     #55,    ERCOUNT         ;SET UP ERROR COUNT 55
 (1)              000056                    N=N+1
2720  015004  004537  011722                JSR     %5,STAER        ;REPORT ERROR SET
2721  015010  000000                        HALT                    ;HALT ON ERROR
2722  015012  013777  015326  163762  D1:    MOV     DAVI1,@LPB      ;SEND DAVFU INSTRUCTION,  SKIP 0 LINES
2723  015020  105777  163754                TSTB    @LPS            ;TEST READY
 (1)  015024  100375                        BPL     .-4             ;WAIT FOR READY
2724  015026  012737  014073  011470        MOV     #MES17,PRTMSG   ;SET PRINTER MESSAGE ADDRESS
2725  015034  004437  011452                JSR     %4,RINT         ;PRINT MESSAGE
2726  015040  012737  014176  011470        MOV     #MES18,PRTMSG   ;SET MESSAGE ADDRESS
2727  015046  013737  015330  001040        MOV     DAVI2,CHRGEN    ;FIRST DAVFU INSTRUCTION
2728  015054  012737  014540  001054        MOV     #TNDI,STRCHR    ;SET TABLE POINTER
2729  015062  012737  000017  001036        MOV     #15.,CHRCNT     ;SET TABLE COUNT
2730  015070  005777  163704          D2:   TST     @LPS            ;TEST FOR ERROR
2731  015074  100006                        BPL     D3              ;CONTINUE IF NO ERRORS
2732  015076  012737  000056  001052  ERR56:  MOV     #56,    ERCOUNT         ;SET UP ERROR COUNT 56
 (1)              000057                    N=N+1
2733  015104  004437  011722                JSR     %4,STAER        ;REPORT ERROR SET
2734  015110  000000                        HALT                    ;HALT ON ERROR
2735  015112  013777  001040  163662  D3:    MOV     CHRGEN,@LPB     ;SEND DAVFU INSTR.
2736  015120  105777  163654                TSTB    @LPS            ;TEST READY
 (1)  015124  100375                        BPL     .-4             ;WAIT FOR READY
2737  015126  017737  163722  014270        MOV     @STRCHR,MES19   ;SET PRINTER MESSAGE
2738  015134  004437  011452                JSR     %4,RINT         ;PRINT MESSAGE
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2739  015140  005337  001036                DEC     CHRCNT          ;DEC TABLE COUNT
2740  015144  001407                        BEQ     D4              ;EXIT TEST IF DONE
2741  015146  005237  001040                INC     CHRGEN          ;NEXT DAVFU INSTR.
2742  015152  062737  000002  001054        ADD     #2,STRCHR       ;INC TABLE POINTER
2743  015160  000137  015070                JMP     D2              ;CONTINUE
2744  015164  005337  001044        D4:     DEC     CYCCNT          ;DEC CYCLE COUNT
2745  015170  001415                        BEQ     DEXD            ;EXIT IF DONE
2746  015172  062737  000140  015326        ADD     #140,DAVI1      ;CHANGE DAVFU INSTR.
2747  015200  062737  000140  015330        ADD     #140,DAVI2      ;CHANGE DAVFU INSTR.
2748  015206  013737  014534  014030        MOV     TNDAV2,MES15    ;SET TEST NUMBER FOR MESSAGE
2749  015214  004437  011406                JSR     %4,PRNNT        ;PRINT TEST NUMBER
2750  015220  000137  014756                JMP     D0              ;RETEST LINE COUNT SLEWING
2751  015224  012737  000220  015326  DEXD: MOV     #220,DAVI1      ;RESET DAVFU INSRT.
2752  015232  012737  000221  015330        MOV     #221,DAVI2      ;RESET DAVFU INSTR.
2753  015240  032777  010000  163536        BIT     #BIT12,@SWR     ;LOOP ON TEST?
2754  015246  001002                        BNE     1$              ;LOOP
2755  015250  000137  015332                JMP     DAV2            ;NEXT TEST
2756  015254  000137  014576        1$:     JMP     DAVFU           ;LOOP
2757
2758
2759  015260  000356                DAVTAB: 356                     ;DAVFU LOAD TABLE
2760  015262  000001                        1
2761  015264  000002                        2
2762  015266  000003                        3
2763  015270  000004                        4
2764  015272  000005                        5
2765  015274  000006                        6
2766  015276  000007                        7
2767  015300  000010                        10
2768  015302  000011                        11
2769  015304  000012                        12
2770  015306  000013                        13
2771  015310  000014                        14
2772  015312  000015                        15
2773  015314  000016                        16
2774  015316  000017                        17
2775  015320  000020                        20
2776  015322  000357                        357
2777  015324  000000                        0
2778
2779
2780  015326  000220                DAVI1:  220
2781  015330  000221                DAVI2:  221
2782
2783                                ;TEST D3
2784                                ;CHECK DAVFU CHANNEL SLEW COMMANDS
2785
2786  015332                        DAV2:
 (1)  015332  022737  000176  001004        CMP     #176,SWR                ;S/W SWR ?
 (1)  015340  001003                        BNE     .+10                    ;NO- CONTINUE
 (1)  015342  052777  000100  163450        BIS     #100,@TKS               ;ENABLE KEYBOARD INTERRUPT
2787  015350  004437  011506                JSR     %4,TYPINT       ;INITIALIZE
2788  015354  013737  016662  014272        MOV     SPSP,MES19+2
2789  015362  013737  014536  014030        MOV     TNDAV3,MES15    ;SAT TEST NUMBER FOR MESSAGE
2790  015370  004437  011406                JSR     %4,PRNNT        ;PRINT TEST NUMBER D3
2791  015374  012737  016644  016126        MOV     #MTAB,MTABP     ;SET MESSAGE TABLE POINTER
```

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2792  015402  012737  016612  016122          MOV     #ITAB,ITABP     ;SET INSTRUCTION TABLE POINTER
2793  015410  017737  000506  001054          MOV     @ITABP,STRCHR   ;SAT FIRST INSTRUCTION
2794  015416  012737  014540  016130          MOV     #TNO1,HTABP     ;SET HEADER MESSAGE TABLE POINTER
2795  015424  012737  016574  016124          MOV     #ICTAB,ICTABP   ;SET INSTR COUNT TABLE POINTER
2796  015432  017737  000466  001056          MOV     @ICTABP,STRCNT  ;GET FIRST INSTR COUNT
2797  015440  012737  016132  016120  LOAD:    MOV     #DTAB,DTABP     ;SET DATA TABLE POINTER
2798  015446  017737  000446  001040          MOV     @DTABP,CHRGEN   ;SET FIRST DATA PAIR
2799  015454  005777  163320                  TST     @LPS            ;TEST FOR ERROR
2800  015460  100007                          BPL     DL1             ;BRANCH IF NO ERROR
2801  015462  012737  000057  001052  ERR57:  MOV     #57,    ERCOUNT         ;SET UP ERROR COUNT 57
 (1)              000060                  N=N+1
2802  015470  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2803  015474  000000                          HALT                    ;HALT ON ERROR
2804  015476  000760                          BR      LOAD            ;RESTART LOAD
2805  015500  012737  000002  001036  DL1:     MOV     #2,CHRCNT       ;SET PAIR COUNT
2806  015506  013777  001040  163266  DL2:     MOV     CHRGEN,@LPB     ;LOAD DAVFU
2807  015514  105777  163260                  TSTB    @LPS            ;TEST READY
 (1)  015520  100375                          BPL     .-4             ;WAIT FOR READY
2808  015522  005777  163252                  TST     @LPS            ;TEST FOR ERROR
2809  015526  100010                          BPL     DL6             ;BRANCH IF NO ERROR
2810  015530  012737  000060  001052  ERR60:  MOV     #60,    ERCOUNT         ;SET UP ERROR COUNT 60
 (1)              000061                  N=N+1
2811  015536  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
2812  015542  000000                          HALT                    ;HALT ON ERROR
2813  015544  000137  015440                  JMP     LOAD            ;RESTART LOAD
2814  015550  022737  000356  001040  DL6:     CMP     #356,CHRGEN     ;LOAD COMMAND?
2815  015556  001407                          BEQ     DL6A            ;YES, SEND ONLY ONCE
2816  015560  022737  000357  001040          CMP     #357,CHRGEN     ;LOAD COMMAND?
2817  015566  001403                          BEQ     DL6A            ;YES,  SEND ONLY ONCE
2818  015570  005337  001036                  DEC     CHRCNT          ;DEC PAIR COUNT
2819  015574  001344                          BNE     DL2             ;FINISH PAIR IF NOT DONE
2820  015576  062737  000002  016120  DL6A:    ADD     #2,DTABP        ;INC DATA TABLE POINTER
2821  015604  017737  000310  001040          MOV     @DTABP,CHRGEN   ;SET NEXT DATA PAIR
2822  015612  022737  077777  001040          CMP     #77777,CHRGEN   ;DONE LOAD?
2823  015620  001327                          BNE     DL1
2824
2825                                  ;START OF CHANNEL SLEW TESTS
2826
2827  015622                          DL8:
2828  015622  013777  001054  163152          MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2829  015630  105777  163144                  TSTB    @LPS            ;TEST READY
 (1)  015634  100375                          BPL     .-4             ;WAIT FOR READY
2830  015636  105777  163136                  TSTB    @LPS            ;TEST READY
2831  015642  100375                          BPL     .-4             ;WAIT FOR READY
2832  015644                          DL8A:
2833  015644  017737  000260  014460          MOV     @HTABP,MES20A   ;SET HEADER MSSG ADDRESS
2834  015652  012737  014404  011470          MOV     #MES20,PRTMSG   ;SET HEADER MSG ADDRESS
2835  015660  004437  011452                  JSR     %4,RINT         ;PRINT HEADER MESSAGE
2836  015664  013777  001054  163110  DL9:     MOV     STRCHR,@LPB     ;SEND DAVFU INSTRUCTION
2837  015672  105777  163102                  TSTB    @LPS            ;TEST READY
 (1)  015676  100375                          BPL     .-4             ;WAIT FOR READY
2838  015700  005777  163074                  TST     @LPS            ;TEST FOR ERROR
2839  015704  100010                          BPL     DL10            ;BRANCH IF OK
2840  015706  012737  000061  001052  ERR61:  MOV     #61,    ERCOUNT         ;SET UP ERROR COUNT 61
 (1)              000062                  N=N+1
2841  015714  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
```

```
2842  015720  000000                          HALT                    ;HALT ON ERROR
2843  015722  000137  015440                  JMP     LOAD            ;RELOAD DAVFU
2844  015726  017737  000174  014270  DL10:   MOV     @MTABP,MES19    ;SET MESSAGE
2845  015734  027727  000164  000001          CMP     @ICTABP,#1      ;CHECK IF MAX LINE SLEW
2846  015742  001004                          BNE     DL10A           ;NOT, CONTINUE
2847  015744  013737  016660  014272          MOV     FS,MES19+2      ;SET MESSAGE
2848  015752  000403                          BR      DL10B           ;CONTINUE
2849  015754  013737  016662  014272  DL10A:  MOV     SPSP,MES19+2    ;SET MESSAGE
2850  015762  012737  014176  011470  DL10B:  MOV     #MES18,PRTMSG   ;SET MSG ADDRESS
2851  015770  004437  011452                  JSR     %4,RINT         ;PRINT MESSAGE
2852  015774  005337  001056                  DEC     STRCNT          ;DEC INSTR COUNT
2853  016000  001331                          BNE     DL9             ;FINISH TESTING THIS CHANNEL
2854  016002  062737  000002  016126          ADD     #2,MTABP        ;INC MSG TABLE POINTER
2855  016010  062737  000002  016130          ADD     #2,HTABP        ;INC HEADER MSG TABLE POINTER
2856  016016  062737  000002  016124          ADD     #2,ICTABP       ;INC INSTR COUNT TABLE POINTER
2857  016024  005777  000074                  TST     @ICTABP         ;CHECK INSTR COUNT
2858  016030  001006                          BNE     DL12
2859  016032  012737  016574  016124          MOV     #ICTAB,ICTABP   ;RESET TABLE POINTER
2860  016040  012737  016644  016126          MOV     #MTAB,MTABP     ;RESET MSG TABLE POINTER
2861  016046  017737  000052  001056  DL12:   MOV     @ICTABP,STRCNT  ;GET INSTR COUNT
2862  016054  062737  000002  016122          ADD     #2,ITABP        ;INC INSTR TABLE POINTER
2863  016062  017737  000034  001054          MOV     @ITABP,STRCHR   ;GET INSTRUCTION
2864  016070  001254                          BNE     DL8             ;CONTINUE IF NOT DONE TEST
2865  016072  013737  016662  014272          MOV     SPSP,MES19+2    ;RESET MESSAGE
2866  016100  032777  010000  162676          BIT     #BIT12,@SWR     ;LOOP ON TEST?
2867  016106  001402                          BEQ     DLEX
2868  016110  000137  015332                  JMP     DAV2            ;LOOP ON TEST
2869  016114  000137  004534          DLEX:   JMP     TEST2           ;RECYCLE PRINTING TESTS
2870
2871  016120  000000          DTABP:  0                               ;DATA TABLE POINTER
2872  016122  000000          ITABP:  0                               ;INSTRUCTION TABLE POINTER
2873  016124  000000          ICTABP: 0                               ;INSTR COUNT TABLE POINTER
2874  016126  000000          MTABP:  0                               ;MESSAGE TABLE POINTER
2875  016130  000000          HTABP:  0                               ;HEADER MESSAGE TABLE POINTER
2876
2877                          ;DATA TABLE FOR DAVFU LOAD
2878
2879  016132  000356          DTAB:   356             ;START LOAD
2880  016134  000077                  77              ;HEADER MESSAGES
2881  016136  000000                  0
2882  016140  000001                  1
2883  016142  000002                  2
2884  016144  000005                  5
2885  016146  000000                  0
2886  016150  000003                  3
2887  016152  000010                  10
2888  016154  000005                  5
2889  016156  000002                  2
2890  016160  000001                  1
2891  016162  000000                  0
2892  016164  000007                  7
2893  016166  000000                  0
2894  016170  000011                  11
2895  016172  000002                  2
2896  016174  000005                  5
2897  016176  000000                  0
```

```
2898  016200  000003                3
2899  016202  000000                0
2900  016204  000005                5
2901  016206  000012                12
2902  016210  000001                1
2903  016212  000000                0
2904  016214  000007                7
2905  016216  000020                20
2906  016220  000001                1
2907  016222  000002                2
2908  016224  000015                15
2909  016226  000000                0
2910  016230  000003                3
2911  016232  000000                0
2912  016234  000005                5
2913  016236  000002                2
2914  016240  000001                1
2915  016242  000010                10
2916  016244  000007                7
2917  016246  000000                0
2918  016250  000001                1
2919  016252  000002                2
2920  016254  000005                5
2921  016256  000000                0
2922  016260  000013                13
2923  016262  000000                0
2924  016264  000005                5
2925  016266  000002                2
2926  016270  000001                1
2927  016272  000000                0
2928  016274  000007                7
2929  016276  000010                10
2930  016300  000021                21
2931  016302  000002                2
2932  016304  000005                5
2933  016306  000000                0
2934  016310  000003                3
2935  016312  000000                0
2936  016314  000015                15
2937  016316  000002                2
2938  016320  000001                1
2939  016322  000000                0
2940  016324  000007                7
2941  016326  000000                0
2942  016330  000001                1
2943  016332  000012                12
2944  016334  000005                5
2945  016336  000000                0
2946  016340  000003                3
2947  016342  000000                0
2948  016344  000005                5
2949  016346  000002                2
2950  016350  000011                11
2951  016352  000000                0
2952  016354  000007                7
2953  016356  000000                0
```

```
 2954  016360  000001                    1
 2955  016362  000022                   22
 2956  016364  000005                    5
 2957  016366  000010                   10
 2958  016370  000003                    3
 2959  016372  000000                    0
 2960  016374  000005                    5
 2961  016376  000002                    2
 2962  016400  000001                    1
 2963  016402  000000                    0
 2964  016404  000017                   17
 2965  016406  000000                    0
 2966  016410  000001                    1
 2967  016412  000002                    2
 2968  016414  000005                    5
 2969  016416  000000                    0
 2970  016420  000003                    3
 2971  016422  000010                   10
 2972  016424  000005                    5
 2973  016426  000002                    2
 2974  016430  000001                    1
 2975  016432  000000                    0
 2976  016434  000007                    7
 2977  016436  000000                    0
 2978  016440  000011                   11
 2979  016442  000002                    2
 2980  016444  000025                   25
 2981  016446  000000                    0
 2982  016450  000003                    3
 2983  016452  000000                    0
 2984  016454  000005                    5
 2985  016456  000012                   12
 2986  016460  000001                    1
 2987  016462  000000                    0
 2988  016464  000007                    7
 2989  016466  000000                    0
 2990  016470  000001                    1
 2991  016472  000002                    2
 2992  016474  000015                   15
 2993  016476  000000                    0
 2994  016500  000003                    3
 2995  016502  000000                    0
 2996  016504  000005                    5
 2997  016506  000002                    2
 2998  016510  000001                    1
 2999  016512  000010                   10
 3000  016514  000007                    7
 3001  016516  000000                    0
 3002  016520  000001                    1
 3003  016522  000002                    2
 3004  016524  000005                    5
 3005  016526  000020                   20
 3006  016530  000013                   13
 3007  016532  000000                    0
 3008  016534  000005                    5
 3009  016536  000002                    2
```

```
3010  016540  000001                        1
3011  016542  000000                        0
3012  016544  000007                        7
3013  016546  000010                        10
3014  016550  000001                        1
3015  016552  000002                        2
3016  016554  000005                        5
3017  016556  000000                        0
3018  016560  000003                        3
3019  016562  000000                        0
3020  016564  000001                        1
3021  016566  000000                        0
3022  016570  000357                        357             ;STOP LOAD
3023  016572  077777                        77777           ;STOP !!!!!
3024
3025                                  ;INSTRUCTION COUNT TABLE - FOR DAVFU CHANNEL SLEW INSTRUCTIONS
3026
3027  016574  000105                  ICTAB:  105
3028  016576  000056                          56
3029  016600  000042                          42
3030  016602  000023                          23
3031  016604  000005                          5
3032  016606  000001                          1
3033  016610  000000                          0                       ;END OF TABLE
3034
3035                                  ;INSTRUCTION TABLE - DAVFU CHANNEL SLEW INSTRUCTIONS
3036
3037  016612  000200                  ITAB:   200                     ;CHANNEL 1
3038  016614  000201                          201                     ;CHANNEL 2
3039  016616  000202                          202                     ;CHANNEL 3
3040  016620  000203                          203                     ;CHANNEL 4
3041  016622  000204                          204                     ;CHANNEL 5
3042  016624  000205                          205                     ;CHANNEL 6
3043  016626  000206                          206                     ;CHANNEL 7
3044  016630  000207                          207                     ;CHANNEL 8
3045  016632  000210                          210                     ;CHANNEL 9
3046  016634  000211                          211                     ;CHANNEL 10
3047  016636  000212                          212                     ;CHANNEL 11
3048  016640  000213                          213                     ;CHANNEL 12
3049  016642  000000                          0                       ;END OF TABLE
3050
3051                                  ;MESSAGE TABLE FOR BLANK LINE COUNTS IN MESSAGE
3052
3053  016644  030440                  MTAB:   .ASCII  / 1/
3054  016646  031040                          .ASCII  / 2/
3055  016650  031440                          .ASCII  / 3/
3056  016652  033040                          .ASCII  / 6/
3057  016654  032062                          .ASCII  /24/
3058  016656  032061                          .ASCII  /14/
3059  016660  020063                  FS:     .ASCII  /3 /
3060  016662  020040                  SPSP:   .ASCII  /  /
3061
3062                                  ;SCOPE LOOP ROUTINE
3063
3064                                  ;SET CHARACTER IN SWITCH REGISTER -0.
3065
```

```
 3067  016664                          SCOPE:
  (1)  016664  022737  000176  001004          CMP     #176,SWR        ;S/W SWR ?
  (1)  016672  001003                          BNE     .+10            ;NO- CONTINUE
  (1)  016674  052777  000100  162116          BIS     #100,@TKS       ;ENABLE KEYBOARD INTERRUPT
```

```
 3069  016702  004437  011506                JSR     %4,TYPINT
 3070  016706  017737  162072  001050        MOV     @SWR,SAVE       ;FETCH SWITCHES
```

```
 3072  016714  012737  177574  001036          MOV     #-132.,CHRCNT   ;SET CHAR COUNT
 3073  016722  042737  177400  001050          BIC     #177400,SAVE    ;MASK CHARACTER
 3074  016730                          LDLPX:
   (1) 016730  105777  162044                  TSTB    @LPS            ;TEST READY
   (1) 016734  100375                          BPL     .-4             ;WAIT FOR READY
 3075  016736  005777  162036                  TST     @LPS            ;TEST FOR ERROR
```

```
 3077  016742  100006                          BPL     LPSCOPE         ;BRANCH IF NO ERROR
 3078  016744  012737  000062  001052  ERR62:  MOV     #62,    ERCOUNT ;SET UP ERROR COUNT 62
  (1)           000063                        N=N+1
 3079
 3080  016752  004537  011722                  JSR     %5,STAER        ;REPORT ERROR SET
 3081  016756  000000                          HALT                    ;HALT ON ERROR
 3082  016760  013777  001050  162014  LPSCOPE:MOV     SAVE,@LPB       ;LOAD PRINTER BUFFER
```

```
  3084  016766  032777  004000  162010          BIT     #BIT11,@SWR     ;SEND ONLY ONE CHAR?
  3085  016774  001402                          BEQ     LSCO            ;NO,  BRANCH
  3086  016776  000000                          HALT                    ;HALT - WAIT FOR OPERATOR
  3087  017000  000731                          BR      SCOPE           ;NEXT CHAR
  3088  017002  000177  000024          LSCO:   JMP     @LOSCOP         ;SEND LF?
  3089  017006  005237  001036          LSCA:   INC     CHRCNT          ;INCREMENT CHAR COUNT
  3090  017012  001346                          BNE     LOLPX           ;CONTINUE IF NOT DONE LINE
  3091  017014  012777  000012  161760          MOV     #12,@LPB        ;SEND LF
  3092  017022  105777  161752                  TSTB    @LPS            ;TEST READY
   (1)  017026  100375                          BPL     .-4             ;WAIT FOR READY
  3093  017030  000715                          BR      SCOPE           ;CONTINUE
  3094
  3095
  3096  017032  017006                  LOSCOP: LSCA
  3097
  3098
  3099
  3100          000001                          .END
```

```
ACNVX   011720          2491*   2495    2500*   2502*   2504*   2509*
ACVN    011652          2495*   2506
BIT0  = 000001           956*   1451    1508
BIT1  = 000002           955*
BIT10 = 002000           946*   1487    2083    2211
BIT11 = 004000           945*   3084
BIT12 = 010000           944*   1814    1872    1921    1984    2033    2073    2124    2168    2199    2246    2285    2327
                        2369    2394    2753    2866
BIT13 = 020000           943*   1479    1337    1863    1997    2085    2133    2178    2213    2254
BIT14 = 040000           942*    983    1629    2397
BIT15 = 100000           941*
BIT2  = 000004           954*
BIT3  = 000010           953*
BIT4  = 000020           952*
BIT5  = 000040           951*
BIT6  = 000100           950*
BIT7  = 000200           949*
BIT8  = 000400           948*
BIT9  = 001000           947*   2513
CHAR    001074          1168*   1206*   2541*   2542*   2543    2545    2547    2550    2558    2559*   2568    2574*   2575*
                        2576    2580
CHRCHK  005352          1033    1879*   1922
CHRCNT  001036          1153*   1489*   1499*   1514*   1524*   1729*   1730*   1789*   1807*   1811*   1826*   1834*   1888*
                        1898*   1918*   1940*   1942    1960*   1967    1974*   2002*   2010*   2045*   2054*   2094*   2103*
                        2144*   2152*   2184*   2191*   2266*   2267*   2278    2297*   2299    2313*   2337*   2338*   2349*
                        2379*   2388*   2729*   2739*   2805*   2818*   3072*   3089*
CHRE    005564          1886    1895    1914*
CHRGEN  001040          1154*   1492*   1493*   1494    1496*   1498    1519*   1520    1522*   1523    1526*   1678*   1685
                        1686*   1687    1715*   1722    1723*   1724    1827*   1833    1836*   1839    1842    1847*   1853
                        1854*   1855    1857    1859    1861    1865*   1866    1944*   1946*   1948    1973*   2003*   2009
                        2013*   2027*   2046*   2053    2096*   2102    2105*   2108    2110*   2112*   2145*   2151    2154*
                        2155    2157*   2183*   2190    2195*   2224*   2225*   2226    2237    2263*   2264*   2265    2299*
                        2300    2302*   2304*   2305*   2306    2312    2317*   2319*   2334*   2356    2357*   2361*   2701*
                        2708    2709*   2710    2727*   2735    2741*   2798*   2806    2814    2816    2821*   2822
CHRS    005562          1908    1913*
CLCKAV  002376          1432*
CNTR    003214          1473*   1531*   1539*
CNTRLG  012210          2540    2574*
CONV    011640          2491*   2515    2589
CONVRT  003230           996    1509    1540    1546*
CR      005430          1888*   1907
CRO     005436          1889*   1899
CR1     005460          1890    1894*
CR2     005464          1895*   1913
CR3     005500          1897*   1911    1920
CR5     005566          1902    1915*
CR7     005542          1908*   1914
CSBR    001022          1076*   1462*
CYCCNT  001044          1156*   1491*   1501*   1788*   1812*   1824*   1870*   1885*   1900*   1917*   1941*   1962*   1976*
                        2095*   2106*   2113*   2222*   2223*   2239    2298*   2315*   2320*   2335*   2362*   2714*   2744*
DAVAV   003656          1620    1625*
DAVFU   014576          1014    2399    2692*   2756
DAVI1   015326          2697*   2722    2746*   2751*   2780*
DAVI2   015330          2698*   2727    2747*   2752*   2781*
DAVTAB  015260          2701    2759*
DAVO    014660          2701*   2707
```

F07


```
DAV00   014666          2702#   2713
DAV1    014714          2703    2708#
DAV2    015332          1015    2755    2786#   2868
DEX0    015224          2745    2751#
DGTS    012172          2544    2570#
DIA     003216          1450#   1463#   1474#   1532#   1546#
DIGITS  001066          1165#   1204#   2553#   2554    2560    2570    2601#
DISPLA  001006          1070#   1183#
DISPRE  000174          1000#   1183
DLEX    016114          2867    2869#
DL1     015500          2800    2805#   2823
DL10    015726          2839    2844#
DL10A   015754          2846    2849#
DL10B   015762          2848    2850#
DL12    016046          2858    2861#
DL2     015506          2806#   2819
DL6     015550          2809    2814#
DL6A    015576          2815    2817    2820#
DL8     015622          2827#   2864
DL8A    015644          2832#
DL9     015664          2836#   2853
DORGN   011326          2402    2409#
DTAB    016132          2797    2879#
DTABP   016120          2797#   2798    2820#   2821    2871#
D0      014756          2715#   2750
D1      015012          2718    2722#
D2      015070          2730#   2743
D3      015112          2731    2735#
D4      015164          2740    2744#
D5      014750          2711    2714#
ERCOUN  001052          1159#   1239#   1244#   1255#   1264#   1269#   1278#   1293#   1302#   1312#   1317#   1324#   1337#
                        1342#   1345#   1354#   1364#   1374#   1396#   1401#   1408#   1590#   1612#   1681#   1693#   1718#
                        1734#   1784#   1793#   1830#   1850#   1891#   1951#   2006#   2050#   2099#   2148#   2187#   2233#
                        2274#   2309#   2342#   2353#   2382#   2444#   2516    2704#   2719#   2732#   2801#   2810#   2840#
                        3078#
ERR0    001330          1239#
ERR1    001352          1244#
ERR10   001632          1312#
ERR11   001654          1317#
ERR12   001704          1324#
ERR13   001742          1337#
ERR14   001764          1342#
ERR15   002000          1345#
ERR16   002040          1354#
ERR17   002100          1364#
ERR2    001416          1255#
ERR20   002140          1374#
ERR21   002240          1396#
ERR22   002262          1401#
ERR23   002322          1408#
ERR24   003460          1590#
ERR25   003564          1612#
ERR26   004100          1681#
ERR27   004162          1693#
ERR3    001446          1264#
ERR30   004274          1718#
```

```
ERR31   004376            1734#
ERR32   004564            1784#
ERR33   004642            1793#
ERR34   005066            1830#
ERR35   005204            1850#
ERR36   005444            1891#
ERR37   005760            1951#
ERR4    001470            1269#
ERR40   006244            2006#
ERR41   006520            2050#
ERR42   007020            2099#
ERR43   007312            2148#
ERR44   007554            2187#
ERR45   010046            2233#
ERR46   010314            2274#
ERR47   010540            2309#
ERR5    001520            1278#
ERR50   010732            2342#
ERR51   011004            2353#
ERR52   011200            2382#
ERR53   011436            2444#
ERR54   014674            2704#
ERR55   014776            2719#
ERR56   015076            2732#
ERR57   015462            2801#
ERR6    001552            1293#
ERR60   015530            2810#
ERR61   015706            2840#
ERR62   016744            3078#
ERR7    001576            1302#
FFSET   003766            1594    1659#
FFTAB   003710            1593    1634#
FS      016660            2847    3059#
FTABE   003764            1619    1656#
HAMALN  011122            1041    2375#   2395
HAMX    011306            2398    2400#
HAM1X   011164            2379#   2393
HAM2    011172            2380#   2389
HEDO    012360            2520    2616#
HED1    012361            2517    2617#
HSPRT   006646            1037    2080#   2125
HSO     006770            2094#   2121    2123
HSOO    006754            2089    2092#
HSOOA   006740            2086    2090#
HS1     007012            2097#   2109    2111    2114
HS2     007034            2098    2102#
HS3     007102            2107    2112#
HS4     007120            2104    2115#
HS6     007170            2118    2124#
HTABP   016130            2794*   2833    2855*   2875#
ICTAB   016574            2795    2859    3027#
ICTABP  016124            2795*   2796    2845    2856*   2857    2859*   2861    2873#
INDAT   004042            1012    1630    1676#   1684    1696
INDATT  004214            1678    1703#
INDATO  004120            1680    1685#
INDAT1  004202            1692    1697#
```

```
IN00    004072          1679#   1690
IN01    004154          1688    1691#
INT1C   002204          1333    1385#
INT1D   002336          1342    1414#
ITAB    016612          2792    3037#
ITABP   016122          2792*   2793    2862*   2863    2872#
KW11L   002612          1022    1438    1469#
KW11P   002532          1023    1443    1458#
LDCH    005220          1849    1853#   1862    1867
LDLPX   016730          3074#   3090
LEGCHR  001060          1162#   1481*   1484*   1486    1494    2087*   2090*   2108    2136*   2139*   2155    2216*   2220#
                        2228    2257*   2261*   2269
LFT     010442          2296#
LFTTR   010406          1040    2249    2293#   2328
LFT0    010450          2297#   2325
LFT1    010472          2300#   2303
LFT2    010512          2301    2304#
LFT3    010532          2307#   2318    2321
LFT4    010554          2308    2312#
LFT5    010604          2316    2319#
LFT6    010622          2314    2322#   2326
LINCNT  001042          1155#   1445*   1459*   1470*   1493    1505*   1549    1551*   1557    1559*   1564    1593*   1607
                        1618*   1619    1621    1884*   1919*   1939*   1969*   1971    2056*   2057*   2058*   2061*   2093*
                        2117*   2143*   2161*   2180*   2182*   2196*   2215*   2219*   2227    2243*   2244    2256*   2260*
                        2282*   2283    2296*   2297    2324*   2333*   2335    2338    2366*   2367    2378*   2392*
LKS     001026          1078#   1435    1474    1475*
LKSRV   003220           993    1539#
LOAD    015440          2797#   2804    2813    2843
LOGICA  011316           981    2404#
LOSCOP  017032          1046*   1051*   3088    3096#
LPB     001002          1064#   1251*   1252*   1309*   1498*   1506*   1523*   1615*   1685*   1722*   1728*   1806*   1809*
                        1833*   1845*   1853*   1868*   1897*   1904*   1915*   1948*   1965*   1979*   2009*   2017*   2053*
                        2059*   2102*   2115*   2151*   2159*   2190*   2193*   2236*   2241*   2277*   2280*   2312*   2322*
                        2345*   2356*   2364*   2387*   2390*   2427*   2448    2708*   2722*   2735*   2806*   2828*   2836*
                        3082*   3091*
LPS     001000          1059#   1237    1242    1253    1262    1267    1276    1291    1300    1310    1315    1320    1335
                        1340    1348*   1350*   1357*   1359*   1367*   1369*   1377*   1379*   1394    1399    1406*   1415*
                        1507    1610    1616    1679    1689    1691    1716    1726    1732    1791    1810    1828    1846
                        1848    1869    1889    1905    1916    1949    1966    2004    2018    2048    2060    2097    2116
                        2146    2160    2185    2194    2231    2242    2272    2281    2307    2323    2340    2351    2365
                        2380    2385    2391    2421    2423    2428    2432    2442    2447    2702    2712    2717    2723
                        2730    2736    2799    2807    2808    2829    2830    2837    2838    3074    3075    3092
LPSCOP  016760          3077    3082#
LPS7    007634          2199#
LP1     001646          1311    1315#   1323
LP2     001670          1316    1320#
LP2B    004656          1792    1796#
LP2E    005102          1829    1833#
LP2H    005172          1825    1847#
LP3     001756          1336    1340#
LP3X    002000          1341    1345#
LP4     002254          1395    1399#
LP5     002276          1400    1404#
LSCA    017006          1046    3089#   3096
LSCO    017002          3085    3088#
M       = 000015        1083#   1787#   1823#   1882#   1938#   1995#   2043#   2082#   2177#   2209#   2295#   2377#
```

```
MESA    012402          1698    1746    2618#
MESB    012447          1742    2619#
MESC    012522          1449    2620#
MESDD   012701          2623#   2696
MESI    012741          1189    2624#
MESIO   013403          1596    2636#
MESII   013516          1568    2638#
MESIIA  013514          1569    2637#
MESI2   013555          1548    2639#
MESI3   013604          1609    2640#
MESI4   014012          2439    2450    2644#
MESI5   014030          1787#   1823#   1882#   1938#   1995#   2043#   2082#   2177#   2209#   2295#   2377#   2645#   2699#
                        2748#   2789#
MESI6   014036          2647#   2715
MESI7   014073          2648#   2724
MESI8   014176          2650#   2726    2850
MESI9   014270          2651#   2694#   2737#   2788#   2844#   2847#   2849#   2865#
MESI2   013004          1191    2625#
MESI20  014404          2653#   2834
MESI20A 014460          2654#   2833#
MESI21  014464          2600    2656#
MESI22  014466          2582    2657#
MESI23  014472          2588    2658#
MESI24  014503          2596    2659#
MESI25  014522          2591    2594    2660#
MESI3   013031          1230    2626#
MESI4   013063          1248    2627#
MESI5   013127          1273    2628#
MESI6   013174          1259    1282    2629#
MESI7   013234          1605    2632#
MESI7A  013232          1627    2631#
MESI8   013270          1595    1625#   2633#
MESI9   013306          1623    2635#
MINCNT  003212          1462    1473    1530#
MLF     006432          1036    2041#   2074
MLFA    006474          2045#   2067
MLFD    006512          2048#   2055
MLFI    006534          2049    2053#
MLF2    006570          2059#   2062
MLF4    006636          2047    2073#
MTAB    016644          2791    2860    3053#
MTABP   016126          2791#   2844    2854#   2860#   2874#
N       = 000063        1082#   1239#   1244#   1255#   1264#   1269#   1278#   1293#   1302#   1312#   1317#   1324#   1337#
                        1342#   1345#   1354#   1364#   1374#   1396#   1401#   1408#   1590#   1612#   1681#   1693#   1718#
                        1734#   1794#   1793#   1830#   1850#   1891#   1951#   2006#   2050#   2099#   2148#   2187#   2233#
                        2274#   2309#   2342#   2353#   2382#   2444#   2704#   2719#   2732#   2801#   2810#   2840#   3078#
NHSPRT  007204          2084    2133#   2169
NHSD    007270          2144#   2165    2167
NHSDD   007246          2138    2141#
NHSDDA  007232          2134    2139#
NHSI    007304          2146#   2156    2158
NHS2    007326          2147    2151#
NHS4    007370          2153    2159#
NHS6    007440          2162    2168#
NODAT   004230          1013    1701    1712#   1721
NODATA  004350          1725    1728#
```

```
NODATO  004312          1717    1722#
NODAT1  004416          1733    1738#
NODAT2  004442          1740    1745#
NODAT3  004454          1715    1751#
NODAT4  004532          1724    1774#
NODO    004266          1716#   1727
NODOA   004260          1715#   1737    1744
NOP   = 000240          1081#
NROTAT  010154          2212    2254#   2286
NROTO   010210          2255    2260#
NROT1   010232          2259    2263#
NROT2   010256          2267#   2279
NROT4   010306          2270    2272#
NROT5   010330          2273    2277#
NROT6   010240          2264#   2284
NTRDY   011376          2429    2432#
NUMCHR  001062          1163#   1482#   1485#   1496    1518    1522    2088#   2091#   2110    2122    2137#   2140#   2157
                        2166    2217#   2221#   2230    2258#   2262#   2271
OCT     001076          1169#   2563#   2565#   2567#   2568#   2572    2602#
OFFSET  001064          1164#   2141#   2154    2268
OVR     005676          1940#   1972
OVREXT  006122          1970    1984#
OVRPRT  005634          1034    1936#   1985
OVR0    005704          1941#   1968
OVR1    005744          1948#   1957    1964
OVR2    005752          1945    1949#   1978
OVR3    005774          1950    1954#
OVR4    005736          1946#   1959
OVR5    006012          1962#
OVR6    006026          1966#   1982
OVR8    006110          1961    1979#
PATTB   003410          1490    1575#
PLKS    001024          1077#   1440    1463    1464#
PRINT   011406          1787    1823    1882    1938    1995    2043    2082    2177    2209    2295    2377    2439#   2700
                        2749    2790
PRTA    006364          2012    2027#
PRTCTL  006132          1035    1992#   2034
PRTINT  011332          1588    1782    2421#
PRTINO  011346          2422    2425#
PRTMSG  011470          1569#   1609#   1623#   2439#   2450#   2715#   2724#   2726#   2834#   2850#
PRT0    006174          1997#   2026    2030    2032
PRT1    006214          1998    2001#
PRT2    006222          2000    2002#
PRT3    006236          2004#   2011    2016    2028
PRT4    006260          2005    2009#
PRT6    006376          2020    2029#
PRT7    006410          2022    2031#
PRT8    006422          2024    2033#
PSW     001010          1071#
PTRPSW  001032          1080#   1334#   1393#   1419#
PTRVEC  001030          1079#   1333#   1392#   1418#
RCHRSW  004704          1797    1802#
RDYOK   011354          2424    2427#
RINT    011452          1570    1617    2443    2447#   2716    2725    2738    2835    2851
ROTATE  007644          1039    2207#   2247
ROT0    007744          2214    2219#
```

```
ROT1    007766          2218    2222#   2245
ROT2    007772          2223#   2240
ROT3    010002          2225#   2238
ROT4    010040          2229    2231#
ROT5    010062          2232    2236#
RTTR    010656          2333#   2370
RT1     010664          2334#   2368
RT2     010724          2340#   2350
RT2A    010746          2341    2345#
RT2AA   010770          2347    2349#
RT3     010776          2339    2351#   2363
RT3A    011020          2352    2356#
RT3B    011054          2359    2362#
SAVE    001050          1158#   1798#   1805#   1806    1896#   1897    1909#   3070#   3073#   3082
SCHRSW  004702          1790    1801#   1804
SCOPE   016664          1047    1051    1052    3067#   3087    3093
SEGCNT  001034          1152#   1999#   2001#   2015#
SET     001072          1167#   1205#   1211#   1213#   2537
SETUP   001100          1006    1174#
SIGNAL  001070          1166#   1203#   1219    2539    2583    2586#   2598#
SKIP    001310          1202    1221#
SLEWCK  003430          1024    1571    1586#
SLW     003474          1589    1593#
SLW0    003506          1595#   1622
SLW1    003516          1597#   1602
SLW1A   003556          1608    1610#
SLW11   003542          1607#   1624
SLW2    003600          1611    1615#
SNGCHR  007450          1038    2128    2175#   2200
SPSP    016662          2694    2788    2849    2865    3060#
STAER   011722          1240    1245    1256    1265    1270    1279    1294    1303    1313    1318    1325    1338    1343
                        1386    1397    1402    1409    1591    1613    1682    1694    1719    1735    1785    1794    1831
                        1851    1892    1952    2007    2051    2100    2149    2188    2234    2275    2310    2343    2354
                        2383    2445    2513#   2705    2720    2733    2802    2811    2841    3080
STAER1  011750          2514    2521#
STARA   002762          1491#   1504
STARED  003060          1500    1505#   1525
STARO   002666          1453    1465    1479#
STAROA  002714          1480    1484#
STAROB  002736          1487#   1510
STAROC  002730          1483    1486#
STAR1   003024          1495    1498#   1502
STP1    001322          1237#   1241
STP2    001344          1238    1242#   1246
STP3    001366          1243    1247#
STP4    001374          1250#   1257
STP5    001432          1254    1258#
STPSA   001440          1262#   1266
STPSB   001462          1263    1267#   1271
STPSC   001504          1268    1272#
STP6    001512          1276#   1280
STP7    001534          1277    1281#
STRCHR  001054          1160#   1486#   1490#   1492    1503#   1515#   1516    1518#   1519    1714#   1728    1738#   1739
                        1790#   1796    1797#   1804#   1886#   1894    1895#   1908#   1996#   2003    2019    2021    2023
                        2025#   2029#   2031#   2044#   2046    2056    2063#   2092#   2096    2112    2119#   2120    2122#
                        2142#   2145    2163#   2164    2166#   2226#   2227#   2228    2230#   2236    2265#   2268#   2269
```

```
                    2271*  2277   2306*  2319   2728*  2737   2742*  2793*  2828   2836   2863*
STRCNT  001056      1161*  1942*  1943*  1954*  1975*  2336*  2346*  2348*  2358*  2360*  2796*  2852*  2861*
SWR     001004      1069*  1179   1182*  1201   1444   1451   1458   1469   1479   1487   1508   1586   1629
                    1676   1712   1780   1814   1821   1837   1863   1872   1879   1921   1936   1984   1992
                    1997   2033   2041   2073   2080   2083   2085   2124   2133   2168   2175   2178   2199
                    2207   2211   2213   2246   2254   2285   2293   2327   2369   2375   2394   2397   2513
                    2521   2572*  2692   2753   2786   2866   3067   3070   3084
SWREG   000176      1001*  1182
SWTIME  002452      1021   1441   1444*
S1      007546      2185*  2192
S2      007524      2179   2182*
S2A     007540      2184*  2197
S4X2    007604      2193*  2198
TABSTR  006620      2044   2069*
TEST1   001542      1290*  1295
TEST1A  001566      1292   1299*  1304
TEST1B  001612      1301   1308*  1314   1319   1326
TEST1C  001720      1321   1333*  1339   1344   1387
TEST1D  002216      1380   1392*  1398   1403   1410
TEST2   004534      1031   1632   1748   1780*  1815   2410   2869
TEST3   004776      1032   1821*  1873
TIMTST  003114      1488   1514*
TKB     001014      1073*  2541   2574
TKINT   011762       987   1209   2531*
TKS     001020      1075*  1216*  1444*  1458*  1469*  1586*  1676*  1712*  1780*  1821*  1879*  1936*  1992*
                    2041*  2080*  2175*  2207*  2293*  2375*  2692*  2786*  3067*
TK1     012060      2548   2550*
TK2     012072      2551   2553*
TK3     012322      2571   2573   2598*
TK4     012326      2546   2599*
TK5     012162      2561   2568*
TK6     012342      2569   2585   2603*
TK7     012332      2597   2601*
TMTST1  003210      1527*
TMTST2  003152      1520*  1527
TNDAV1  014532      2662*  2699
TNDAV2  014534      2663*  2748
TNDAV3  014536      2664*  2789
TN01    014540      2665*  2728   2794
TN010   014556      2082   2672*
TN011   014560      2177   2673*
TN012   014562      2209   2674*
TN013   014564      1625   2295   2675*
TN014   014566      2377   2676*
TN015   014570      2677*
TN016   014572      2678*
TN017   014574      2679*
TN02    014542      1787   2666*
TN03    014544      1823   2667*
TN04    014546      1882   2668*
TN05    014550      1938   2669*
TN06    014552      1995   2670*
TN07    014554      2043   2671*
TPB     001012      1072*  2448*  2454*  2471*  2558*  2580*
TPS     001016      1074*  2447*  2453*  2472   2556   2578
TST2AX  004600      1783   1787*
```

```
TYP     011524            972   2459#
TYPA    011534           2462#  2470   2479
TYPC    011544           2463   2465#
TYPD    011572           2469   2471#  2476   2478
TYPDAT  011636           1547#  1552#  1554#  1555   1556#  1560#  1562#  1563   1564#  1565#  1566   2462#  2465
                         2467   2471   2475#  2477#  2480#
TYPDO   011600           2472#
TYPF    011610           2466   2475#
TYPG    011622           2468   2477#
TYPINT  011506           1174   1446   1460   1471   1587   1677   1713   1781   1822   1880   1937   1993   2042
                         2081   2176   2208   2294   2376   2453#  2693   2787   3069
TYPSWR  012264           2538   2577   2584   2586#
T1A     004706           1802   1804#
T2A     004662           1797#  1801
T280    005044           1826#  1871
T280A   005052           1827#  1840   1843
T281    005060           1828#  1841   1844
T282    005156           1835   1845#
T282B   005144           1838   1842#
T283    005176           1848#
T284    005226           1854#  1856   1858   1860
T285    005320           1864   1868#
T3A     004634           1791#  1808
T5A     004722           1799   1806#  1813
WORK    001046           1157#  1308#  1322#
WT      001274           1217#  1220
WT2     012106           2556#  2557
WT3     012234           2549   2552   2555   2578#  2579
XH3M1   011214           2381   2385#
XHWM1X  011224           2387#
XS1X    007570           2186   2190#
.    =  017034            962#   967    970#   976#   980#   982#   986#   991#   999#   1003#  1009#  1018#  1028#
                         1044#  1049#  1055#  1444   1458   1469   1507   1586   1616   1676   1689   1712   1726
                         1780   1810   1821   1846   1869   1879   1905   1916   1936   1966   1992   2018   2041
                         2060   2071#  2080   2116   2160   2175   2181   2194   2207   2242   2281   2293   2323
                         2365   2375   2385   2386   2391   2432   2473   2522   2630#  2634#  2655#  2661#  2692
                         2712   2723   2736   2786   2807   2829   2831   2837   3067   3074   3092
```

```
$ENABL  1124#  1444  1458  1469  1586  1676  1712  1780  1821  1879  1936  1992  2041  2080  2175
        2207   2293  2375  2692  2786  3067
$ERROR  1089#  1239  1244  1255  1264  1269  1278  1293  1302  1312  1317  1324  1337  1342  1345
        1354   1364  1374  1396  1401  1408  1590  1612  1681  1693  1718  1734  1784  1793  1830
        1850   1891  1951  2006  2050  2099  2148  2187  2233  2274  2309  2342  2353  2382  2444
        2704   2719  2732  2801  2810  2840  3078
$PRINT  1099#  1787  1823  1882  1938  1995  2043  2082  2177  2209  2295  2377
$SETIS  1139#  1347  1356  1366  1376  1405  1417  2441  2452
$WAIT   1110#  1507  1616  1689  1726  1810  1846  1869  1905  1916  1966  2018  2060  2116  2160
        2194   2242  2281  2323  2365  2385  2391  2432  2712  2723  2736  2807  2829  2837  3074
        3092

. ABS.  017034     000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 DZLPKG.BIN,DZLPKG.LST/CRF/NL:TOC=DZLPKG.P11
 RUN-TIME:  3 6 .9 SECONDS
 RUN-TIME RATIO:  51/10=4.8
 CORE USED:  9K  (17 PAGES)
```