

LP11

LINE PRINTER TEST
MD-11-DZLPA-B

EP DZLPA B DL
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The microfiche contains 48 frames of data, organized in a 12x4 grid. Each frame displays a small-scale version of a document page. The pages appear to be technical or test-related, with some containing what looks like a table or a list of data points. The text is very small and difficult to decipher, but the layout suggests a structured report or manual.

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZLPA-B²
SUPERCEDES 11-D2CA
PRODUCT NAME: LP11 LINE PRINTER TEST
DATE: DECEMBER, 1975
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: EARL HAIGHT

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1. ABSTRACT

THE LP11 LINE PRINTER DIAGNOSTIC TEST PROGRAM IS DESIGNED TO PROVIDE A THOROUGH CHECK-OUT OF THE PRINTER CONTROL INTERFACE ELECTRONICS AS WELL AS THE ELECTRONIC AND MECHANICAL PORTIONS OF THE LINE PRINTER MECHANISM ITSELF. THE PROGRAM CONSISTS OF A SERIES OF SEVEN (7) TEST AND DRIVE ROUTINES, EACH OF WHICH CAN BE SELECTED AND OPERATED INDEPENDENTLY OF THE OTHERS USING SPECIAL ENTRY POINTS. INTERNALLY DETECTED ERROR CONDITIONS ARE DISPLAYED ON THE TELEPRINTER WHILE DETAILED DESCRIPTIONS OF EACH ERROR AND WHAT WAS HAPPENING AT THE TIME THE ERROR OCCURRED, IS PRESENTED IN THE LISTING. PRINT PATTERNS USED IN THESE TESTS HAVE BEEN CHOSEN FOR EASE OF VISUAL VERIFICATION.

THE FIRST TEST (TEST 1) IS COMPOSED OF SEVERAL TESTS DESIGNED TO CHECK-OUT THE PROCESSOR INTERFACE CONTROL ELECTRONICS AND INTERCOMMUNICATIONS DATA PATHS. TEST 2, 3, AND 4 USE WORST CASE PATTERNS TO TEST PRINTER PERFORMANCE AND ENDURANCE WHILE TESTS 5 AND 6 PROVIDE DRIVE FOR PRINTER HAMMER ALIGNMENT AND INTENSITY ADJUSTMENT PROCEDURES AND A TEST OF THE PAPER BLEW AND CLUTCH OPERATIONS.

TEST 7 CONSISTS OF SEVERAL SUB-TESTS AND MAINTENANCE AIDS AMONG THEM A SCOPE DRIVE TEST, FOR HELPING THE TECHNICIAN TO DERUG THE HARDWARE.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 PROCESSOR
TELETYPE MODEL 33 ASCII KEYBOARD PRINTER
DATA PRODUCTS, MODEL 2310, LINE PRINTER
LP11 LINE PRINTER CONTROL UNIT

2.2 STORAGE

MEMORY LOCATION 0 TO 7000

2.3 PRELIMINARY PROGRAMS (NONE)

3. LOADING PROCEDURE

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3.1 METHOD

POWER DOWN THE LINE PRINTER
POWER UP THE PDP-11 ONLY
LOAD THE ABSOLUTE LOADER
LOAD THE LP11 DIAGNOSTIC PROGRAM TAPE
AFTER LOADING HAS BEEN COMPLETED, LOAD ADDRESS 0200
DEPRESS STANT AND PROCEED WITH THE LINE PRINTER POWER-UP TEST SEQUENCE.

4. STARTING PROCEDURE

4.1 STARTING ADDRESS OR ADDRESSES

THE INITIAL STARTING ADDRESS FOR THE LP11 LINE PRINTER TEST IS LOC. 0200. THE RESTART ADDRESS IS 600.

4.2 PROGRAM AND/OR OPERATOR ACTION

DURING INITIAL START-UP OF THE LINE PRINTER DIAGNOSTIC TEST THE HEADER MESSAGE "MAINDEC-11-02CA LINE PRINTER TEST" WILL BE TYPED ON THE TELEPRINTER FOLLOWED BY RESTART ADDRESS 600 EXECUTION OF THE PRINTER READY PORTION OF TEST 1. PRINTING OF THE MESSAGE "POWER-UP" ON THE TELEPRINTER INDICATES START OF THIS TEST SEQUENCE. THIS TEST IS CARRIED OUT BY AN INTERACTIVE EXCHANGE BETWEEN THE TEST AND THE USER.

5. SWITCH REGISTER 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.

SWITCH

| | |
|----------|--|
| 15 SET | MALT AFTER ERROR PRINTOUT (OPTIONAL IN STATIC TEST ONLY) |
| 15 RESET | CONTINUE AFTER ERROR PRINTOUT |
| 14 SET | 132 COL. LINE PRINTER |
| 14 RESET | 80 COL. LINE PRINTER |
| 13 SET | 96 CHARACTER LINE PRINTER |
| 13 RESET | 64 CHARACTER LINE PRINTER |
| 12 SET | LOOP ON ROUTINE |
| 12 RESET | CONTINUE TO THE NEXT |

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5.2 ADDRESS ENTRY POINTS

600 CONTROL TEST (TEST 1, SECTION 1)
610 TEST DATA PATHS (TEST 1, SECTION 2)
614 TEST CHARACTER GENERATOR (TEST 1, SECTION 3)
620 TEST ZONE AND FORMAT CONTROL (TEST 1, SECTION 4)
624 TEST WORST CASE NOISE
630 ROTATING PATTERN
634 DOUBLE WEDGE PATTERN
640 HAMMER ALIGNMENT TEST
644 SLEW TEST
650 SCOPE LOOP TEST

6. 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 TEST PROGRAM. MONITORING OF THE CURRENT CONDITION OF THE READY LINE (BIT 7 OF LPS) AND THE ERROR FLAG FLIP-FLOP (BIT 15 OF LPS) AFTER EACH OPERATION AS WELL AS TIME TIME OUT OF THE PRINT CYCLE (PRT TIM), LINE FEED (LF TIME), AND FORM FEED (FF TIM), CYCLES 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 SEGMENT OF TEST 1. FOR A COMPLETE DESCRIPTION OF THESE 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.

6.2 ERROR REPORTS

XXX ERROR COUNT

/

EQUALS THE ERROR TAG IN THE ASSEMBLY LISTING.
CONSULT THE ASSEMBLY FOR A DEFINITION OF THE ERROR.

6.3 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 TEST 7 TO DETECT AND DIAGNOSE ADDITIONAL DIFFICULTIES.

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

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7. PROGRAM DESCRIPTION

7.1 GENERAL

7.2 TEST DESCRIPTIONS

7.2.1 TEST 1 COMPREHENSIVE DATA TRANSFER AND CONTROL TEST

TEST 1 IS MADE UP OF SEVERAL SECTIONS LINKED TOGETHER AND EXECUTED AS A SINGLE TEST.

7.2.1.1 TEST 1, SECTION 1 COMMAND DECODE AND CONTROL INTERFACE TEST

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. AFTER INITIAL ENTRY, THE MANUAL INTERVENTION PART OF THIS TEST WILL NOT BE ENTERED AGAIN.

THE PRINTER ERROR 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.

- A. PAPER OUT OR TORN.
- B. DRUM GATE OPEN.
- C. PAPER FEED MOTOR OVER-TEMPERATURE.
- D. POWER SUPPLY FAULT.
- E. DRUM NOT UP TO SPEED.

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.) AND (C.)).

INITIAL MANUAL TEST SEQUENCE:

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

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7.2.1.2 TEST 1, SECTION 2 DATA TRANSFER PATHS TEST

THIS PORTION OF TEST 1 IS DESIGNED TO TEST THE DATA TRANSFER PATHS FROM THE PROCESSOR INTERFACE, THRU THE LINE PRINTER INPUT REGISTER AND INTO THE PRINTER'S 8 X 20 BUFFER MEMORY. SINCE PRINTING WILL ALSO TAKE PLACE, THIS TEST PROVIDES A PRELIMINARY TEST OF THAT FUNCTION AS WELL. AN ALTERNATING STRING OF "0" AND "9" CHARACTERS IS TRANSMITTED TO THE PRINTER ON A FULL 80 COLUMN BASIS. SINCE THESE CHARACTERS ARE COMPLIMENTARY BITWISE, THEY PROVIDE BOTH A ONES AND ZEROS CHECK OF ALL TRANSMISSION LINES. AUTOMATIC PRINTING TAKES PLACE AFTER EACH 20 CHARACTERS IS RECEIVED BY THE PRINTER PROVIDING A CHECK ON ZONE ADVANCE AND HAMMER DRIVER SWITCHING. END OF LINE IS SENSED WITH THE PROCESSOR AND A "LINE FEED" CHARACTER TRANSMITTED AFTER COMPLETION OF THE LAST PRINT CYCLE FOR EACH LINE. PRINTING OF THE TEST LINE IS REPEATED TEN (10) TIMES ALTERNATING THE COLUMN POSITIONS OF THE "0" AND "9" CHARACTERS. COMPLETION OF THIS SECTION OF TEST 1 INITIATES SECTION 3 OF TEST 1 DIRECTLY.

7.2.1.3 TEST 1, SECTION 3 CHARACTER GENERATOR AND COMPARATOR TEST

SECTION 3 OF TEST 1 IS DESIGNED PRIMARILY TO TEST THE LINE PRINTER CHARACTER GENERATOR AND COMPARATOR LOGIC AND ITS ABILITY TO DETECT AND ACT ON BOTH PRINTABLE AND ILLEGAL 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 (SEE TABLES II AND III FOR THE CHARACTER SEQUENCE).

THIS IS FOLLOWED BY AN ALTERNATE LINE OF ALL 64 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 (NON-PRINTING CHARACTER) IS REPEATED 10 TIMES PRODUCING 20 LINES OF PRINT. COMPLETION OF THIS TEST INITIATES SECTION 4 OF TEST 1 DIRECTLY.

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TABLE II

CHARACTER SEQUENCE AND ASCII CODES
 FOR STANDARD 64-CHARACTER DRUM

| ROWS 1-16 ----- | ROWS 17-32 ----- | ROWS 33-48 ----- | ROWS 49-64 ----- |
|--------------------|---------------------|---------------------|---------------------|
| SPACE (40) | 0 (60) | 0 (100) | P (120) |
| ! (41) | 1 (61) | A (101) | Q (121) |
| " (42) | 2 (62) | B (102) | R (122) |
| # (43) | 3 (63) | C (103) | S (123) |
| \$ (44) | 4 (64) | D (104) | T (124) |
| % (45) | 5 (65) | E (105) | U (125) |
| & (46) | 6 (66) | F (106) | V (126) |
| ' (47) | 7 (67) | G (107) | W (127) |
| ((50) | 8 (70) | H (110) | X (130) |
|) (51) | 9 (71) | I (111) | Y (131) |
| * (52) | ! (72) | J (112) | Z (132) |
| + (53) | # (73) | K (113) | [(133) |
| , (54) | \$ (74) | L (114) | ^ (134) |
| - (55) | % (75) | M (114) | _ (135) |
| . (56) | > (76) | N (116) | ((136) |
| / (57) | ? (77) | O (117) |) (137) |

TABLE III

CHARACTER SEQUENCE AND ASCII CODES FOR
 OPTIONAL 96-CHARACTER DRUM

| ROWS 1-16 ----- | ROWS 17-32 ----- | ROWS 33-48 ----- | ROWS 49-64 ----- | ROWS 65-80 ----- | ROWS 81-96 ----- |
|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| SPACE (40) | 0 (60) | 0 (100) | P (120) | ((140) | P (160) |
| ! (41) | 1 (61) | A (101) | Q (121) | A (141) | Q (161) |
| " (42) | 2 (62) | B (102) | R (122) | B (142) | R (162) |
| # (43) | 3 (63) | C (103) | S (123) | C (143) | S (163) |
| \$ (44) | 4 (64) | D (104) | T (124) | D (144) | T (164) |
| % (45) | 5 (65) | E (105) | U (125) | E (145) | U (165) |
| & (46) | 6 (66) | F (106) | V (126) | F (146) | V (166) |
| ' (47) | 7 (67) | G (107) | W (127) | G (147) | W (167) |
| ((50) | 8 (70) | H (110) | X (130) | H (150) | X (170) |
|) (51) | 9 (71) | I (111) | Y (131) | I (151) | Y (171) |
| * (52) | ! (72) | J (112) | Z (132) | J (152) | Z (172) |
| + (53) | # (73) | K (113) | [(133) | K (153) | ((173) |
| , (54) | \$ (74) | L (114) | ^ (134) | L (154) | ^ (174) |
| - (55) | % (75) | M (115) | _ (135) | M (155) | _ (175) |
| . (56) | > (76) | N (116) | ((136) | N (156) | ((176) |
| / (57) | ? (77) | O (117) |) (137) | O (157) |) (177) |

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7.2.1.4 TEST 1, SECTION 4 FORMAT CONTROL CHARACTER TEST

SECTION 4 OF TEST 1 IS DESIGNED TO TEST THE ABILITY OF THE LINE PRINTER TO DETECT AND ACT UPON EACH OF THE FORMAT CONTROL CHARACTERS, "CR", "LF", AND "FF". THE TEST IS PERFORMED BY FIRST TRANSMITTING 20 SPACE CHARACTERS (ONE FULL SEGMENT) FOLLOWED BY A "CR" CHARACTER. THIS SEQUENCE WILL CAUSE THE FIRST SEGMENT OF THE PRINTER TO BE LOADED AND PRINTED AFTER WHICH THE PRINTER'S ZONE COUNTER WILL BE RESET TO COLUMN 1. PAPER FEED SHOULD NOT TAKE PLACE DURING THIS CYCLE. THE PRECEDING STRING IS THEN FOLLOWED BY 20 "A" CHARACTERS, A "CR" AND FINALLY A "FF" CHARACTER. THIS SHOULD AGAIN CAUSE PRINTING AND RETURN OF THE ZONE COUNTER TO COLUMN 1 OVER-PRINTING THE "A"'S ON THE PREVIOUSLY PRINTED SPACES. THIS SEQUENCE OF FIRST PRINTING SPACES AND THEN OVER-PRINTING "A"'S IS CONTINUED 4 MORE TIMES, EACH TIME INCREASING THE LINE LENGTH BY AN ADDITIONAL 20 "SPACE" AND "A" CHARACTERS UNTIL ALL 4 SEGMENTS OF THE 80 COLUMN PRINT LINE HAVE BEEN COVERED. THE WHOLE TEST SEQUENCE IS REPEATED 10 TIMES PRODUCING A SERIES OF 10 LEFT TRIANGLES EXTENDING DOWN THE PAPER APPARENTLY MADE UP OF THE LETTER "A". THE FINAL CHARACTER TRANSMITTED IN THIS TEST TO THE LINE PRINTER IS THE FORM FEED (FF) CHARACTER WHICH SHOULD PRODUCE A SLEM TO TOP OF PAGE TERMINATING TEST 1.

7.2.2 TEST 2 SINGLE CHARACTER, ALL COLUMNS TEST

THIS TEST IS DESIGNED AS A WORST CASE HAMMER DRIVER AND SUPPLY TEST AS WELL AS A PRINTER ENDURANCE TEST. 80 COLUMNS OF EACH OF THE 64 PRINTABLE CHARACTERS IS TRANSMITTED TO THE LINE PRINTER AND PRINTED IN ROTATION. THE COMPLETE CHARACTER SEQUENCE IS AS SHOWN IN TABLE II AND A SAMPLE OF THE PRINTOUT SHOWN BELOW.

```

      . . . . .
1111 - . . . . . -1111
-- " . . . . . - ----
-- " . . . . . - ----
-- " . . . . . - ----
AAAA - " . . . . . -AAA
BBBB - " . . . . . -BBB
-- " . . . . . - --
-- " . . . . . - --
-- " . . . . . - --
      . . . . .

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7.2.3 TEST 3 ROTATING PATTERN TEST

THIS TEST IS DESIGNED AS A WORST CASE NOISE AND ENDURANCE TEST OF THE LINE PRINTER. A ROTATING, 68 COLUMN PATTERN FOLLOWING THE CHARACTER SEQUENCE SHOWN IN TABLE II IS TRANSMITTED TO THE LINE PRINTER AND PRINTED. A SAMPLE OF THE PRINT PATTERN IS SHOWN BELOW:

```
!08- - - - -ABC- - - - -  
!08- - - - -ABC- - - - -
```

7.2.4 TEST 4 RIGHT AND LEFT HAND WEDGE PATTERN TEST

THIS TEST IS DESIGNED TO DETECT SPURIOUS HAMMER FIRINGS DURING OPERATION OF THE LINE PRINTER. THE PATTPNS WHICH ARE PRODUCED ARE RIGHT AND LEFT HAND WEDGES EACH COMPPOSED OF 80 LINES OF "?" CHARACTERS AS SHOWN BELOW:

```
-----  
LEFT-MAND  
CYCLE (80 LINES)  
  
----- FULL CYCLE  
                (160 LINES)  
RIGHT-MAND  
CYCLE (80 LINES)  
-----
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PRINTED
AREA
"?" CHAN.

A FULL CYCLE CONSISTS OF BOTH THE RIGHT AND LEFT HAND WEDGES. THE LEFT HAND WEDGE IS FORMED SIMPLY BY TRANSMITTING AND PRINTING DECREASING NUMBERS OF CHARACTERS TO THE PRINTER ON SUCCESSIVE LINES UNTIL THE NUMBER OF CHARACTERS TO BE TRANSMITTED BECOMES ZERO. EACH LINE IS TERMINATED BY A "LF" CHARACTER CAUSING PAPER FEED TO OCCUR. THE RIGHT HAND WEDGE HOWEVER, REQUIRES THAT INCREASING NUMBERS OF LEADING SPACES BE TRANSMITTED FOLLOWED BY "?" CHARACTERS TO FILL OUT THE LINE. AGAIN, EACH LINE IS TERMINATED WITH A "LF" CHARACTER.

7.2.5 TEST 5 HAMMER ALIGNMENT TEST

THIS ROUTINE IS DESIGNED TO BE USED AS A DRIVER FOR MANUAL HAMMER ALIGNMENT AND INTENSITY ADJUSTMENTS OF THE LINE PRINTER. NO INTERNAL ERROR TESTS ARE MADE DURING THE EXECUTION OF THIS ROUTINE. IN OPERATION, THIS TEST PRINTS A FULL 80 COLUMN LINES OF "E" CHARACTERS. MORE DETAIL CONCERNING THE OPERATION OF THE ROUTINE MAY BE OBTAINED FROM THE PROGRAM LISTINGS.

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7.2.6 TEST 6 SLEN TEST

THE PURPOSE OF THIS TEST IS TO INSURE THAT THE PAPER FEED DRIVE AND CLUTCH ARE OPERATING PROPERLY AND THAT THE FUNCTION OF MULTIPLE LINE SLEWS CAN BE PERFORMED CORRECTLY. IN THE LATTER CASE, THE DEMAND LINE FROM THE LINE PRINTER GOES HIGH BEFORE THE ACTUAL END OF THE PREVIOUS LINE FEED OPERATION HAS BEEN COMPLETED. IF A SECOND LINE FEED APPEARS AS THE FIRST CHARACTER TRANSMITTED FOR THE NEW LINE, SLEWING WILL CONTINUE TO THE NEXT LINE WITHOUT A STOP IN BETWEEN. THIS MODE OF OPERATION WILL IN FACT CONTINUE AS LONG AS LINE FEEDS ARE TRANSMITTED AS THE FIRST CHARACTER AND BEFORE THE END OF SLEN HAS OCCURRED FOR THE CURRENT LINE. THE TEST CONSISTS OF A ROUTINE TO PRINT A LINE OF E'S FOLLOWED BY MULTIPLE LINE SLEWS AS DETERMINED BY A LINE SLEN TABLE. THE ENTRIES IN THE TABLE ARE AS FOLLOWS:

| LINE NO. | NO. OF LINES SLEWED AFTER PRINTING |
|----------|------------------------------------|
| ----- | ----- |
| 1 | 3 |
| 2 | 2 |
| 3 | 10 |
| 4 | 14 |
| 5 | 6 |
| 6 | 3 |
| 7 | 8 |
| 8 | 4 |
| 9 | 5 |
| 10 | 5 |
| 11 | 3 |

THE TOTAL NUMBER OF LINES SLEWED AND PRINTED IS 63 OR ONE FULL PAGE. CAREFUL EXAMINATION OF THE PRINTED LINES SHOULD DETERMINE IF ANY CLUTCH SLIPPAGE IS TAKING PLACE.

NO INTERNAL ERRORS ARE DETECTED DURING THIS TEST AND THE READER IS REFERRED TO THE PROGRAM LISTING FOR FURTHER DETAILS ON THE OPERATION OF THE ROUTINE.

7.2.7 TEST 7 SCOPE DRIVE ROUTINE

THE PURPOSE OF THIS TEST SEQUENCE IS TO PROVIDE THE OPERATOR WITH A SHORT BUT COMPREHENSIVE SCOPE DRIVER ROUTINE FOR USE IN TROUBLE SHOOTING THE PRINTER INTERFACE CONTROL MODULE WITH THE SCOPE.

.ENDR

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511 /
512 /*****LP11 PRINTER TEST*****/
513 /
514 /
515 /
516 /
517 /
518 /DATA PRODUCTS 2310 LINE PRINTER
519 /
520 /LIST OF SWITCH SETTINGS USED IN THIS TEST
521 /SWITCH NO. DESCRIPTION
522 /15 SET MALT AFTER ERROR PRINT OUT (OPTIONAL IN STATIC TEST ONLY).
523 /14 SET = 132 COL. PRINTER.
524 /13 "DOWN" 64 CHAR./"UP"-96 CHAR OPTION
525 /12 LOOP ON TEST
526 /
527 /
528 /
529 /ENABL ABS
530 /ENABL AMA
531 /
532 /
533 /
534 /
535 /
536 000007 PC=17
537 000006 SP=16
538 /
539 100000 BIT15=100000
540 040000 BIT14=400000
541 020000 BIT13=200000
542 010000 BIT12=100000
543 004000 BIT11=400000
544 002000 BIT10=200000
545 001000 BIT9=100000
546 000400 BIT8=400000
547 000200 BIT7=200000
548 000100 BIT6=100000
549 000040 BIT5=400000
550 000020 BIT4=200000
551 000010 BIT3=100000
552 000004 BIT2=400000
553 000002 BIT1=200000
554 000001 BIT0=100000
555 /
556 /
557 /
558 /
559 000000 .00
560 /
561 /THE FIRST 100 LOCATIONS WILL HAVE
562 / .+2
563 / MALT
564 /AS TRAP CATCHERS
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566          000030          .030
567 000030 006746          TYP
568 000032 000340          34R
569          000042          .042
570 000042 000000          0
571          000046          .046
572 000046 006424          LOGICAL
573          000052          .052
574 000052 040000          BIT14
575
576          000174          .0174
577 000174 000000          DISPREG: 0
578 000176 000000          SWREG: 0
579
580          000200          .0200
581 000200 012706 001000          MOV      01000,X6
582 000204 000137 001056          JMP      SETUP
583          000600          .0600
584 000600 012706 001000          MOV      01000,X6
585 000604 000137 002074          JMP      TEST2A
586 000610 000137 002422          JMP      TEST2B
587 000614 000137 003240          JMP      TEST3
588 000620 000137 003732          JMP      SNGCHR
589 000624 000137 004304          JMP      ROTATE
590 000630 000137 005052          JMP      T8Y6
591 000634 000137 006110          JMP      HAMALN
592 000640 000137 006254          JMP      SLWTSY
593 000644 000137 007514          JMP      SCGPE
594 000650 000137 001316          JMP      TEST1
595          001000          .01000
596
597          ;
598          ;LINE PRINTER HARDWARE REGISTERS
599          ;
600 001000 177514          LPS:    177514          ;STATUS REGISTER
601          ;BIT 15=ERROR
602          ;BIT 7=READY
603 001002 177516          LPB:    177516          ;BIT 6=INTERRUPT ENABLE
604          ;DATA BUFFER REGISTER
605          ;BITS 0-607 BIT ASCII CHARACTER BUFFER
606          ;BITS 7-15=NOT USED
607          ;
608 001004 177570          SWR:    177570
609 001006 177570          DISPLAY:177570
610 001010 177776          PS:     177776
611 001012 177566          TPB:    177566
612 001014 177562          TKB:    177562
613 001016 177564          TPB:    177564
614 001020 177560          TKB:    177560
615
616          000240          NOP=240
617          000000          N=0
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MI

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;
;MACRO FOR SETTING UP ERROR COUNT
.MACR ERROR X
ERR'X': MOV BX, ERCOUNT ;SET UP ERROR COUNT X
        NON+1
        .ENDM
;
;
;MEMORY LOCATIONS USED AS PROGRAM FLAGS AND COUNTERS
;
;SEGMENT COUNTER
SEGCNT: 0
CHRCNT: 0
CHRGEN: 0
LINCNT: 0
CYCCNT: 0
ERNOI: 0
TSTNO: 0
LOCAL: 0
TSTSW: 0
WORKI: 0
SAVEI: 0
ERCOUNT: 0
WIDTH: 0
SEGMENT: 0
;
;ROUTINE TO TEST THE MECH. OPERATION OF THE 1310
;
;
;
;SETUP: RESET
        MOV     4, -(SP) ;SAVE CURRENT VECTORS
        MOV     6, -(SP)
;
        MOV     018, 4 ;SET UP TIMEOUT VECTOR
        TST     03WR ;TRY TO REFERENCE HARDWARE SWR
        BR      28 ;BRANCH IF NO TIMEOUT TRAP OCCURS
;
        18: MOV     03WREG, SWR ;POINT TO SOFTWARE SWITCH REG
        MOV     0DISPREG, DISPLAY ;POINT TO DISPLAY REGISTER
        CMP     (SP)+, (SP)+ ;RESTORE STACK
;
        28: MOV     (SP)+, 4 ;RESTORE TIMEOUT VECTORS
        MOV     (SP)+, 6
;
        ENT     00
        MES1
        ENT     00
        MES2
        ENT     00 ;TYPE "POWER-UP"
        MES3
        HALT
        8TP1: TST     0LPS ;TEST FOR ERROR
        BPL     8TP2 ;NO ERROR TEST FOR READY
        ERROR  \N ;REPORT ERROR
        MOV     00, ERCOUNT ;SET UP ERROR COUNT 0
        NON+1

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AZ

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673 001164 004537 007152          JSR    ES,STAER          ;REPORT ERROR BIT SET
674 001170 000767                BR     STP1              ;GO TEST FOR ERROR NOT
675
676 001172 105777 177602          STP2:  TSTB    0LPS          ;TEST FOR READY
677 001176 100406                BMI    STP3              ; READY SET OK
678 001200                ERROR    \N              ;REPORT READY NOT SET
679 001200 012737 000001 001050  ERR1:  MOV  01, ERCOUNT  ;SET UP ERROR COUNT 1
680                000002  N=N+1
681 001206 004537 007152          JSR    ES,STAER          ;REPORT READY NOT SET
682 001212 000767                BR     STP2              ;GO TEST FOR READY
683 001214 100400                STP3:  EMT    +0          ;REPORT
684 001216 007352                MESS   ;PRINTER OK "READY SET" TRY TORN PAPER SWITCH
685 001220 000000                HALT   ;DEPRESS CONTINUE WHEN READY
686
687 001222 012777 000014 177552          MOV    014,0LPS          ;SEND A "FF" TO THE PRINTER
688 001230 012777 000015 177544          MOV    015,0LPS          ;ATTEMPT "FF" BY SENDING "CR"
689 001236 005777 177536          TST    0LPS              ;TEST FOR ERROR
690                100406                BMI    STP5              ;
691 001244                ERROR    \N              ;REPORT ERROR NOT SET
692 001244 012737 000002 001050  ERR2:  MOV  02, ERCOUNT  ;SET UP ERROR COUNT 2
693                000003  N=N+1
694 001252 004537 007152          JSR    ES,STAER          ;REPORT ERROR
695 001256 000761                BR     STP4              ;LOOP ON ERROR
696 001260 100400                STP5:  EMT    +0          ;
697 001262 007414                MESS   ;DEPRESS CONTINUE WHEN READY
698 001264 000000                HALT
699 001266 005777 177506          STP6:  TST    0LPS          ;
700 001272 100406                BMI    STP7              ;
701 001274                ERROR    \N              ;
702 001274 012737 000003 001050  ERR3:  MOV  03, ERCOUNT  ;SET UP ERROR COUNT 3
703                000004  N=N+1
704 001302 004537 007152          JSR    ES,STAER          ;
705 001306 000767                BR     STP6              ;
706 001310 100400                STP7:  EMT    +0          ;
707 001312 007457                MESS   ;
708 001314 000000                HALT
709
710
711
712
713
714
715
716 001316 000005                ;IS THE PRINTER FREE OF ERRORS
717 001320 005777 177454          TEST1:  RESET              ;CLEAR THE WORLD
718 001324 100006                TST    0LPS              ;IS ERROR FLAG CLEAR
719 001326                BPL    TEST1A            ;ERROR IS CLEAR OK
720 001326 012737 000004 001050  ERR4:  MOV  04, ERCOUNT  ;SET UP ERROR COUNT 4
721                000005  N=N+1
722 001334 004537 007152          JSR    ES,STAER          ;REPORT ERROR SET
723 001340 000766                BR     TEST1             ;LOOP ON ERROR
724
725
726 001342 000005                ;IS READY SET (NO ERRORS EXIST)
TEST1A:  RESET              ;CLEAR THE WORLD

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B2

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727 001344 105777 177430          TSTB  OLPS          IIS READY SET
728 001350 100406          BMI  TEST10        IREADY SET! PRINTER OK
729 001352          ERROR  \N          IREPORT READY NOT SET
730 001352 012737 000005 001050 ERR5:  MOV 05, ERCOUNT  ISET UP ERROR COUNT 5
731          000006          N=N+1
732 001360 004537 007152          JSR  X5,STAER      IREPORT READY NOT SET
733 001364 000766          BR   TEST1A        ILOOP ON ERROR
734
735          I
736          IDOES LOADING THE BUFFER RESET READY
737 001366 032777 040000 177410 TEST10: BIT 0BIT14,PSMR IIS THE PRINTER 132 COL
738 001374 001043          BNE  TEST1C        IYES SKIP THIS TEST
739 001376 005037 001044          CLR  WORK          ICLEAR COUNTER
740 001402 012777 000015 177372          MOV 015,PLPB      ILOAD CARRIAGE RETURN INTO BUFFER
741 001410 105777 177364          TSTB OLPS          IIS READY CLEAR
742 001414 100006          BPL  LP1           IREADY TO CLEAR OK!
743 001416          ERROR  \N          IREPORT READY STILL SET
744 001416 012737 000006 001050 ERR6:  MOV 06, ERCOUNT  ISET UP ERROR COUNT 6
745          000007          N=N+1
746 001424 004537 007152          JSR  X5,STAER      IREPORT READY STILL SET
747 001430 000756          BR   TEST10        ILOOP ON ERROR
748 001432 005777 177342          LP1:  TST  OLPS      IIS THERE AN ERROR
749 001436 100006          BPL  LP2           INO ERROR CONTINUE
750 001440          ERROR  \N
751 001440 012737 000007 001050 ERR7:  MOV 07, ERCOUNT  ISET UP ERROR COUNT 7
752          000010          N=N+1
753 001446 004537 007152          JSR  X5,STAER      IREPORT ERROR OCCURRED
754 001452 000745          BR   TEST10        ILOOP ON ERROR
755
756 001454 105777 177320          LP2:  TSTB OLPS      IIS THE PRINTER STILL BUSY
757 001460 100411          BMI  TEST1C        INO! GO TO NEXT TEST
758 001462 005237 001044          INC  WORK          IYES! GO CHECK FLAGS
759 001466 001361          BNE  LP1           IPRINTER STILL BUSY WAIT
760 001470          ERROR  \N
761 001470 012737 000010 001050 ERR10: MOV 010, ERCOUNT  ISET UP ERROR COUNT 10
762          000011          N=N+1
763 001476 004537 007152          JSR  X5,STAER      IERROR REPORT TIME OUT
764 001502 000731          BR   TEST10        ILOOP ON ERROR
765
766          I
767          ICHECK INTERRUPT LEVEL OF PRINTER
768          ITHE PRINTER SHOULD BE AT LEVEL 4
769          I
770 001504 012737 001740 000200 TEST10: MOV 0INT1C,200 ISET UP INT VECTOR
771 001512 012737 000340 000202          MOV 0340,202
772 001520 005777 177254          TST  OLPS          ITEST FOR ERROR
773 001524 100006          BPL  LP3           INO ERROR CONTINUE
774 001526          ERROR  \N          IREPORT ERROR SET
775 001526 012737 000011 001050 ERR11: MOV 011, ERCOUNT  ISET UP ERROR COUNT 11
776          000012          N=N+1
777 001534 004537 007152          JSR  X5,STAER      IREPORT ERROR SET
778 001540 000761          BR   TEST1C        ILOOP ON ERROR
779 001542 105777 177232          LP3:  TSTB OLPS      ITEST FOR READY
780 001546 100406          BMI  LP3X          IREADY SET OK

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781 001550          ERROR  \N          IREPORT READY NOT SET
782 001550 012737 000P12 001050 ERR12: MOV #12,          ERCOUNT          ISET UP ERROR COUNT 12
783          000013          NON+1
784 001556 004537 007152          JSR  X5,STAER          IREPORT READY NOT SET
785 001562 000750          BR  TESTIC          ILOOP ON ERROR
786 001564          LPSX1  ERROR  \N
787 001564 012737 000013 001050 ERR13: MOV #13,          ERCOUNT          ISET UP ERROR COUNT 13
788          000014          NON+1
789 001572 012777 000340 177210          MOV  #340,OPS          ILOCKUP PROCESSOR
790 001600 052777 000100 177172          BIS  #100,PLPS          ISET PRINTER INTO ENABLE
791 001606 000240          NOP
792 001610 042777 000100 177162          BIC  #100,PLPS          ICLEAR PRINTER INT. ENABLE
793
794          ITEST THAT THE PRINTER WILL NOT INTERRUPT AT LEVEL 6
795 001616          ERROR  \N
796 001616 012737 000P14 001050 ERR14: MOV #14,          ERCOUNT          ISET UP ERROR COUNT 14
797          000015          NON+1
798 001624 012777 000300 177156          MOV  #300,OPS          ISET PROCESSOR PRIORITY LEVEL 6
799 001632 052777 000100 177140          BIS  #100,PLPS          ISET PRINTER INT ENABLE
800 001640 000240          NOP
801 001642 042777 000100 177130          BIC  #100,PLPS          ICLEAR PRINTER INT. ENABLE
802
803          ITEST THAT THE PRINTER WILL NOT INT. AT
804          IPROCESSOR LEVEL 5
805
806 001650          ERROR  \N
807 001650 012737 000015 001050 ERR15: MOV #15,          ERCOUNT          ISET UP ERROR COUNT 15
808          000016          NON+1
809 001656 012777 000240 177124          MOV  #240,OPS          ISET UP PROCESSOR TO LEVEL 5
810 001664 052777 000100 177106          BIS  #100,PLPS          ISET PRINTER INT ENABLE
811 001672 000240          NOP
812 001674 042777 000100 177076          BIC  #100,PLPS          ICLEAR INT ENABLE PRINTER OK
813
814          ITEST THAT THE PRINTER WILL NOT INT
815          IWHEN THE PROCESSOR IS AT LEVEL 4
816
817
818 001702          ERROR  \N
819 001702 012737 000016 001050 ERR16: MOV #16,          ERCOUNT          ISET UP ERROR COUNT 16
820          000017          NON+1
821 001710 012777 000200 177072          MOV  #200,OPS          ISET PROCESSOR TO LEVEL 4
822 001716 052777 000100 177054          BIS  #100,PLPS          ISET PRINTER INT. ENABLE
823 001724 000240          NOP
824 001726 042777 000100 177044          BIC  #100,PLPS          ICLEAR PRINTER INT ENABLE
825 001734 000137 001752          JMP  TEST1D          IPRINTER OK CONTINUE
826
827
828
829          IINTERRUPT HANDLE FOR TESTIC
830          IRESTORE STACK AND REPORT ERROR
831
832 001740 022626          INT1C1  CMP  (6)+,(6)+          IRESTORE STACK
833 001742 004537 007152          JSR  X5,STAER          IREPORT ERROR
834 001746 000137 001504          JMP  TESTIC          IRE-ENTER TESTIC

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D2

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035
036
037
038
039      ;TEST THE ABILITY OF THE PRINTER TO INTERRUPT
040      ;AT PRIORITY LEVEL 4
041
042      TEST10: MOV      @INT10,200      ;SET UP INTERRUPT VECTOR
043              MOV      @340,202      ;LOCK UP PRIORITIES
044              TST      @LPS          ;IS THERE A PRINTER ERROR
045              BPL      LPS          ;NO! CONTINUE
046              ERROR    \N
047      ERR17: MOV      @17,          ERCOUNT      ;SET UP ERROR COUNT 17
048              N=N+1
049              JSR      X5,STAER      ;REPORT PRINTER ERROR
050              BR       TEST10       ;LOOP ON ERROR
051      LP4:   TSTR     @LPS          ;IS READY SET
052              BHI      LPS          ;YES - PRINTER READY
053              ERROR    \N
054      ERR20: MOV      @20,          ERCOUNT      ;SET UP ERROR COUNT 20
055              N=N+1
056              JSR      X5,STAER      ;REPORT READY NOT SET
057              BR       TEST10       ;LOOP ON ERROR
058      LPS:   MOV      @140,@PS       ;SET PRIORITY TO LEVEL 3
059              BIS      @100,@LPS     ;SET PRINTER INTERRUPT ENABLE
060              NOP
061              ERROR    \N
062      ERR21: MOV      @21,          ERCOUNT      ;SET UP ERROR COUNT 21
063              N=N+1
064              JSR      X5,STAER      ;REPORT ERROR
065              BR       TEST10       ;LOOP ON ERROR
066
067      ;
068      ;INTERRUPT HANDLER FOR TEST10
069      INT10: CMP      (6)+,(6)+      ;RESET STACK
070              BIC      @100,@LPS     ;CLEAR INT. ENABLE FOR PRINTER
071              JENTER  NEXT TEST
072
073      ;TEST1 SECTION 2
074      ;TESTS INTERFACE AND PRINTER DATA PATHS
075      ;WITH ALTERNATING ONES AND ZEROS
076
077      TEST2A: JSR      X7,SIZE
078              JSR      X5,PRINT      ;INITIALIZE PRINTER
079              BR       TST2AX
080              ERROR    \N
081      ERR22: MOV      @22,          ERCOUNT      ;SET UP ERROR COUNT 22
082              N=N+1
083              JSR      X5,STAER      ;REPORT PRINTER NOT READY
084              HALT
085      TST2AX: MOV      @-41,CYCCNT    ;SET UP PASS COUNT
086              MOV      WIDTH,LINCNT  ;RESET ZONE COUNT
087              MOV      SEGMENT,SEGCNT ;RESET SEGMENT COUNT
088              MOV      @CHARSW,CHARSW ;SET CHAR. SWITCH TO 0

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088 002152 005777 176622          T3A1  TST      0LPB      ;TEST FOR ERROR
089 002156 100006                    DPL      LP2B      ;NO ERROR CONTINUE
091 002160                    ERROR     \N          ;SET UP ERROR COUNT
092 002160 012737 000023 001050 ERR23: MOV #23,    ERCOUNT     ;SET UP ERROR COUNT 23
093 000024                    N=N+1
094 002166 004537 007152          JSR      X5,STAER ;REPORT ERROR SET
095 002172 000F00                    HALT
096 002174 000177 000214          LP2B:   JMP      0CHARSW ;OPERATOR MUST TAKE ACTION
097 002200 013737 002416 002414 T1A1   MOV      RCHARSW,CHARSW ;SET CHAR, SWITCH TO 0
098 002206 012737 000100 001046   MOV      #100,SAVE
099 002214 013777 001046 176560 T5A1   MOV      SAVE,0LPB ;LOAD BUFFER
100 002222 005237 001022          INC      SEGCNT   ;INC SEGMENT COUNT
101 002226 001401                    BEQ      ,+4
102 002230 000750                    BR       T3A
103 002232 013737 001054 001022   MOV      SEGMNT,SEGCNT ;RESET SEGMENT COUNT
104 002240 004537 006632          JSR      X5,PRTH  ;TEST CHAR, PRINT TIME
105 002244 000405                    BR       LPSA
106 002246                    ERROR     \N          ;REPORT TOO LONG TO PRINT
107 002246 012737 000024 001050 ERR24: MOV #24,    ERCOUNT     ;SET UP ERROR COUNT 24
108 000025                    N=N+1
109 002254 004537 007152          JSR      X5,STAER
110 002260 005237 001030          LPSA:   INC      LINCNT ;INC. ZONE COUNT
111 002264 001414                    BEQ      XLINF
112 002266 032777 040000 176510   BIT     @BIT14,@SWR
113 002274 001726                    BEQ      T3A
114 002276 022737 177777 001030   CMP     @-1,LINCNT
115 002304 001322                    BNE     T3A
116 002306 012737 177764 001022   MOV     @-12,,SEGCNT
117 002314 000716                    BR       T3A
118 002316 013737 001052 001030 XLINF: MOV     WIDTH,LINCNT ;RESET ZONE COUNT
119 002324 012777 000012 176450   MOV     #12,0LPB ;ISSUE LINE FEED
120 002332 004537 006642          JSR      X5,SLWTM ;CHECK SLEW TIME
121 002336 000405                    BR       LPSB
122 002340                    ERROR     \N          ;REPORT TOO LONG OF TIME FOR SLOW
123 002340 012737 000025 001050 ERR25: MOV #25,    ERCOUNT     ;SET UP ERROR COUNT 25
124 000026                    N=N+1
125 002346 004537 007152          JSR      X5,STAER
126 002352 005237 001032          LPSB:   INC      CYCCNT ;INC CYCLE COUNT
127 002356 001401                    BEQ      ,+4
128 002360 000674                    BR       T3A
129 002362 032777 010000 176414   BIT     @BIT12,@SWR
130 002370 001241                    BNE     TEST2A
131 002372 000413                    BR       TEST2B
132
133
134
135
136 002374 013737 002420 002414 T2A1   MOV      RCHARSW,CHARSW ;RESET CHAR, SWITCH
137 002402 012737 000077 001046   MOV      #77,SAVE
138 002410 000137 002214          JMP      T5A      ;LOAD CHAR.
139
140
141
142 002414 000000          CHARSW: 0

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943 002416 002374          SCHRSWI T2A
944 002420 002200          RCHRSWI T1A
945
946
947
948          ITEST 1, SECTION 3
949          ITEST CHARACTER COMPARATOR WITH ALTERNATE LINES OF
950          IALL CHARACTERS AND ILLEGAL CHARACTERS
951          I
952 002422 004737 006566          TEST20: JSR      X7,SIZE
953 002426 032777 020000 176350          BIT      @BIT13,@SWR          ITEST FOR 96 CHR SW,
954 002434 001412          REQ      LP2C          INOT 96 = 64 CHARACTERS
955 002436 012737 177766 001032          MOV      @-12,CYCCNT          ISET 10 CYCLES, 30 LINES
956 002444 012737 002624 003234          MOV      @T207,NOCHRS          ISET NO. CHAR. SWITCH
957 002452 012737 177640 003236          MOV      @-96.,LEGCHR          ISTORE CHAR. CNT
958 002460 000411          BR      T200          IGO PRINT
959 002462 012737 177761 001032 LP2C:  MOV      @-17,CYCCNT          ISET CYCLE FOR 30 LINES
960 002470 012737 002720 003234          MOV      @T202,NOCHRS          IRESET NO. CHAR. SW.
961 002476 012737 177700 003236          MOV      @-64.,LEGCHR          ISTORE 64 CHAR. CNT
962 002504 013737 001052 001030 T200:  MOV      WIDTH,LINCNT          ISET UP LINE CNT
963 002512 012737 000040 001026          MOV      @40,CHRGEN          ISET FIRST CHAR.
964 002520 013737 003236 001024          MOV      LEGCHR,CHRCNT          ISET CHAR. COUNT
965 002526 013737 001054 001022          MOV      SEGMENT,SEGCNT          IRESET SEG. COUNT
966 002534 005777 176240          T201:  TST      @LPB          IDOES THE PRINTER HAVE AN ERROR
967 002540 100006          BPL      LP2E          IBRANCH IF NO ERROR
968 002542
969 002542 012737 000026 001050 ERR26: MOV @26,          ERCOUNT          ISET UP ERROR COUNT 26
970          N=N+1
971 002550 004537 007152          JSR      X5,STAER          IREPORT ERROR
972 002554 000000          HALT          IERROR SET OPERATOR MUST TAKE ACTION
973 002556 013777 001026 176216 LP2E:  MOV      CHRGEN,@LPB          IPRINT CHARACTER
974 002564 005237 001022          INC      SEGCNT          IINC. SEGMENT COUNT
975 002570 001053          BNE      T202
976 002572 013737 001054 001022          MOV      SEGMENT,SEGCNT
977 002600 004537 006632          JSR      X5,PRTHM          ICHECK PRINT TIME
978 002604 000405          BR      LP2F          IBRANCH IF NO PRINT TIME ERROR
979 002606
980 002606 012737 000027 001050 ERR27: MOV @27,          ERCOUNT          ISET UP ERROR COUNT 27
981          N=N+1
982 002614 004537 007152          JSR      X5,STAER          IREPORT PRINT TIME ERROR
983 002620 000177 000410          LP2F:  JMP      @NOCHRS
984 002624 005237 001030          T207:  INC      LINCNT
985 002630 001414          BEQ      REFIL
986 002632 032777 040000 176144          BIT      @BIT14,@SWR
987 002640 001427          BEQ      T202
988 002642 022737 177777 001030          CMP      @-1,LINCNT
989 002650 001023          BNE      T202
990 002652 012737 177764 001022          MOV      @-12.,SEGCNT
991 002660 000417          BR      T202
992 002662 013737 001052 001030 REFIL: MOV      WIDTH,LINCNT          IRESET LINE COUNT
993 002670 012777 000012 176104          MOV      @12,@LPB          IISSUE LINE FEED
994 002676 004537 006642          JSR      X5,SLWTIM          ICHECK SLEW TIME
995 002702 000406          BR      T202          ITIME OK
996 002704          ERROR          \N

```

| | | | | | | | | |
|------|--------|--------|--------|--------|--------|--------------------|---------|--------------------------------|
| 997 | 002704 | 012737 | 000030 | 001050 | ERR30: | MOV #30, | ERCOUNT | 1SET UP ERROR COUNT 30 |
| 998 | | 000031 | | | | NON+1 | | |
| 999 | 002712 | 004537 | 007152 | | | JBR X5,STAER | | 1REPORT SLEN TIME TOO LONG |
| 1000 | 002716 | 000000 | | | | HALT | | |
| 1001 | 002720 | 005237 | 001026 | | T202: | INC CHRGEN | | 1SET UP NEXT CHARACTER |
| 1002 | 002724 | 005237 | 001024 | | | INC CHR CNT | | 1INC. CHAR. COUNT |
| 1003 | 002730 | 001301 | | | | RNE T201 | | |
| 1004 | 002732 | 012777 | 000012 | 176042 | | MOV #12,PLPB | | 1ISSUE LINE FEED |
| 1005 | 002740 | 004537 | 006642 | | | JBR X5,SLNTIM | | 1CHECK SLEN TIME |
| 1006 | 002744 | 000406 | | | | RR LP2M | | 1SLEN TIME OK |
| 1007 | 002746 | | | | | ERROR \N | | |
| 1008 | 002746 | 012737 | 000031 | 001050 | ERR31: | MOV #31, | ERCOUNT | 1SET UP ERROR COUNT 31 |
| 1009 | | 000032 | | | | NON+1 | | |
| 1010 | 002754 | 004537 | 007152 | | | JBR X5,STAER | | 1REPORT TIME TOO LONG |
| 1011 | 002760 | 000000 | | | | HALT | | |
| 1012 | 002762 | 013737 | 001050 | 001022 | LP2M: | MOV SEGMENT,SEGCNT | | 1RESET SEGMENT COUNT |
| 1013 | 002770 | 012737 | 000200 | 001024 | | MOV #200,CHR CNT | | |
| 1014 | 002776 | 063737 | 003236 | 001024 | | ADD LEGCHR,CHR CNT | | 1SETUP # OF ILLEGAL CHARACTERS |
| 1015 | 003004 | 005137 | 001024 | | | COM CHR CNT | | |
| 1016 | 003010 | 005237 | 001024 | | | INC CHR CNT | | |
| 1017 | | | | | | | | |
| 1018 | 003014 | 005777 | 175760 | | T203: | TST #LPS | | 1TEST FOR ERROR |
| 1019 | 003020 | 100006 | | | | RPL LDCH | | 1BRANCH IF NO ERROR |
| 1020 | 003022 | | | | | ERROR \N | | |
| 1021 | 003022 | 012737 | 000032 | 001050 | ERR32: | MOV #32, | ERCOUNT | 1SET UP ERROR COUNT 32 |
| 1022 | | 000033 | | | | NON+1 | | |
| 1023 | 003030 | 004537 | 007152 | | | JBR X5,STAER | | 1REPORT ERROR SET |
| 1024 | 003034 | 000000 | | | | HALT | | |
| 1025 | 003036 | 013777 | 001026 | 175736 | LDCH: | MOV CHRGEN,#LPS | | 1TRANSMIT CHARACTER |
| 1026 | 003044 | 005237 | 001022 | | | INC SEGCNT | | 1+1 SEGMENT COUNT |
| 1027 | 003050 | 001014 | | | | RNE T204 | | |
| 1028 | 003052 | 013737 | 001050 | 001022 | | MOV SEGMENT,SEGCNT | | 1RESET SEGMENT COUNT |
| 1029 | 003060 | 004537 | 006632 | | | JBR X5,PRTTM | | 1CHECK PRINT TIME |
| 1030 | 003064 | 000406 | | | | BR T204 | | |
| 1031 | 003066 | | | | | ERROR \N | | |
| 1032 | 003066 | 012737 | 000033 | 001050 | ERR33: | MOV #33, | ERCOUNT | 1SET UP ERROR COUNT 33 |
| 1033 | | 000034 | | | | NON+1 | | |
| 1034 | 003074 | 004537 | 007152 | | | JBR X5,STAER | | 1PRINT TOOK TOO LONG |
| 1035 | 003100 | 000000 | | | | HALT | | |
| 1036 | 003102 | 005237 | 001024 | | T204: | INC CHR CNT | | 1+1 CHARACTER COUNT |
| 1037 | 003106 | 001422 | | | | BEO T205 | | |
| 1038 | 003110 | 005237 | 001026 | | | INC CHRGEN | | |
| 1039 | 003114 | 042737 | 177600 | 001026 | | BIC #177600,CHRGEN | | |
| 1040 | 003122 | 022737 | 000012 | 001026 | | CHP #12,CHRGEN | | 1TEST FOR LINE FEED |
| 1041 | 003130 | 001764 | | | | BEO T204 | | |
| 1042 | 003132 | 022737 | 000014 | 001026 | | CHP #14,CHRGEN | | 1TEST FOR SLEN |
| 1043 | 003140 | 001760 | | | | BEO T204 | | |
| 1044 | 003142 | 022737 | 000015 | 001026 | | CHP #15,CHRGEN | | 1TEST FOR CARRIAGE RETURN |
| 1045 | 003150 | 001754 | | | | REQ T204 | | |
| 1046 | 003152 | 000720 | | | | BR T203 | | 1LOAD CHARACTER |
| 1047 | | | | | / | | | |
| 1048 | | | | | / | | | |
| 1049 | | | | | / | | | |
| 1050 | 003154 | 012777 | 000012 | 175620 | T205: | MOV #12,PLPB | | 1ISSUE LINE FEED |

| | | | | | | | | |
|------|--------|--------|--------|--------|--------|----------|-------------|------------------------|
| 1051 | 003162 | 004537 | 006642 | | | JBR | Z5,SLWTIM | ICHECK SLEW TIME |
| 1052 | 003166 | 000406 | | | | BR | LP20X | |
| 1053 | 003170 | | | | | ERROR | \N | |
| 1054 | 003170 | 012737 | 000034 | 001050 | ERR341 | MOV 034, | ERCOUNT | IBET UP ERROR COUNT 34 |
| 1055 | | 000035 | | | | NON=1 | | |
| 1056 | 003176 | 004537 | 007152 | | | JBR | Z5,STAER | ISLEW TIME TOO LONG |
| 1057 | 003202 | 000000 | | | | HALT | | |
| 1058 | 003204 | 005237 | 001032 | | | LP20X1 | INC | CYCCNT |
| 1059 | 003210 | 001402 | | | | BEG | .+6 | |
| 1060 | 003212 | 000137 | 002504 | | | JMP | T200 | |
| 1061 | 003216 | 032777 | 010000 | 175560 | | BIT | 0BIT12,08WR | ICHECK TO LOOP ON TEST |
| 1062 | 003224 | 001402 | | | | BEG | .+6 | |
| 1063 | 003226 | 000137 | 002422 | | | JMP | TEST20 | |
| 1064 | 003232 | 000402 | | | | BR | TEST3 | |
| 1065 | | | | | | | | |
| 1066 | 003234 | 000000 | | | | NOCHR31 | 0 | |
| 1067 | 003236 | 000000 | | | | LEGCHR1 | 0 | |
| 1068 | | | | | | / | | |
| 1069 | | | | | | / | | |
| 1070 | | | | | | / | | |
| 1071 | | | | | | / | | |

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1072
1073
1074
1075
1076 003240 004737 006566
1077 003244 013737 003716 003720
1078 003252 032777 040000 175524
1079 003260 001404
1080 003262 012737 000007 003730
1081 003270 000403
1082 003272 012737 000005 003730
1083 003300 004537 006700
1084 003304 000406
1085 003306
1086 003306 012737 000035 001050
1087 000036
1088 003314 004537 007152
1089 003320 000000
1090 003322 012737 177777 003722
1091 003330 012737 003506 003724
1092 003336 012737 003422 003726
1093 003344 012737 177777 001032
1094 003352 013737 001054 001022
1095 003360 005777 175414
1096 003364 100006
1097 003366
1098 003366 012737 000036 001050
1099 000037
1100 003374 004537 007152
1101 003400 000000
1102 003402 105777 175372
1103 003406 100403
1104 003410
1105 003410 012737 000037 001050
1106 000040
1107 003416 000177 000304
1108 003422 012777 000040 175352
1109 003430 005237 001022
1110 003434 001351
1111 003436 013737 001054 001022
1112 003444 004537 006632
1113 003450 000406
1114 003452
1115 003452 012737 000040 001050
1116 000041
1117 003460 004537 007152
1118 003464 000000
1119 003466 005237 001032
1120 003472 001332
1121 003474 013737 003722 001032
1122 003502 000177 000216
1123 003506 012737 003550 003724
1124 003514 012737 003540 003726
1125 003522 012777 000015 175252

/
/TEST 1, SECTION 4
/TESTS PRINTER ZONE AND FORMAT CONTROL
/
TEST3: JSR X7,SIZE
MOV XN,T3NCNT /SET UP CYCLE COUNT
BIT 0BIT14,08HR /IS PRINTER 132 COL.
BEQ Z002 /NO IT IS AN 80 COL PRINTER
MOV 07,ZCOUNT /IT IS AN 132 COL PRINTER
BR FORMF
Z002: MOV 05,ZCOUNT /SET UP FOR 80 COL PRINTER
FORMF: JSR X5,PRINT /INITIALIZE PRINTER
BR T9
ERROR \N
ERR35: MOV 035, ERCOUNT /SET UP ERROR COUNT 35
N=N+1
JSR X5,STAER /PRINTER NOT READY
HALT
T9: MOV 0-1,CYCTST /
MOV 0T0,PHFLG /PRESET PHASE FLAG
MOV 0T5,SPCFLG /PRESET SPACE FLAG
MOV 0-1,CYCCNT
MOV SEGMENT,SEGCNT /SET UP SEGMENT COUNT
T1: TST 0LPB /TEST FOR ERROR
BPL XT1A /NO ERROR
ERROR \N
ERR36: MOV 036, ERCOUNT /SET UP ERROR COUNT 36
N=N+1
JSR X5,STAER
HALT
XT1A: TST 0LPB /TEST FOR READY
BHI T1X /READY SET
ERROR \N
ERR37: MOV 037, ERCOUNT /SET UP ERROR COUNT 37
N=N+1
T1X: JMP 00PCFLG
T5: MOV 040,0LPB /LOAD A SPACE
T5X: INC SEGCNT /+1 SEGMENT CNT
BNE T1 /TEST FOR END
MOV SEGMENT,SEGCNT
JSR X5,PRYTM /CHECK PRINT OUT
BR INCCY /TIME OK
ERROR \N
ERR40: MOV 040, ERCOUNT /SET UP ERROR COUNT 40
N=N+1
JSR X5,STAER /IT TOOK TOO LONG TO PRINT
HALT
INCCY: INC CYCCNT
BNE T1
MOV CYCTST,CYCCNT
T8: JMP 0PHFLG
T8: MOV 0T7,PHFLG /SET PHASE FLAG
MOV 0T4,SPCFLG /SET SPACE FLAG
MOV 015,0LPB /LOAD CARRIAGE RETURN

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1126 003530 105777 175244          TSTB  OLPS          IWAIT FOR SEGMENT DIODES
1127 003530 100375          BPL  .-4          ITO SETTLE
1128 003536 000710          BR   T1
1129
1130
1131 003540 012777 000101 175234 T41  MOV  0101,OLPS      ILOAD CHARACTER "A"
1132 003546 000730          BR   TSX
1133 003550 012737 003506 003724 T71  MOV  0TS,PHFLG      ISET PHASE FLAG
1134 003556 012737 003422 003726      MOV  0TS,SPCFLG     ISET SPACE /A FLAG
1135 003560 012777 000012 175210      MOV  012,OLPS      IISSUE LINE FEED
1136 003572 004537 006642          JSR  25,SLMTIM      ICHECK SLEN TIME
1137 003576 000405          BR   LPT7X
1138 003600
1139 003600 012737 000041 001050 ERR41: MOV  041,          ERCOUNT          ISET UP ERROR COUNT 41
1140          000042          NON+1
1141 003606 004537 007152          JSR  25,STAER      IREPORT SLEN TOOK TOO LONG
1142
1143 003612 005337 003722          LPT7X: DEC  CYCTST
1144 003616 013737 003722 001032      MOV  CYCTST,CYCCNT IRESET CYCLE COUNT
1145 003624 013737 003722 001044      MOV  CYCTST,WORK
1146 003632 063737 003730 001044      ADD  ZCOUNT,WORK
1147 003640 001247          BNE  T1
1148 003642 005237 003720          INC  T3NCNT        ITEST ALL CYCLES
1149 003646 001225          BNE  T0
1150 003650 012777 000014 175124      MOV  014,OLPS
1151 003656 004537 006502          JSR  25,FRPTIM     ICHECK FORM FEED
1152 003662 000406          BR   XLPX2
1153 003664
1154 003664 012737 000042 001050 ERR42: MOV  042,          ERCOUNT          ISET UP ERROR COUNT 42
1155          000043          NON+1
1156 003672 004537 007152          JSR  25,STAER      IFORM FEED TOOK TOO LONG
1157 003676 000002          HALT
1158 003700 032777 010000 175076 XLPX2: BIT  0BIT12,0SHR  ICHECK TO LOOP ON TEST
1159 003706 001402          BEQ  .+6
1160 003710 000137 003240          JMP  TEST3         ILOOP ON TEST
1161 003714 000406          BR   8NGCHR
1162
1163          I
1163 003716 177760          XN1  -14
1164 003720 000000          T3NCNT: 0
1165 003722 000000          CYCTST: 0
1166 003724 000000          PHFLG: 0
1167 003726 000000          SPCFLG: 0
1168 003730 000000          ZCOUNT: 0
1169
1170          I
1170          IWORST CASE NOISE TEST
1171          ISINGLE CHAR. ACROSS ALL COLS.
1172          I
1173 003732 004737 006566          8NGCHR: JSR  27,8IZE
1174 003736 013737 001054 001022      MOV  SEGMENT,SEGCNT ISET UP SEGMENT COUNT
1175 003744 032777 020000 175032      BIT  0BIT13,0SHR  ITEST FOR 96 CHAR.
1176 003752 001404          BEQ  82
1177 003754 012737 177640 001024      MOV  0-96.,CHRCNT  I96 CHAR.
1178 003762 000403          BR   .+10
1179 003764 012737 177700 001024 82:  MOV  0-64.,CHRCNT  I64 CHAR.

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K2

| | | | | | | | | |
|------|--------|--------|--------|--------|--------|----------|---------------|-----------------------------|
| 1100 | 003772 | 013737 | 001052 | 001030 | | MOV | WIDTH,LINCNT | 1SET UP LINE COUNT |
| 1101 | 004000 | 012737 | 000040 | 001026 | | MOV | 040,CHRGEN | 1SET UP SPACE |
| 1102 | 004006 | 005777 | 174766 | | 81: | TST | 0LPB | 1TEST FOR ERRORS |
| 1103 | 004012 | 100006 | | | | BPL | X81X | 1BRANCH IF NO ERRORS |
| 1104 | 004014 | | | | | ERROR | \N | |
| 1105 | 004014 | 012737 | 000043 | 001050 | ERR43: | MOV 043, | ERCOUNT | 1SET UP ERROR COUNT 43 |
| 1106 | | 000044 | | | | N=N+1 | | |
| 1107 | 004022 | 004537 | 007152 | | | JSR | X5,STAER | 1REPORT ERROR |
| 1108 | 004026 | 000000 | | | | HALT | | 1HALT ON ERROR |
| 1109 | 004030 | 013777 | 001026 | 174744 | X81X: | MOV | CHRGEN,0LPB | 1LOAD PRINTER BUFFER |
| 1190 | 004036 | 005237 | 001022 | | | INC | SEGCNT | |
| 1191 | 004042 | 001361 | | | | BNE | 81 | |
| 1192 | 004044 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | 1SET UP NEW SEGMENT CNT |
| 1193 | 004052 | 005237 | 001030 | | | INC | LINCNT | 1+1 LINE COUNT |
| 1194 | 004056 | 001424 | | | | BEQ | 84 | 1END OF LINE |
| 1195 | 004060 | 032777 | 040000 | 174716 | | BIT | 0BIT14,0SHR | |
| 1196 | 004066 | 001407 | | | | BEQ | LINPT | |
| 1197 | 004070 | 022737 | 177777 | 001030 | | CMR | 0-1,LINCNT | |
| 1198 | 004076 | 001003 | | | | BNE | LINPT | |
| 1199 | 004100 | 012737 | 177764 | 001022 | | MOV | 0-12,,SEGCNT | |
| 1200 | 004106 | 004537 | 006632 | | LINPT: | JSR | X5,PRTTM | 1PRINT SEGMENT |
| 1201 | 004112 | 000735 | | | | BR | 81 | 1FETCH NEXT SEGMENT |
| 1202 | 004114 | | | | | ERROR | \N | |
| 1203 | 004114 | 012737 | 000044 | 001050 | ERR44: | MOV 044, | ERCOUNT | 1SET UP ERROR COUNT 44 |
| 1204 | | 000045 | | | | N=N+1 | | |
| 1205 | 004122 | 004537 | 007152 | | | JSR | X5,STAER | 1REPORT PRINT TIME TOO LONG |
| 1206 | 004126 | 000000 | | | | HALT | | |
| 1207 | | | | | | | | |
| 1208 | 004130 | 013737 | 001052 | 001030 | 84: | MOV | WIDTH,LINCNT | 1SET UP LINE COUNT |
| 1209 | 004136 | 004537 | 006632 | | | JSR | X5,PRTTM | 1END OF LINE PRINT |
| 1210 | 004142 | 000406 | | | | BR | 84X | 1PRINT TIME OK |
| 1211 | 004144 | | | | | ERROR | \N | |
| 1212 | 004144 | 012737 | 000045 | 001050 | ERR45: | MOV 045, | ERCOUNT | 1SET UP ERROR COUNT 45 |
| 1213 | | 000046 | | | | N=N+1 | | |
| 1214 | 004152 | 004537 | 007152 | | | JSR | X5,STAER | 1REPORT TOO LONG TO PRINT |
| 1215 | 004156 | 000000 | | | | HALT | | |
| 1216 | 004160 | 005777 | 174614 | | 84X: | TST | 0LPB | 1TEST FOR ERROR |
| 1217 | 004164 | 100006 | | | | BPL | 84X1 | 1BRANCH IF NO ERROR |
| 1218 | 004166 | | | | | ERROR | \N | |
| 1219 | 004166 | 012737 | 000046 | 001050 | ERR46: | MOV 046, | ERCOUNT | 1SET UP ERROR COUNT 46 |
| 1220 | | 000047 | | | | N=N+1 | | |
| 1221 | 004174 | 004537 | 007152 | | | JSR | X5,STAER | 1REPORT ERROR SET |
| 1222 | 004200 | 000000 | | | | HALT | | |
| 1223 | 004202 | 105777 | 174572 | | 84X1: | TSTB | 0LPB | 1TEST FOR READY |
| 1224 | 004206 | 100406 | | | | BMI | 84X2 | 1BRANCH IF READY SET |
| 1225 | 004210 | | | | | ERROR | \N | |
| 1226 | 004210 | 012737 | 000047 | 001050 | ERR47: | MOV 047, | ERCOUNT | 1SET UP ERROR COUNT 47 |
| 1227 | | 000050 | | | | N=N+1 | | |
| 1228 | 004216 | 004537 | 007152 | | | JSR | X5,STAER | 1REPORT READY NOT SET |
| 1229 | 004222 | 000000 | | | | HALT | | |
| 1230 | 004224 | 012777 | 000012 | 174550 | 84X2: | MOV | 012,0LPB | 1ISSUE LINE FEED |
| 1231 | 004232 | 004537 | 006642 | | | JSR | X5,SLWTIM | 1CHECK SLEW TIME |
| 1232 | 004236 | 000406 | | | | BR | 87 | |
| 1233 | 004240 | | | | | ERROR | \N | |

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1234 004240 012737 000050 001050 ERR50: MOV 050,          ERCOUNT          ISET UP ERROR COUNT 50
1235                      000051                      NON#1
1236 004246 004537 007152                      JSR          25,STAER          IREPORT BLEW TOO LONG
1237 004252 000000                      HALT
1238 004254 005237 001026          87: INC          CHRGEN          I+1 CHAR.
1239 004260 005237 001024          INC          CHRcnt          I+1 CHAR. COUNT
1240 004264 001401                      BEQ          LP87
1241 004266 000647                      BR          81
1242 004270 032777 010000 174506 LP87: BIT          00IT12,05WR          ICHECK TO LOOP ON TEST
1243 004276 001402                      BEQ          .+6          IDO NOT LOOP ON TEST
1244 004300 000137 003732                      JMP          8NGCHR          ILOOP ON TEST
1245                      ;
1246                      ;
1247
1248                      ;
1249          ITEST 3
1250          IROTATING PATTERN CHARACTER TEST
1251                      ;
1252                      ;
1253 004304 004737 006566          ROTATE: JSR          27,SIZE
1254 004310 013737 001054 001022          MOV          SEGMENT,SEGCNT          ISET UP SEGMENT COUNT
1255 004316 013737 001052 001030          MOV          WIDTH,LINCNT          ISET UP LINE COUNT
1256 004324 013737 005036 005032          MOV          R88GFL,SEGFLG          ISET SEGMENT FLAG
1257 004332 013737 005044 005040          MOV          R8LNFL,LINFLG          ISET LINE FLAG
1258 004340 032777 020000 174436 ROT3: BIT          00IT13,05WR          ITEST FOR 96 CHAR.
1259 004346 001404                      BEQ          ROT7          I64 CHAR. PRINTER
1260 004350 012737 177640 005050          MOV          0-96,,STRCNT          ISET UP FOR 96 CHAR.
1261 004356 000403                      BR          .+10
1262 004360 012737 177700 005050 ROT7: MOV          0-64,,STRCNT          ISET UP FOR 64 CHAR.
1263 004366 012737 000040 005046          MOV          040,STRCHR          IFETCH A SPACE
1264 004374 013737 005046 001026 ROT11: MOV          STRCHR,CHRGEN
1265 004402 013737 005050 001024          MOV          STRCNT,CHRcnt
1266 004410 005777 174364          ROT1: TST          0LPS          ITEST FOR ERROR
1267 004414 100006          BPL          ROT112          IBRANCH IF NO ERROR
1268 004416          ERROR          \N          IREPORT PRINTER ERROR
1269 004416 012737 000051 001050 ERR51: MOV 051,          ERCOUNT          ISET UP ERROR COUNT 51
1270                      000052                      NON#1
1271 004424 004537 007152                      JSR          25,STAER
1272 004430 000000                      HALT
1273 004432 013777 001026 174342 ROT112: MOV          CHRGEN,0LPS          ILOAD CHARACTER
1274 004440 005237 001022          INC          SEGCNT          I+1 SEGMENT COUNT
1275 004444 001425                      BEQ          ROT8          IEND OF SEG.
1276 004446 005237 001026          ROT9: INC          CHRGEN          I+1 CHAR. GENERATOR
1277 004452 005237 001024          INC          CHRcnt          I+1 CHAR. COUNT
1278 004456 001454                      BEQ          ROT10          IROLL OVER
1279 004460 000177 000354          ROT4: JMP          0LINFLG          ITEST LINE FLAG
1280 004464 000177 000342          ROT5: JMP          0SEGFLG          ITEST SEGMENT FLAG
1281 004470 013737 005036 005032 ROT2: MOV          R88GFL,SEGFLG
1282 004476 004537 006632          JSR          25,PRTHM          ICHECK PRINT TIME
1283 004502 000742                      BR          ROT1          ICONTINUE
1284 004504          ERROR          \N
1285 004504 012737 000050 001050 ERR52: MOV 052,          ERCOUNT          ISET UP ERROR COUNT 52
1286                      000053                      NON#1
1287 004512 004537 007152                      JSR          25,STAER          IREPORT PRINT TIME TOO LONG

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M2

| | | | | | | | | |
|------|--------|--------|--------|--------|---------|----------|---------------|-----------------------------|
| 1288 | 004516 | 000000 | | | | MALT | | |
| 1289 | | | | | | | | |
| 1290 | | | | | | | | |
| 1291 | | | | | | | | |
| 1292 | 004520 | 013737 | 001P50 | 001022 | ROT01 | MOV | SEGMNT,SEGCNT | ISET UP SEGMENT COUNT |
| 1293 | 004526 | 013737 | 005030 | 005032 | | MOV | STSGFL,SEGFLG | ISET SEGMENT FLAG |
| 1294 | 004530 | 005237 | 00103P | | | INC | LINCNT | I+1 LINE COUNT |
| 1295 | 004540 | 001410 | | | | BEQ | ROT0X | |
| 1296 | 004542 | 032777 | 040000 | 174234 | | BIT | 0BIT10,08MR | |
| 1297 | 004550 | 001736 | | | | BEQ | ROT0 | |
| 1298 | 004552 | 022737 | 177777 | 001030 | | CMP | 0=1,LINCNT | |
| 1299 | 004560 | 001332 | | | | BNE | ROT0 | |
| 1300 | 004562 | 012737 | 177760 | 001022 | | MOV | 0=12.,SEGCNT | |
| 1301 | 004570 | 000726 | | | | BR | ROT0 | |
| 1302 | 004572 | 013737 | 001052 | 001030 | ROT0X1 | MOV | WIDTH,LINCNT | IRESET LINE COUNT |
| 1303 | 004600 | 013737 | 005042 | 005040 | | MOV | STLNFL,LINFLG | ISET LINE FLAG |
| 1304 | 004606 | 000717 | | | | BR | ROT0 | |
| 1305 | 004610 | 012737 | 000040 | 001026 | ROT101 | MOV | 040,CHRCNT | IRESET CHAR. GPN |
| 1306 | 004616 | 032777 | 020000 | 174160 | | BIT | 0BIT13,08MR | I TEST FOR 96 CHAR. |
| 1307 | 004624 | 001404 | | | | BEQ | .+12 | 160 CHAR. |
| 1308 | 004626 | 012737 | 177640 | 001024 | | MOV | 0=96.,CHRCNT | I96 CHAR COUNT |
| 1309 | 004634 | 000403 | | | | BR | .+10 | |
| 1310 | 004636 | 012737 | 177700 | 001024 | | MOV | 0=64.,CHRCNT | 160 CHAR. |
| 1311 | 004644 | 000705 | | | | BR | ROT0 | |
| 1312 | 004646 | 013737 | 005044 | 005040 | ROT61 | MOV | RSLNFL,LINFLG | ISET UP LINE FLG. |
| 1313 | 004650 | 013737 | 005036 | 005032 | | MOV | RSSGFL,SEGFLG | ISET UP SEG. FLG. |
| 1314 | 004662 | 004537 | 006632 | | | JSR | RS,PRTH | ICHECK PRINTIME |
| 1315 | 004666 | 000406 | | | | BR | ROT6X | ITIME OK |
| 1316 | 004670 | | | | | ERROR | \N | |
| 1317 | 004670 | 012737 | 000053 | 001050 | ERR531 | MOV 053, | ERCOUNT | ISET UP ERROR COUNT 53 |
| 1318 | | 000054 | | | | NON+1 | | |
| 1319 | 004676 | 004537 | 007152 | | | JSR | RS,STAER | I PRINT TIME TOO LONG |
| 1320 | 004702 | 000000 | | | | MALT | | |
| 1321 | 004704 | 005777 | 174070 | | ROT6X1 | TST | 0LPS | ICHECK FOR ERROR |
| 1322 | 004710 | 100006 | | | | BPL | ROT6X1 | I BRANCH IF NO ERROR |
| 1323 | 004712 | | | | | ERROR | \N | |
| 1324 | 004712 | 012737 | 000054 | 001050 | ERR541 | MOV 054, | ERCOUNT | ISET UP ERROR COUNT 54 |
| 1325 | | 000055 | | | | NON+1 | | |
| 1326 | 004720 | 004537 | 007152 | | | JSR | RS,STAER | I REPORT PRINTER ERROR |
| 1327 | 004724 | 000000 | | | | MALT | | |
| 1328 | 004726 | 105777 | 174046 | | ROT6X11 | TSTB | 0LPS | ITEST FOR READY |
| 1329 | 004732 | 100406 | | | | BMI | ROT6X2 | I BRANCH IF READY |
| 1330 | 004734 | | | | | ERROR | \N | |
| 1331 | 004734 | 012737 | 000055 | 001050 | ERR551 | MOV 055, | ERCOUNT | ISET UP ERROR COUNT 55 |
| 1332 | | 000056 | | | | NON+1 | | |
| 1333 | 004742 | 004537 | 007152 | | | JSR | RS,STAER | I REPORT PRINTER NOT READY |
| 1334 | 004746 | 000000 | | | | MALT | | |
| 1335 | 004750 | 012777 | 000012 | 174024 | ROT6X21 | MOV | 012,0LPB | ISSUE LINE FEED |
| 1336 | 004756 | 004537 | 006642 | | | JSR | RS,SLWTIM | ICHECK BLEW TIME |
| 1337 | 004762 | 000406 | | | | BR | ROT6X3 | ISLEW OK |
| 1338 | 004764 | | | | | ERROR | \N | |
| 1339 | 004764 | 012737 | 000056 | 001050 | ERR561 | MOV 056, | ERCOUNT | ISET UP ERROR COUNT 56 |
| 1340 | | 000057 | | | | NON+1 | | |
| 1341 | 004772 | 004537 | 007152 | | | JSR | RS,STAER | I REPORT BLEW TOOK TOO LONG |

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|------|--------|--------|--------|--------|--------|------------------------|---------------|--|------------------------------|
| 1342 | 004776 | 000000 | | | | HALT | | | |
| 1343 | 005000 | 005237 | 005046 | | | ROT6X3: INC | STRCHR | | I=1 START CHAR. |
| 1344 | 005004 | 005237 | 005250 | | | INC | STRCNT | | I=1 CTR. CHAR. CNT. |
| 1345 | 005010 | 001402 | | | | BEG | .+6 | | |
| 1346 | 005012 | 000137 | 004374 | | | JMP | ROT11 | | INO ROLL OVER |
| 1347 | 005016 | 032777 | 010000 | 173760 | | BIT | 0BIT12,08HR | | ILOOP ON TEST |
| 1348 | 005024 | 001412 | | | | BEG | TST6 | | INO DO NOT LOOP |
| 1349 | 005026 | 000137 | 004340 | | | JMP | ROT3 | | |
| 1350 | | | | | | | | | |
| 1351 | | | | | | | | | |
| 1352 | 005032 | 004410 | | | | SEGF16: ROT1 | | | |
| 1353 | 005034 | 004470 | | | | STRGFL: ROT2 | | | |
| 1354 | 005036 | 004410 | | | | RSSGFL: ROT1 | | | |
| 1355 | 005040 | 004464 | | | | LINFLG: ROT5 | | | |
| 1356 | 005042 | 004464 | | | | STLNFL: ROT6 | | | |
| 1357 | 005244 | 004464 | | | | RBLNFL: ROT5 | | | |
| 1358 | 005046 | 000000 | | | | STRCHR: 0 | | | |
| 1359 | 005050 | 000000 | | | | STRCNT: 0 | | | |
| 1360 | | | | | | | | | |
| 1361 | | | | | | | | | |
| 1362 | | | | | | I TEST 4 | | | |
| 1363 | | | | | | I DOUBLE WEDGE PATTERN | | | |
| 1364 | | | | | | | | | |
| 1365 | 005252 | 012737 | 000077 | 001026 | | TST6: MOV | 077,CHRGEN | | I FETCH? |
| 1366 | 005060 | 004737 | 006566 | | | JBR | 27,SIZE | | |
| 1367 | 005064 | 032777 | 040000 | 173712 | | BIT | 0BIT14,08HR | | |
| 1368 | 005072 | 001404 | | | | BEG | X66X | | |
| 1369 | 005074 | 012737 | 177574 | 006106 | | MOV | 0-132,,T6LNLC | | |
| 1370 | 005102 | 000403 | | | | BR | .+10 | | |
| 1371 | 005104 | 012737 | 177660 | 006106 | X66X: | MOV | 0-00,,T6LNLC | | |
| 1372 | 005112 | 013737 | 006106 | 006102 | | MOV | T6LNLC,T6LNCT | | |
| 1373 | 005120 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | | ISET UP SEGMENT CNT |
| 1374 | 005126 | 013737 | 001052 | 001030 | | MOV | WIDTH,LINCNT | | ISET UP LINE CNT |
| 1375 | 005134 | 005777 | 173640 | | T61: | TST | 0LPS | | I TEST FOR ERROR |
| 1376 | 005140 | 100006 | | | | BPL | T61Z | | I BRANCH IF NO ERROR |
| 1377 | 005142 | | | | | ERROR | \N | | |
| 1378 | 005142 | 012737 | 000057 | 001050 | ERR57: | MOV 057, | ERCOUNT | | ISET UP ERROR COUNT 57 |
| 1379 | | 000060 | | | | NON+1 | | | |
| 1380 | 005150 | 004537 | 007152 | | | JBR | 25,STAER | | I REPORT PRINTED ERROR |
| 1381 | 005154 | 000000 | | | | HALT | | | |
| 1382 | 005156 | 013777 | 001026 | 173616 | T61Z: | MOV | CHRGEN,0LPS | | I LOAD CHAR. |
| 1383 | 005164 | 005237 | 001022 | | | INC | SEGCNT | | I=1 SEGMENT CNT |
| 1384 | 005170 | 001013 | | | | BNE | T65 | | |
| 1385 | 005172 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | | I RESET SEGMENT COUNT |
| 1386 | 005200 | 004537 | 006632 | | | JBR | 25,PRYTM | | I CHECK PRINT TIME |
| 1387 | 005204 | 000405 | | | | BR | T65 | | I PRINT TIME OK |
| 1388 | 005206 | | | | | ERROR | \N | | |
| 1389 | 005206 | 012737 | 000060 | 001050 | ERR60: | MOV 060, | ERCOUNT | | ISET UP ERROR COUNT 60 |
| 1390 | | 000061 | | | | NON+1 | | | |
| 1391 | 005214 | 004537 | 007152 | | | JBR | 25,STAER | | I REPORT PRINT TIME TOO LONG |
| 1392 | 005220 | 005237 | 006102 | | T65: | INC | T6LNCT | | |
| 1393 | 005224 | 001343 | | | | BNE | T61 | | |
| 1394 | 005226 | 005777 | 173546 | | | TST | 0LPS | | I TEST FOR ERROR |
| 1395 | 005232 | 100006 | | | | BPL | T65X | | I BRANCH IF NO ERROR |

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|------|--------|--------|--------|--------|--------|-------|---------------|---------|-----------------------------|
| 1396 | 005234 | | | | | ERROR | \N | | |
| 1397 | 005234 | 012737 | 000061 | 001050 | ERR61: | MOV | 061, | ERCOUNT | ISET UP ERROR COUNT 61 |
| 1398 | | 000062 | | | | NON+1 | | | |
| 1399 | 005242 | 004537 | 007152 | | | JSR | X5,STAER | | IREPORT PRINTER ERROR |
| 1400 | 005246 | 000000 | | | | HALT | | | |
| 1401 | 005250 | 012777 | 000012 | 173524 | T65X1 | MOV | 012,0LPB | | IISSUE LINE FEED |
| 1402 | 005256 | 004537 | 006642 | | | JSR | X5,0LWTIM | | ICHECK SLEW TIME |
| 1403 | 005262 | 000406 | | | | BR | T65Z | | I BRANCH IF TIME OK |
| 1404 | 005264 | | | | | ERROR | \N | | |
| 1405 | 005264 | 012737 | 000062 | 001050 | ERR62: | MOV | 062, | ERCOUNT | ISET UP ERROR COUNT 62 |
| 1406 | | 000063 | | | | NON+1 | | | |
| 1407 | 005272 | 004537 | 007152 | | | JSR | X5,STAER | | IREPORT SLEW TIME TOO LONG |
| 1408 | 005276 | 000000 | | | | HALT | | | |
| 1409 | 005300 | 013737 | 001054 | 001022 | T65Z: | MOV | SEGMNT,SEGCNT | | I RESET SEGMENT CNT |
| 1410 | 005306 | 005237 | 006106 | | | INC | T6LNL6 | | I+1 LINE LENGTH |
| 1411 | 005312 | 001405 | | | | BEG | T6PT2 | | |
| 1412 | 005314 | 013737 | 006106 | 006102 | | MOV | T6LNL6,T6LNCT | | ISET UP NEW LINE CNT |
| 1413 | 005322 | 000137 | 005134 | | | JMP | T61 | | |
| 1414 | | | | | | | | | |
| 1415 | | | | | | | | | |
| 1416 | 005326 | 032777 | 040000 | 173450 | T6PT2: | BIT | 0BIT14,08HR | | |
| 1417 | 005334 | 001404 | | | | BEG | X00X | | |
| 1418 | 005336 | 012737 | 177974 | 001032 | | MOV | 0-132,,CYCCNT | | |
| 1419 | 005344 | 000403 | | | | BR | X00X+6 | | |
| 1420 | 005346 | 012737 | 177660 | 001032 | X00X: | MOV | 0-00,,CYCCNT | | I PRESET CYCLE COUNT |
| 1421 | 005354 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | | ISET UP SEG. COUNT |
| 1422 | 005362 | 013737 | 001052 | 001030 | | MOV | WIDTH,LINCNT | | ISET UP LINE COUNT |
| 1423 | 005370 | 005777 | 173404 | | T66: | TST | 0LPB | | ICHECK FOR ERROR |
| 1424 | 005374 | 100006 | | | | BPL | T66X | | I BRANCH IF NO ERROR |
| 1425 | 005376 | | | | | ERROR | \N | | |
| 1426 | 005376 | 012737 | 000063 | 001050 | ERR63: | MOV | 063, | ERCOUNT | ISET UP ERROR COUNT 63 |
| 1427 | | 000064 | | | | NON+1 | | | |
| 1428 | 005404 | 004537 | 007152 | | | JSR | X5,STAER | | IREPORT PRINTER ERROR |
| 1429 | 005410 | 000000 | | | | HALT | | | |
| 1430 | 005412 | 105777 | 173362 | | T66X: | TSTB | 0LPB | | ITEST FOR READY |
| 1431 | 005416 | 100406 | | | | BMI | T66Z | | I BRANCH IF READY |
| 1432 | 005420 | | | | | ERROR | \N | | |
| 1433 | 005420 | 012737 | 000064 | 001050 | ERR64: | MOV | 064, | ERCOUNT | ISET UP ERROR COUNT 64 |
| 1434 | | 000065 | | | | NON+1 | | | |
| 1435 | 005426 | 004537 | 007152 | | | JSR | X5,STAER | | IREPORT PRINTER NOT READY |
| 1436 | 005432 | 000000 | | | | HALT | | | |
| 1437 | 005434 | 013777 | 001026 | 173340 | T66Z: | MOV | CHRGEN,0LPB | | ILOAD CHARACTER |
| 1438 | 005442 | 005237 | 001022 | | | INC | SEGCNT | | I+1 SEG. CNT |
| 1439 | 005446 | 001350 | | | | BNE | T66 | | ILOAD NEXT CHARACTER |
| 1440 | 005450 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | | I RESET SEG. CNT |
| 1441 | 005456 | 004537 | 006632 | | | JSR | X5,PRYTM | | ICHECK PRINT TIME |
| 1442 | 005462 | 000406 | | | | BR | T66Z: | | ITIME OK |
| 1443 | 005464 | | | | | ERROR | \N | | |
| 1444 | 005464 | 012737 | 000065 | 001050 | ERR65: | MOV | 065, | ERCOUNT | ISET UP ERROR COUNT 65 |
| 1445 | | 000066 | | | | NON+1 | | | |
| 1446 | 005472 | 004537 | 007152 | | | JSR | X5,STAER | | IREPORT PRINT TIME TOO LONG |
| 1447 | 005476 | 000000 | | | | HALT | | | |
| 1448 | 005500 | 005237 | 001030 | | T66Z1: | INC | LINCNT | | I+1 LINE COUNT |
| 1449 | 005504 | 001414 | | | | BEG | T66Z1X | | |

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|------|--------|--------|--------|--------|---------|----------|---------------|-----------------------------|
| 1450 | 005506 | 032777 | 040000 | 173270 | | BIT | 00IT14,08HR | |
| 1451 | 005514 | 001729 | | | | BEQ | T66 | |
| 1452 | 005516 | 022737 | 177777 | 001030 | | CMP | 0-1,LINCNT | |
| 1453 | 005524 | 001321 | | | | BNE | T66 | |
| 1454 | 005526 | 012737 | 177764 | 001022 | | MOV | 0-12,,SEGCNT | |
| 1455 | 005534 | 000715 | | | | BR | T66 | |
| 1456 | 005536 | 013737 | 001052 | 001030 | T66Z1X1 | MOV | WIDTH,LINCNT | I RESET LINE COUNT |
| 1457 | 005544 | 005777 | 173230 | | | TST | 0LPS | I CHECK FOR ERROR |
| 1458 | 005550 | 100006 | | | | BPL | T70 | I BRANCH IF NO ERROR |
| 1459 | 005552 | | | | | ERROR | \N | |
| 1460 | 005552 | 012737 | 000066 | 001050 | ERR661 | MOV #66, | ERCOUNT | I SET UP ERROR COUNT 66 |
| 1461 | | 000067 | | | | NON+1 | | |
| 1462 | 005560 | 004537 | 007152 | | | JBR | Z5,STAER | I REPORT PRINTER ERROR |
| 1463 | 005564 | 000000 | | | | HALT | | |
| 1464 | 005566 | 105777 | 173206 | | T701 | TSTB | 0LPS | I TEST FOR READY |
| 1465 | 005572 | 100406 | | | | BHI | T70X | I BRANCH IF READY |
| 1466 | 005574 | | | | | ERROR | \N | |
| 1467 | 005574 | 012737 | 000067 | 001050 | ERR671 | MOV #67, | ERCOUNT | I SET UP ERROR COUNT 67 |
| 1468 | | 000070 | | | | NON+1 | | |
| 1469 | 005602 | 004537 | 007152 | | | JBR | Z5,STAER | I REPORT PRINTER NOT READY |
| 1470 | 005606 | 000000 | | | | HALT | | |
| 1471 | 005610 | 012777 | 000012 | 173164 | T70X1 | MOV | 012,0LPS | I ISSUE LINE FEED |
| 1472 | 005616 | 004537 | 006642 | | | JBR | Z5,SLWTIM | I CHECK SLEW TIME |
| 1473 | 005622 | 000406 | | | | BR | T71 | |
| 1474 | 005624 | | | | | ERROR | \N | |
| 1475 | 005624 | 012737 | 000070 | 001050 | ERR701 | MOV #70, | ERCOUNT | I SET UP ERROR COUNT 70 |
| 1476 | | 000071 | | | | NON+1 | | |
| 1477 | 005632 | 004537 | 007152 | | | JBR | Z5,STAER | I REPORT SLEW TOOK TOO LONG |
| 1478 | 005636 | 000000 | | | | HALT | | |
| 1479 | 005640 | 005237 | 001032 | | T711 | INC | CYCCNT | I +1 CYCLE COUNT |
| 1480 | 005644 | 001006 | | | | BNE | T72 | |
| 1481 | 005646 | 032777 | 010000 | 173130 | | BIT | 00IT12,08HR | I CHECK TO LOOP ON TEST |
| 1482 | 005654 | 001515 | | | | BEQ | NAMALN | I NO GO TO NEXT TEST |
| 1483 | 005656 | 000137 | 005052 | | | JMP | T8T6 | I LOOP ON TEST |
| 1484 | 005662 | 013737 | 001054 | 001022 | T721 | MOV | SEGMNT,SEGCNT | |
| 1485 | 005670 | 032777 | 040000 | 173106 | | BIT | 00IT14,08HR | |
| 1486 | 005676 | 001404 | | | | BEQ | T72X | |
| 1487 | 005700 | 012737 | 000204 | 006104 | | MOV | 0132,,T6SPCT | |
| 1488 | 005706 | 000403 | | | | BR | +10 | |
| 1489 | 005710 | 012737 | 000120 | 006104 | T72X1 | MOV | 000,,T6SPCT | I GET CYCLE COUNT AND |
| 1490 | 005716 | 063737 | 001032 | 006104 | | ADD | CYCCNT,T6SPCT | I DERIVE SPACE COUNTER |
| 1491 | | | | | | | | |
| 1492 | 005724 | 005777 | 173050 | | T691 | TST | 0LPS | I TEST FOR ERROR |
| 1493 | 005730 | 100006 | | | | BPL | T69X | I BRANCH IF NO ERROR |
| 1494 | 005732 | | | | | ERROR | \N | |
| 1495 | 005732 | 012737 | 000071 | 001050 | ERR711 | MOV #71, | ERCOUNT | I SET UP ERROR COUNT 71 |
| 1496 | | 000072 | | | | NON+1 | | |
| 1497 | 005740 | 004537 | 007152 | | | JBR | Z5,STAER | I REPORT PRINTER ERROR |
| 1498 | 005744 | 000000 | | | | HALT | | |
| 1499 | 005746 | 105777 | 173026 | | T69X1 | TSTB | 0LPS | I TEST FOR READY |
| 1500 | 005752 | 100406 | | | | BHI | T69Z | I BRANCH IF READY |
| 1501 | 005754 | | | | | ERROR | \N | |
| 1502 | 005754 | 012737 | 000072 | 001050 | ERR721 | MOV #72, | ERCOUNT | I SET UP ERROR COUNT 72 |
| 1503 | | 000073 | | | | NON+1 | | |

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|------|--------|--------|--------|--------|-------------------|----------|---------------|-----------------------------|
| 1504 | 005762 | 004537 | 007152 | | JSR | Z5,STAER | | IREPORT PRINTER NOT READY |
| 1505 | 005766 | 000000 | | | HALT | | | |
| 1506 | 005770 | 012777 | 000040 | 173004 | T60Z1 | MOV | 040,0LPB | ILOAD SPACE |
| 1507 | 005776 | 005237 | 001022 | | | INC | SEGCNT | |
| 1508 | 006002 | 001032 | | | | BNE | T60X | |
| 1509 | 006004 | 013737 | 001054 | 001022 | | MOV | SEGMNT,SEGCNT | |
| 1510 | 006012 | 004537 | 006632 | | JSR | Z5,PRYTM | | I CHECK PRINT TIME |
| 1511 | 006016 | 020406 | | | BR | T60 | | I PRINT TIME OK |
| 1512 | 006020 | | | | ERROR | \N | | |
| 1513 | 006020 | 012737 | 000073 | 001050 | ERR731 | MOV #73, | ERCOUNT | ISET UP ERROR COUNT 73 |
| 1514 | | 000074 | | | | N=N+1 | | |
| 1515 | 006026 | 004537 | 007152 | | JSR | Z5,STAER | | IREPORT PRINT TIME TOO LONG |
| 1516 | 006032 | 000000 | | | HALT | | | |
| 1517 | 006034 | 005237 | 001030 | | T601 | INC | LINCNT | |
| 1518 | 006040 | 001416 | | | | BEQ | T60Z | |
| 1519 | 006042 | 032777 | 040000 | 172734 | | BIT | 0BIT14,0SWR | |
| 1520 | 006050 | 001407 | | | | BEQ | T60X | |
| 1521 | 006052 | 022737 | 177777 | 001030 | | CMR | 0-1,LINCNT | |
| 1522 | 006060 | 001003 | | | | BNE | T60X | |
| 1523 | 006062 | 012737 | 177764 | 001022 | | MOV | 0-12,,SEGCNT | |
| 1524 | 006070 | 005337 | 006104 | | T60X1 | DEC | T60PCT | |
| 1525 | 006074 | 001313 | | | | BNE | T60 | |
| 1526 | 006076 | 000137 | 005370 | | T60Z1 | JMP | T60 | |
| 1527 | 006102 | 000000 | | | T6LNCT1 | 0 | | |
| 1528 | 006104 | 000000 | | | T6SPCT1 | 0 | | |
| 1529 | 006106 | 000000 | | | T6LNLC1 | 0 | | |
| 1530 | | | | | | | | |
| 1531 | | | | | I | | | |
| 1532 | | | | | I | | | |
| 1533 | | | | | I | | | |
| 1534 | | | | | IHAMMER ALIGNMENT | | | |
| 1535 | | | | | I | | | |
| 1536 | 006110 | 012737 | 177702 | 006252 | HAMALN1 | MOV | 0-76,HAMCNT | ISET UP FOR 63 LINES |
| 1537 | 006116 | 032777 | 040000 | 172660 | HAMIX1 | BIT | 0BIT14,0SWR | |
| 1538 | 006124 | 001404 | | | | BEQ | HAM1 | |
| 1539 | 006126 | 012737 | 177574 | 001030 | | MOV | 0-132,,LINCNT | |
| 1540 | 006134 | 000403 | | | | BR | HAM2 | |
| 1541 | 006136 | 012737 | 177660 | 001030 | HAM11 | MOV | 0-80,,LINCNT | ISET UP LINE COUNT |
| 1542 | 006144 | 005777 | 172630 | | HAM21 | TST | 0LPS | I CHECK FOR ERROR |
| 1543 | 006150 | 100006 | | | | BPL | XHAM1 | I BRANCH IF NO ERROR |
| 1544 | 006152 | | | | | ERROR | \N | |
| 1545 | 006152 | 012737 | 000074 | 001050 | ERR741 | MOV #74, | ERCOUNT | ISET UP ERROR COUNT 74 |
| 1546 | | 000075 | | | | N=N+1 | | |
| 1547 | 006160 | 004537 | 007152 | | JSR | Z5,STAER | | IREPORT ERROR OCCURRED |
| 1548 | 006164 | 000000 | | | HALT | | | |
| 1549 | 006166 | 105777 | 172606 | | XHAM11 | TSTB | 0LPS | I CHECK FOR READY |
| 1550 | 006172 | 100375 | | | | BPL | 0-4 | |
| 1551 | 006174 | 012777 | 000105 | 172600 | XHAMIX1 | MOV | 0105,0LPB | I TRANSMIT E TO PRINTER |
| 1552 | 006202 | 005237 | 001030 | | | INC | LINCNT | I+1 LINE COUNT |
| 1553 | 006206 | 001356 | | | | BNE | HAM2 | I TRANSMIT ANOTHER CHAR. |
| 1554 | 006210 | 105777 | 172564 | | | TSTB | 0LPS | |
| 1555 | 006214 | 100375 | | | | BPL | 0-4 | |
| 1556 | 006216 | 012777 | 000012 | 172556 | | MOV | 012,0LPB | I TRANSMIT LINE FEED |
| 1557 | 006224 | 105777 | 172550 | | | TSTB | 0LPS | I TEST FOR READY |

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1558 006230 100375          SPL      0=4          IWAIT FOR READY
1559 006232 005237 006252  INC      MAMCNT          I+1 COUNT
1560
1561 006236 001327          BNE      MAMIX          IGO DO NEXT LINE
1562 006240 032777 010000 172536  BIT      @BIT12,@SWR    ICHECK TO LOOP ON TEST
1563 006246 001320          BNE      MAMALN         ILOOP ON TEST
1564 006250 000401          BR
1565 006252 000000          MAMCNT: 0
1566
1567
1568
1569
1570
1571 006254 012737 006454 006450  SLWTST: MOV      @TABSTR,@BPTR  IPRESET LINE COUNT
1572 006262 032777 040000 172514  SLWIX:  BIT      @BIT14,@SWR
1573 006270 001404          BEQ
1574 006272 012737 177574 001030  MOV      0-132.,LINCNT
1575 006300 000403          BR      SLW1
1576 006302 012737 177660 001030  MOV      0=80.,LINCNT  ISET UP LINE LENGTH
1577 006310 012777 000105 172464  SLW1:  MOV      @105,@LPB  ILOAD CHARACTER "E"
1578 006316 005777 172456          TST      @LPB          ITEST FOR ERROR
1579 006322 100203          BPL      XSLW1         IBRANCH IF NO ERROR
1580 006324          ERROR      \N          IAN ERROR OCCURRED
1581 006324 012737 000075 001050  ERR75:  MOV      @75,      ERCOUNT  ISET UP ERROR COUNT 75
1582          000076
1583 006332 105777 172442          XSLW1:  TSTR      @LPB          ITEST FOR READY
1584 006336 100367          BPL      SLW1+6        IBRANCH BACK NOT READY
1585 006340 005237 001030          INC      LINCNT        I+1 LINE COUNT
1586 006344 001361          BNE      SLW1
1587 006346 017737 000076 006452  MOV      @BPTR,SLWCNT  ISET UP SLEW CNT
1588 006350 012777 000012 172420  SLEW:  MOV      @12,@LPB  IISSUE LINE FEED
1589 006362 105777 172412          TSTR      @LPB          ITEST FOR READY
1590 006366 100375          BPL      0=4
1591 006370 005237 006452          INC      SLWCNT
1592 006374 001367          BNE      SLEW          IISSUE NEXT SLEW
1593 006376 023727 006450 006500  CMP      @BPTR,@TABEND I
1594 006404 001015          BNE      INCSLW
1595 006406 032777 010000 172370  BIT      @BIT12,@SWR    ICHECK TO LOOP ON TEST
1596 006414 001317          BNE      SLWTST        IYES LOOP ON TEST
1597 006416 013700 000042          MOV      @042,@0
1598 006422 001404          BEQ      INCSLW-4
1599 006424 004710          LOGICAL:JSR      @7,(0)
1600          NOP
1601          NOP
1602          NOP
1603 006434 000137 001316          JMP
1604 006440 062737 000002 006450  INCSLW: ADD      @2,@BPTR    IRECYCLE TEST
1605 006446 000705          BR      SLWIX          ISET UP NEW SLEW CNT
1606
1607
1608          TOPTR: 0
1609          SLWCNT: 0
1610 006454 177775          TABSTR: -3
1611 006456 177776          -2
1612
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|------|--------|--------|--------|--------|--|------|---------------|--|--|---------------------------------|
| 1612 | 006460 | 177766 | | | | -12 | | | | ISLEN 12 LINES |
| 1613 | 006462 | 177762 | | | | -16 | | | | ISLEN 16 LINES |
| 1614 | 006464 | 177772 | | | | -6 | | | | ISLEN 6 LINES |
| 1615 | 006466 | 177775 | | | | -3 | | | | ISLEN 3 LINES |
| 1616 | 006470 | 177770 | | | | -10 | | | | ISLEN 10 LINES |
| 1617 | 006472 | 177774 | | | | -4 | | | | ISLEN 4 LINES |
| 1618 | 006474 | 177773 | | | | -5 | | | | ISLEN 5 LINES |
| 1619 | 006476 | 177773 | | | | -5 | | | | ISLEN 5 LINES |
| 1620 | 006500 | 177775 | | | TABEND1 | -3 | | | | ISLEN 3 LINES |
| 1621 | | | | | / | | | | | |
| 1622 | | | | | / | | | | | |
| 1623 | | | | | / | | | | | |
| 1624 | 006502 | 013737 | 006556 | 006564 | FRPTIM: | MOV | FFTIMU,FFCNT2 | | | ISSET UP TIMER ASSUME /9INC/SEC |
| 1625 | 006510 | 013737 | 006560 | 006562 | | MOV | FFTIML,FFCNT1 | | | |
| 1626 | 006516 | 185777 | 172256 | | FFRDY: | TSTB | OLPS | | | ISTEST FOR READY |
| 1627 | 006522 | 100001 | | | | SPL | ,00 | | | IPRINTER NOT READY |
| 1628 | 006524 | 000205 | | | | RTS | %5 | | | IEXIT HERE IF READY %5 |
| 1629 | 006526 | 005237 | 006562 | | | INC | FFCNT1 | | | |
| 1630 | 006532 | 001371 | | | | BNE | FFRDY | | | |
| 1631 | 006534 | 013737 | 006560 | 006562 | | MOV | FFTIML,FFCNT1 | | | |
| 1632 | 006542 | 005237 | 006564 | | | INC | FFCNT2 | | | |
| 1633 | 006546 | 001363 | | | | BNE | FFRDY | | | |
| 1634 | 006550 | 062705 | 000002 | | | ADD | 02,%5 | | | IEXIT TIME TOO LONG |
| 1635 | 006554 | 000205 | | | | RTS | %5 | | | |
| 1636 | | | | | / | | | | | |
| 1637 | 006556 | 177210 | | | FFTIMU: | -570 | | | | |
| 1638 | 006560 | 177210 | | | FFTIML: | -570 | | | | |
| 1639 | 006562 | 000000 | | | FFCNT1: | 0 | | | | |
| 1640 | 006564 | 000000 | | | FFCNT2: | 0 | | | | |
| 1641 | | | | | / | | | | | |
| 1642 | 006566 | 032777 | 040000 | 172210 | SIZE: | BIT | 0BIT14,0SWR | | | |
| 1643 | 006574 | 001407 | | | | SEQ | COL00 | | | |
| 1644 | 006576 | 012737 | 177750 | 001054 | | MOV | 0-24,,SEGMNT | | | |
| 1645 | 006604 | 012737 | 177772 | 001052 | | MOV | 0-6,WIDTH | | | |
| 1646 | 006612 | 000207 | | | | RTS | %7 | | | |
| 1647 | 006614 | 012737 | 177754 | 001054 | COL00: | MOV | 0-20,,SEGMNT | | | |
| 1648 | 006622 | 012737 | 177774 | 001052 | | MOV | 0-4,WIDTH | | | |
| 1649 | 006630 | 000207 | | | | RTS | %7 | | | |
| 1650 | | | | | / | | | | | |
| 1651 | | | | | / | | | | | |
| 1652 | | | | | IMISC. ROUTINE | | | | | |
| 1653 | | | | | WAIT 144 MSEC. FOR CHARACTER TO BE PRINTED | | | | | |
| 1654 | | | | | WAIT 136 MSEC FOR SLEN TO BE EXECUTED | | | | | |
| 1655 | | | | | / | | | | | |
| 1656 | 006632 | 012737 | 140000 | 001044 | PRTTM: | MOV | 0140000,WORK | | | ISSET UP FOR 144 MSEC COUNT |
| 1657 | 006640 | 000403 | | | | BR | PTIMU | | | |
| 1658 | 006642 | 012737 | 140000 | 001044 | SLWTM: | MOV | 0140000,WORK | | | ISSET UP FOR 136 MSEC COUNT |
| 1659 | 006650 | 005777 | 172124 | | PTIMU: | TST | OLPS | | | IS THERE AN ERROR |
| 1660 | 006654 | 100406 | | | | BMI | PITML | | | IBRANCH IF ERROR |
| 1661 | 006656 | 185777 | 172116 | | | TSTB | OLPS | | | ISTEST FOR READY COND. |
| 1662 | 006662 | 100405 | | | | BMI | PTIML | | | IBRANCH IF READY |
| 1663 | 006664 | 005237 | 001044 | | | INC | WORK | | | IWAIT FOR FLAG |
| 1664 | 006670 | 001367 | | | | BNE | PTIMU | | | IND FLAG WAIT |
| 1665 | 006672 | 062705 | 000202 | | PITML: | ADD | 02,%5 | | | ISSET UP FOR ERROR REPORT |

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1666 006676 000205          PTIML: RTS      X5          )EXIT
1667                               )
1668                               )
1669                               )
1670                               )
1671                               )
1672                               )ROUTINE TO INITIALIZE PRINTER
1673                               )ENTER FROM JSR X5, PRTINT
1674                               )
1675 006700 105777 172074    PRTINT: TSTB     0LPS          )TEST FOR READY
1676 006704 100403          BMI      ROYOK          )READY SET OK
1677 006706 062705 000002    ADD      02,X5          )SET UP FOR ERROR REPORT
1678 006712 000205          RTS      X5          )REPORT READY NOT SET
1679 006714 012777 000014 172060 ROYOK: MOV      014,0LPS        )ISSUE FOR FEED
1680 006722 105777 172052    TSTB     0LPS          )TEST FOR READY NOT SET
1681 006726 100003          SPL      NTRDY          )READY NOT SET OK
1682 006730 062705 000012    ADD      012,X5          )SET UP FOR REPORT
1683 006734 000205          RTS      X5          )EXIT AND REPORT
1684 006736 105777 172036    NTRDY: TSTB     0LPS          )
1685 006742 100375          SPL      -4          )TEST FOR RDY SET
1686 006744 000205          RTS      X5          )READY SET EXIT
1687                               )
1688                               )
1689                               )
1690                               )
1691                               )
1692                               )
1693                               )SUBROUTINE TO OUTPUT ASCII MESSAGES ON TELETYPE PRINTER
1694                               )
1695 006746 011600          TYP:   MOV      0X6,X0          )GET ADDR. THAT CONTAINS MESS.
1696 006750 062716 000002    ADD      02,0X6          )SET UP EXIT
1697 006754 011000          MOV      0X0,X0          )ADDRESS OF MESSAGE IN R0
1698                               )
1699 006756 112037 007066    TYPAL: MOVB    (0)+,TYPDAT    )GET CHARACTER
1700 006762 122737 000100 007066    CMPB    0100,TYPDAT        )CHECK FOR "0" CHARACTER
1701 006770 001001          BNE     TYPC              )BRANCH IF NOT "0"
1702 006772 000002          RTI                      )BYTE EQUALD "0" EXIT
1703 006774 122737 000045 007066    TYPCL: CMPB    045,TYPDAT    )CHECK FOR "X"
1704 007002 001416          BEQ    TYPF              )BRANCH IF "X"
1705 007004 122737 000042 007066    TYPCL: CMPB    042,TYPDAT    )CHECK FOR "0"
1706 007012 001417          BEQ    TYPG              )BRANCH IF "0"
1707 007014 004737 007022          JSR    X7,TYPD           )TYPE CHARACTER IN TYPDAT
1708 007020 000756          BR     TYPA              )
1709 007022 113777 007066 171762    TYPDI: MOVB    TYPDAT,0TPB    )OUTPUT CHARACTER TO PRINTER
1710 007030 105777 171762          TSTB    0TPB             )WAIT FOR DONE FLAG
1711 007034 100375          SPL      -4              )
1712 007036 000207          RTS      X7              )CHAR. TYPED EXIT
1713 007040 112737 000015 007066    TYPFI: MOVB    015,TYPDAT    )OUTPUT CARRIAGE RETURN
1714 007046 004737 007022          JSR    X7,TYPD           )GO TYPE CHAR.
1715 007052 112737 000012 007066    TYPGI: MOVB    012,TYPDAT    )OUTPUT LINE FEED
1716 007060 004737 007022          JSR    X7,TYPD           )GO TYPE CHAR.
1717 007064 000734          BR     TYPA              )
1718 007066 000000          TYPDAT: 0                )
1719                               )

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1729 007670 013537 007150
1730 007074 012501
1731 007076 012502
1732 007100 060201
1733 007102 013703 007150
1734 007106 042703 177770
1735 007112 062703 000060
1736 007116 110341
1737 007120 000241
1738 007122 006037 007150
1739 007126 000241
1740 007130 006037 007150
1741 007134 000241
1742 007136 006037 007150
1743 007142 005302
1744 007144 001356
1745 007146 000205
1746
1747 007150 000000
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1756 007152 004537 007070
1757 007156 001050
1758 007160 007210
1759 007162 000003
1760 007164 104000
1761 007166 007206
1762 007170 104000
1763 007172 007210
1764 007174 005777 171604
1765 007200 100001
1766 007202 000000
1767 007204 000205
1768
007206 040045
007210 020040 020040 051105

/
/ROUTINE TO CONVERT OCTAL TO ASCII
/
/ENTER ROUTINE AS FOLLOWS
/ JBR X5,CONV
/XXXXXXXX=ADDRESS OF NUMBER TO BE CONVERTED
/XXXXXXXX=ADDRESS OF ASCII MESSAGE
/XXXXXXXX=NUMBER OF OCTAL NO.'S TO BE CONVERTED
/
CONV:  MOV 0(S)+,ACNVX /ADDRESS OF NO. TO BE CONVERTED
      MOV (S)+,X1 /ADDRESS OF MESSAGE
      MOV (S)+,X2 /NUMBER OF ASCII CHARACTERS
      ADD X2,X1
ACVX:  MOV ACNVX,X3 /ISOLATE LEAST SIGNIFICANT BIT
      BIC 0177770,X3
      ADD 000,X3 /SET UP ASCII CHARACTER
      MOVB X3,-(1) /STORE CHARACTER
      CLC
      ROR ACNVX
      CLC
      ROR ACNVX
      CLC
      ROR ACNVX
      DEC X2 /I-1 FROM ASCII CHAR. CNT
      ONE ACVN /CONVERT NEXT CHARACTER
      RTS X5 /EXIT! CONVERSION DONE

/
ACNVX: 0 /WORK REGISTER
/
/
/
/
/
/ROUTINE TO REPORT ERROR COUNT
/
STAER: JBR X5,CONV /CONVERT OCTAL TO ASCII
      ERCOUNT
      MED1
      3
      EMT *0 /PRINT MESSAGE
      MEDIA
      EMT *0
      MED1
      TST 08WR /TEST FOR HALT ON ERROR
      OPL *+4
      HALT
      RTS X5

MED1A: .ASCII /X0/
/
/
MED1: .ASCII / ERROR COUNT0/
/

```

```

/
/
/
007230 046445 044501 042116 MEB11 .ASCII /%MAINDEC-11-DZLPA-B LINE PRINTER TEST0/
/
007276 051045 051505 040524 MEB21 .ASCII /%RESTART ADDRESS 0000/
/
007323 045 047520 042527 MEB31 .ASCII /%POWER ON-TURN ON LINE0/
/
007352 047445 020116 044514 MEB41 .ASCII /%ON LINE OK-TRY TORN PAPER SWITCH0/
/
007414 042445 051122 051117 MEB51 .ASCII /%ERROR SET OK-TRY DRUM GATE SWITCH0/
/
007457 045 051105 047522 MEB61 .ASCII /%ERROR SET OK-TURN ON LINE 0/
/
/
/

```

LP11 SCOPE LOOP ROUTINE

!SET CHARACTER IN SWITCH REGISTER 5-0.

```

                                007514                                .EVEN
1769 007514 004737 006566                                SCOPE: JSR    E7,SIZE
1770 007520 017737 171260 001046                                MOV    08HR,SAVE          !FETCH SWITCHES
1771 007526 013737 001054 001022                                MOV    SEGMNT,SEGCNT
1772 007534 013737 001052 001030                                MOV    WIDTH,LINCNT
1773 007542 042737 177600 001046                                BIC    0177600,SAVE      !MASK CHARACTER
1774 007550 105777 171220                                LOLPX: TSTB  0LPS          !TEST FOR READY
1775 007554 100375                                BPL    .-4                !WAIT FOR READY
1776 007556 013777 001046 171216                                MOV    SAVE,0LPS         !LOAD PRINTER BUFFER
1777 007564 005777 171210                                TSTB  0LPS               !TEST FOR ERROR
1778 007570 100006                                BPL    LPSCOPE           !BRANCH IF NO ERROR
1779 007572                                ERROR  \N
1780 007572 012737 000076 001050 ERRY61 MOV    076,          ERCOUNT          !SET UP ERROR COUNT 76
1781                                MBR+1
1782 007600 004537 007152                                JSR    X5,STAER          !REPORT ERROR SET
1783 007604 000000                                HALT                    !OPERATOR MUST TAKE ACTION
1784 007606 005237 001022                                LPSCOPE: INC    SEGCNT
1785 007612 001356                                BNE    LOLPX
1786 007614 013737 001054 001022                                MOV    SEGMNT,SEGCNT
1787 007622 005237 001030                                INC    LINCNT
1788 007626 001414                                BEQ    LOSCOP
1789 007630 032777 040000 171146                                BIT    0BIT14,08HR
1790 007636 001744                                BEQ    LOLPX

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1791 007640 022737 177777 001030      CMP      0=1,LINCNT
1792 007646 001340                      BNE      LDLPX
1793 007650 012737 177764 001022      MOV      0-12.,SEGCNT
1794 007656 000734                      BR       LDLPX
1795 007660 013737 001052 001030  LOSCOPI MOV      WIDTH,LINCNT
1796 007666 012777 000012 171106      MOV      012,0LPB
1797 007674 105777 171100                      TSTB    0LPB          ;TEST FOR READY
1798 007700 100375                      BPL     .-4          ;WAIT FOR READY
1799 007702 017737 171076 007150  SRCHANI MOV      @BWR,ACNVX
1800 007710 042737 177600 007150      BIC     @177600,ACNVX
1801 007716 023737 007150 001046      CMP     ACNVX,SAVE   ;HAS BR CHANGED
1802 007724 001273                      BNE     SCOPE        ;NEW BR
1803 007726 000674                      BR      SCOPE+4     ;SR HAS NOT CHANGED
1804
1805
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1810          000001                      .END
  
```

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|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| ACNVX | 007150 | 17290 | 1733 | 17300 | 17400 | 17420 | 17470 | 17990 | 18000 | 1801 | | | | |
| ACVN | 007102 | 17330 | 1744 | | | | | | | | | | | |
| BIT0 | 000001 | 5540 | | | | | | | | | | | | |
| BIT1 | 000002 | 5530 | | | | | | | | | | | | |
| BIT10 | 002000 | 5440 | | | | | | | | | | | | |
| BIT11 | 004000 | 5430 | | | | | | | | | | | | |
| BIT12 | 010000 | 5420 | 920 | 1061 | 1150 | 1242 | 1347 | 1401 | 1562 | 1595 | | | | |
| BIT13 | 020000 | 5410 | 953 | 1175 | 1250 | 1306 | | | | | | | | |
| BIT14 | 040000 | 5400 | 574 | 737 | 912 | 966 | 1070 | 1195 | 1296 | 1367 | 1416 | 1450 | 1489 | 1519 |
| | | 1537 | 1572 | 1642 | 1709 | | | | | | | | | |
| BIT15 | 100000 | 5390 | | | | | | | | | | | | |
| BIT2 | 000004 | 5320 | | | | | | | | | | | | |
| BIT3 | 000010 | 5510 | | | | | | | | | | | | |
| BIT4 | 000020 | 5500 | | | | | | | | | | | | |
| BIT5 | 000040 | 5490 | | | | | | | | | | | | |
| BIT6 | 000100 | 5480 | | | | | | | | | | | | |
| BIT7 | 000200 | 5470 | | | | | | | | | | | | |
| BIT8 | 000400 | 5460 | | | | | | | | | | | | |
| BIT9 | 001000 | 5450 | | | | | | | | | | | | |
| CHARSW | 002414 | 8800 | 896 | 8970 | 9360 | 9420 | | | | | | | | |
| CHRCNT | 001024 | 6310 | 9640 | 10020 | 10130 | 10140 | 10150 | 10160 | 10360 | 11770 | 11790 | 12390 | 12650 | 12770 |
| | | 13000 | 13100 | | | | | | | | | | | |
| CHRGEN | 001026 | 6320 | 9630 | 973 | 10010 | 1025 | 10300 | 10390 | 1040 | 1042 | 1044 | 11010 | 1109 | 12300 |
| | | 12600 | 1273 | 12760 | 13050 | 13090 | 1302 | 1437 | | | | | | |
| COL00 | 006614 | 1643 | 16470 | | | | | | | | | | | |
| CONV | 007070 | 17290 | 1756 | | | | | | | | | | | |
| CYCCNT | 001032 | 6340 | 8050 | 9260 | 9550 | 9590 | 10500 | 10930 | 11190 | 11210 | 11440 | 14100 | 14200 | 14790 |
| | | 1490 | | | | | | | | | | | | |
| CYCYST | 003722 | 10900 | 1121 | 11430 | 1144 | 1145 | 11650 | | | | | | | |
| DISPLA | 001006 | 6090 | 6560 | | | | | | | | | | | |
| DISPRE | 000174 | 5770 | 656 | | | | | | | | | | | |
| ERCOUN | 001050 | 6410 | 6710 | 6790 | 6920 | 7020 | 7200 | 7300 | 7440 | 7510 | 7610 | 7750 | 7820 | 7870 |
| | | 7960 | 8070 | 8190 | 8470 | 8540 | 8620 | 8810 | 8920 | 9070 | 9230 | 9690 | 9800 | 9970 |
| | | 10000 | 10210 | 10320 | 10540 | 10060 | 10900 | 11250 | 11150 | 11390 | 11540 | 11850 | 12030 | 12120 |
| | | 12190 | 12260 | 12340 | 12690 | 12850 | 13170 | 13240 | 13310 | 13390 | 13700 | 13890 | 13970 | 14050 |
| | | 14260 | 14330 | 14440 | 14600 | 14670 | 14750 | 14950 | 15020 | 15130 | 15450 | 15810 | 1757 | 17800 |
| ERNO | 001034 | 6350 | | | | | | | | | | | | |
| ERRP | 001156 | 6710 | | | | | | | | | | | | |
| ERR1 | 001200 | 6790 | | | | | | | | | | | | |
| ERR10 | 001470 | 7610 | | | | | | | | | | | | |
| ERR11 | 001526 | 7750 | | | | | | | | | | | | |
| ERR12 | 001550 | 7820 | | | | | | | | | | | | |
| ERR13 | 001564 | 7870 | | | | | | | | | | | | |
| ERR14 | 001616 | 7960 | | | | | | | | | | | | |
| ERR15 | 001650 | 8070 | | | | | | | | | | | | |
| ERR16 | 001702 | 8190 | | | | | | | | | | | | |
| ERR17 | 001774 | 8470 | | | | | | | | | | | | |
| ERR2 | 001244 | 6920 | | | | | | | | | | | | |
| ERR20 | 002016 | 8540 | | | | | | | | | | | | |
| ERR21 | 002050 | 8670 | | | | | | | | | | | | |
| ERR22 | 002106 | 8810 | | | | | | | | | | | | |
| ERR23 | 002160 | 8920 | | | | | | | | | | | | |
| ERR24 | 002246 | 9070 | | | | | | | | | | | | |
| ERR25 | 002340 | 9230 | | | | | | | | | | | | |

| | | | | | |
|--------|--------|-------|-------|-------|-------|
| ERR26 | 002542 | 9690 | | | |
| ERR27 | 002606 | 9800 | | | |
| ERR3 | 001274 | 7020 | | | |
| ERR30 | 002700 | 9970 | | | |
| ERR31 | 002746 | 10000 | | | |
| ERR32 | 003022 | 10210 | | | |
| ERR33 | 003066 | 10320 | | | |
| ERR34 | 003170 | 10540 | | | |
| ERR35 | 003306 | 10860 | | | |
| ERR36 | 003366 | 10980 | | | |
| ERR37 | 003410 | 11050 | | | |
| ERR4 | 001326 | 7200 | | | |
| ERR40 | 003452 | 11150 | | | |
| ERR41 | 003600 | 11390 | | | |
| ERR42 | 003664 | 11540 | | | |
| ERR43 | 004014 | 11850 | | | |
| ERR44 | 004114 | 12030 | | | |
| ERR45 | 004144 | 12120 | | | |
| ERR46 | 004166 | 12190 | | | |
| ERR47 | 004210 | 12260 | | | |
| ERR5 | 001352 | 7300 | | | |
| ERR50 | 004240 | 12340 | | | |
| ERR51 | 004416 | 12690 | | | |
| ERR52 | 004504 | 12850 | | | |
| ERR53 | 004670 | 13170 | | | |
| ERR54 | 004712 | 13240 | | | |
| ERR55 | 004734 | 13310 | | | |
| ERR56 | 004764 | 13390 | | | |
| ERR57 | 005142 | 13700 | | | |
| ERR6 | 001416 | 7440 | | | |
| ERR60 | 005206 | 13800 | | | |
| ERR61 | 005234 | 13970 | | | |
| ERR62 | 005264 | 14050 | | | |
| ERR63 | 005376 | 14260 | | | |
| ERR64 | 005420 | 14330 | | | |
| ERR65 | 005464 | 14440 | | | |
| ERR66 | 005552 | 14600 | | | |
| ERR67 | 005574 | 14670 | | | |
| ERR7 | 001440 | 7510 | | | |
| ERR70 | 005624 | 14750 | | | |
| ERR71 | 005732 | 14950 | | | |
| ERR72 | 005754 | 15020 | | | |
| ERR73 | 006020 | 15130 | | | |
| ERR74 | 006152 | 15450 | | | |
| ERR75 | 006324 | 15810 | | | |
| ERR76 | 007572 | 17000 | | | |
| FFCNT1 | 006562 | 16250 | 16290 | 16310 | 16390 |
| FFCNT2 | 006564 | 16240 | 16320 | 16400 | |
| FPRDY | 006516 | 16260 | 1630 | 1633 | |
| FFTIML | 006560 | 1625 | 1631 | 16300 | |
| FFTIMU | 006556 | 1624 | 16370 | | |
| FORMP | 003300 | 1001 | 10030 | | |
| FRFTIN | 006502 | 1151 | 16240 | | |
| HAMALN | 006110 | 591 | 1482 | 15360 | 1563 |

M3

| | | | | | | | | | | | | | | |
|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| HAMCNT | 006252 | 1536 | 1559 | 1565 | | | | | | | | | | |
| HAM1 | 006136 | 1530 | 1541 | | | | | | | | | | | |
| HAM1X | 006116 | 1537 | 1561 | | | | | | | | | | | |
| HAM2 | 006144 | 1540 | 1542 | 1593 | | | | | | | | | | |
| MED1 | 007210 | 1750 | 1763 | 1760 | | | | | | | | | | |
| MEDIA | 007206 | 1761 | 1760 | | | | | | | | | | | |
| INCCY | 003466 | 1113 | 1119 | | | | | | | | | | | |
| INCLW | 006440 | 1596 | 1598 | 1604 | | | | | | | | | | |
| INTIC | 001740 | 770 | 832 | | | | | | | | | | | |
| INTID | 002064 | 842 | 869 | | | | | | | | | | | |
| LDCH | 003036 | 1019 | 1025 | | | | | | | | | | | |
| LDLPX | 007550 | 1774 | 1785 | 1790 | 1792 | 1794 | | | | | | | | |
| LEGCHR | 003236 | 957 | 961 | 964 | 1014 | 1067 | | | | | | | | |
| LINCNT | 001030 | 633 | 886 | 910 | 914 | 918 | 962 | 984 | 988 | 992 | 1100 | 1193 | 1197 | 1200 |
| | | 1255 | 1298 | 1298 | 1302 | 1374 | 1422 | 1448 | 1452 | 1456 | 1517 | 1521 | 1539 | 1541 |
| | | 1552 | 1574 | 1576 | 1585 | 1772 | 1787 | 1791 | 1795 | | | | | |
| LINFLB | 005040 | 1257 | 1279 | 1303 | 1312 | 1355 | | | | | | | | |
| LINPT | 004106 | 1196 | 1198 | 1200 | | | | | | | | | | |
| LOCA | 001040 | 637 | | | | | | | | | | | | |
| LOGICA | 006424 | 572 | 1599 | | | | | | | | | | | |
| LOSCOP | 007660 | 1788 | 1795 | | | | | | | | | | | |
| LPB | 001002 | 693 | 687 | 688 | 740 | 899 | 919 | 973 | 993 | 1004 | 1025 | 1050 | 1100 | 1125 |
| | | 1131 | 1135 | 1150 | 1189 | 1230 | 1273 | 1335 | 1382 | 1401 | 1437 | 1471 | 1506 | 1551 |
| | | 1556 | 1577 | 1580 | 1679 | 1776 | 1796 | | | | | | | |
| LPB | 001000 | 599 | 668 | 676 | 689 | 699 | 717 | 727 | 741 | 748 | 756 | 772 | 779 | 790 |
| | | 792 | 799 | 821 | 810 | 812 | 822 | 824 | 844 | 851 | 899 | 870 | 889 | 966 |
| | | 1010 | 1095 | 1192 | 1126 | 1182 | 1216 | 1223 | 1266 | 1321 | 1328 | 1375 | 1394 | 1423 |
| | | 1430 | 1457 | 1464 | 1492 | 1499 | 1542 | 1549 | 1554 | 1557 | 1578 | 1583 | 1589 | 1626 |
| | | 1659 | 1661 | 1675 | 1680 | 1684 | 1774 | 1777 | 1797 | | | | | |
| LPSCOP | 007606 | 1778 | 1784 | | | | | | | | | | | |
| LPST | 004270 | 1240 | 1242 | | | | | | | | | | | |
| LP77X | 003612 | 1137 | 1143 | | | | | | | | | | | |
| LP1 | 001432 | 742 | 748 | 759 | | | | | | | | | | |
| LP2 | 001454 | 749 | 756 | | | | | | | | | | | |
| LP20 | 002174 | 890 | 896 | | | | | | | | | | | |
| LP20X | 003204 | 1052 | 1050 | | | | | | | | | | | |
| LP2C | 002462 | 954 | 959 | | | | | | | | | | | |
| LP2E | 002556 | 967 | 973 | | | | | | | | | | | |
| LP2F | 002620 | 978 | 983 | | | | | | | | | | | |
| LP2H | 002762 | 1006 | 1012 | | | | | | | | | | | |
| LP3 | 001542 | 773 | 779 | | | | | | | | | | | |
| LP3X | 001564 | 780 | 786 | | | | | | | | | | | |
| LP4 | 002010 | 845 | 851 | | | | | | | | | | | |
| LP5 | 002032 | 852 | 858 | | | | | | | | | | | |
| LP5A | 002260 | 905 | 910 | | | | | | | | | | | |
| LP5B | 002352 | 921 | 926 | | | | | | | | | | | |
| ME81 | 007230 | 662 | 1768 | | | | | | | | | | | |
| ME82 | 007276 | 664 | 1768 | | | | | | | | | | | |
| ME83 | 007323 | 666 | 1768 | | | | | | | | | | | |
| ME84 | 007352 | 684 | 1768 | | | | | | | | | | | |
| ME85 | 007414 | 697 | 1768 | | | | | | | | | | | |
| ME86 | 007457 | 787 | 1768 | | | | | | | | | | | |
| N | 000077 | 617 | 678 | 672 | 678 | 688 | 691 | 693 | 701 | 703 | 719 | 721 | 729 | 731 |
| | | 743 | 745 | 750 | 752 | 760 | 762 | 774 | 776 | 781 | 783 | 786 | 788 | 798 |

| | | | | | | | | | | | | | | |
|---------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 7970 | 806 | 8080 | 810 | 8200 | 846 | 8480 | 853 | 8550 | 861 | 8630 | 880 | 8820 |
| | | 891 | 8930 | 906 | 9080 | 922 | 9240 | 968 | 9700 | 979 | 9810 | 996 | 9980 | 1007 |
| | | 10090 | 1020 | 10220 | 1031 | 10330 | 1053 | 10550 | 1085 | 10870 | 1097 | 10990 | 1104 | 11060 |
| | | 1114 | 11160 | 1130 | 11400 | 1153 | 11550 | 1184 | 11860 | 1202 | 12040 | 1211 | 12130 | 1218 |
| | | 12200 | 1229 | 12270 | 1233 | 12350 | 1268 | 12700 | 1284 | 12860 | 1316 | 13180 | 1323 | 13250 |
| | | 1330 | 13320 | 1330 | 13400 | 1377 | 13790 | 1388 | 13900 | 1396 | 13980 | 1404 | 14060 | 1423 |
| | | 14270 | 1432 | 14340 | 1443 | 14450 | 1459 | 14610 | 1466 | 14680 | 1474 | 14760 | 1494 | 14960 |
| | | 1501 | 15030 | 1512 | 15140 | 1544 | 15460 | 1580 | 15820 | 1779 | 17810 | | | |
| | | 9560 | 9600 | 983 | 10600 | | | | | | | | | |
| NOCHR8 | 003234 | | | | | | | | | | | | | |
| NOP | 000240 | 6160 | | | | | | | | | | | | |
| NTRDY | 006736 | 1601 | 16040 | | | | | | | | | | | |
| PC | 0000007 | 5360 | | | | | | | | | | | | |
| PHFLG | 003724 | 10910 | 1122 | 11230 | 11330 | 11660 | | | | | | | | |
| PITML | 006672 | 1660 | 16650 | | | | | | | | | | | |
| PRINT | 006780 | 870 | 1003 | 10750 | | | | | | | | | | |
| PRTM | 006632 | 904 | 977 | 1020 | 1112 | 1200 | 1209 | 1202 | 1314 | 1386 | 1441 | 1510 | 16560 | |
| PS | 001010 | 6100 | 7090 | 7900 | 8090 | 8210 | 8500 | | | | | | | |
| PTML | 006676 | 1662 | 16660 | | | | | | | | | | | |
| PTMU | 006650 | 1657 | 16590 | 1664 | | | | | | | | | | |
| RCHR8W | 002420 | 936 | 9440 | | | | | | | | | | | |
| RDYCK | 006714 | 1676 | 16790 | | | | | | | | | | | |
| REFIL | 002662 | 985 | 9920 | | | | | | | | | | | |
| ROTATE | 004304 | 509 | 12530 | | | | | | | | | | | |
| ROT1 | 004410 | 12660 | 1283 | 1352 | 1354 | | | | | | | | | |
| ROT10 | 004610 | 1270 | 13050 | | | | | | | | | | | |
| ROT11 | 004374 | 12640 | 1346 | | | | | | | | | | | |
| ROT112 | 004432 | 1267 | 12730 | | | | | | | | | | | |
| ROT2 | 004470 | 12810 | 1353 | | | | | | | | | | | |
| ROT3 | 004340 | 12580 | 1349 | | | | | | | | | | | |
| ROT4 | 004460 | 12790 | 1311 | | | | | | | | | | | |
| ROT5 | 004464 | 12800 | 1355 | 1357 | | | | | | | | | | |
| ROT6 | 004646 | 13120 | 1356 | | | | | | | | | | | |
| ROT6X | 004704 | 1315 | 13210 | | | | | | | | | | | |
| ROT6X1 | 004726 | 1322 | 13280 | | | | | | | | | | | |
| ROT6X2 | 004750 | 1329 | 13350 | | | | | | | | | | | |
| ROT6X3 | 005000 | 1337 | 13430 | | | | | | | | | | | |
| ROT7 | 004360 | 1259 | 12620 | | | | | | | | | | | |
| ROT8 | 004520 | 1275 | 12920 | | | | | | | | | | | |
| ROT8X | 004572 | 1295 | 13020 | | | | | | | | | | | |
| ROT9 | 004446 | 12760 | 1297 | 1299 | 1301 | 1304 | | | | | | | | |
| RSLNFL | 005044 | 1257 | 1312 | 13570 | | | | | | | | | | |
| RS80FL | 005036 | 1256 | 1281 | 1313 | 13540 | | | | | | | | | |
| SAVE | 001046 | 6400 | 8980 | 899 | 9370 | 17700 | 17730 | 1776 | 1801 | | | | | |
| SCHR8W | 002416 | 888 | 897 | 9430 | | | | | | | | | | |
| SCOPE | 007514 | 593 | 17690 | 1802 | 1803 | | | | | | | | | |
| SEGCNT | 001022 | 6300 | 8870 | 9000 | 9930 | 9160 | 9650 | 9740 | 9760 | 9900 | 10120 | 10260 | 10280 | 10940 |
| | | 11090 | 11110 | 11740 | 11900 | 11920 | 11990 | 12540 | 12740 | 12920 | 13000 | 13730 | 13830 | 13890 |
| | | 14090 | 14210 | 14300 | 14400 | 14540 | 14840 | 15070 | 15090 | 15230 | 17710 | 17840 | 17860 | 17930 |
| SEGFLG | 005032 | 12560 | 1280 | 12810 | 12930 | 13130 | 13520 | | | | | | | |
| SEGMENT | 001054 | 6430 | 887 | 903 | 965 | 976 | 1012 | 1020 | 1094 | 1111 | 1174 | 1192 | 1294 | 1292 |
| | | 1373 | 1385 | 1409 | 1421 | 1440 | 1480 | 1509 | 16440 | 16470 | 1771 | 1786 | | |
| SETUP | 001056 | 502 | 6400 | | | | | | | | | | | |
| SIZE | 006566 | 877 | 952 | 1076 | 1173 | 1253 | 1366 | 16420 | 1760 | | | | | |
| BLEW | 006354 | 15880 | 1592 | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|--------|---------|-------|-------|-------|-------|-------|-------|------|------|------|-------|------|------|------|--|--|--|
| BLWENT | 006452 | 15070 | 15910 | 16090 | | | | | | | | | | | | | |
| BLWTIM | 006642 | 920 | 994 | 1005 | 1051 | 1136 | 1231 | 1336 | 1402 | 1472 | 16500 | | | | | | |
| BLWTST | 006254 | 592 | 15710 | 1596 | | | | | | | | | | | | | |
| BLW1 | 006310 | 1573 | 1575 | 15770 | 1584 | 1586 | | | | | | | | | | | |
| BLWIX | 006262 | 15720 | 1605 | | | | | | | | | | | | | | |
| SNBCHR | 003732 | 500 | 1161 | 11730 | 1244 | | | | | | | | | | | | |
| SP | 0000006 | 5370 | 6490 | 6500 | 657 | 659 | 660 | | | | | | | | | | |
| SPCFLG | 003726 | 10920 | 1107 | 11240 | 11340 | 11670 | | | | | | | | | | | |
| SRCHAN | 007702 | 17990 | | | | | | | | | | | | | | | |
| STAER | 007152 | 673 | 681 | 694 | 704 | 722 | 732 | 746 | 753 | 763 | 777 | 784 | 833 | 849 | | | |
| | | 856 | 864 | 883 | 894 | 909 | 925 | 971 | 982 | 999 | 1010 | 1023 | 1034 | 1056 | | | |
| | | 1000 | 1100 | 1117 | 1141 | 1156 | 1187 | 1205 | 1214 | 1221 | 1220 | 1236 | 1271 | 1287 | | | |
| | | 1319 | 1326 | 1333 | 1341 | 1300 | 1391 | 1399 | 1407 | 1420 | 1435 | 1446 | 1462 | 1469 | | | |
| | | 1477 | 1497 | 1504 | 1515 | 1547 | 17560 | 1782 | | | | | | | | | |
| STLNFL | 005042 | 1303 | 13560 | | | | | | | | | | | | | | |
| STP1 | 001150 | 6680 | 674 | | | | | | | | | | | | | | |
| STP2 | 001172 | 669 | 6760 | 682 | | | | | | | | | | | | | |
| STP3 | 001214 | 677 | 6830 | | | | | | | | | | | | | | |
| STP4 | 001222 | 6860 | 695 | | | | | | | | | | | | | | |
| STP5 | 001260 | 690 | 6960 | | | | | | | | | | | | | | |
| STP6 | 001266 | 6990 | 705 | | | | | | | | | | | | | | |
| STP7 | 001310 | 700 | 7060 | | | | | | | | | | | | | | |
| STRCHR | 005046 | 12630 | 1264 | 13430 | 13500 | | | | | | | | | | | | |
| STRCNT | 005050 | 12600 | 12620 | 1265 | 13440 | 13590 | | | | | | | | | | | |
| STBFL | 005034 | 1293 | 13530 | | | | | | | | | | | | | | |
| SHR | 001004 | 6000 | 652 | 6550 | 737 | 912 | 929 | 953 | 986 | 1061 | 1070 | 1150 | 1175 | 1195 | | | |
| | | 1242 | 1250 | 1296 | 1306 | 1347 | 1367 | 1416 | 1450 | 1481 | 1485 | 1510 | 1537 | 1562 | | | |
| | | 1572 | 1595 | 1642 | 1764 | 1770 | 1789 | 1799 | | | | | | | | | |
| SHREG | 000176 | 5700 | 655 | | | | | | | | | | | | | | |
| S1 | 004006 | 11020 | 1191 | 1201 | 1241 | | | | | | | | | | | | |
| S2 | 003764 | 1176 | 11790 | | | | | | | | | | | | | | |
| S4 | 004130 | 1194 | 12080 | | | | | | | | | | | | | | |
| S4X | 004160 | 1210 | 12160 | | | | | | | | | | | | | | |
| S4X1 | 004202 | 1217 | 12230 | | | | | | | | | | | | | | |
| S4X2 | 004224 | 1224 | 12300 | | | | | | | | | | | | | | |
| S7 | 004254 | 1232 | 12380 | | | | | | | | | | | | | | |
| TABEND | 006500 | 1593 | 16200 | | | | | | | | | | | | | | |
| TABSTR | 006454 | 1571 | 16100 | | | | | | | | | | | | | | |
| TBPTR | 006450 | 15710 | 1587 | 1593 | 16040 | 16000 | | | | | | | | | | | |
| TEST1 | 001316 | 594 | 7160 | 723 | 1603 | | | | | | | | | | | | |
| TEST1A | 001342 | 710 | 7260 | 733 | | | | | | | | | | | | | |
| TEST1B | 001366 | 720 | 7370 | 747 | 754 | 764 | | | | | | | | | | | |
| TEST1C | 001504 | 730 | 757 | 7700 | 778 | 785 | 834 | | | | | | | | | | |
| TEST1D | 001752 | 825 | 8420 | 850 | 857 | 865 | | | | | | | | | | | |
| TEST2A | 002074 | 585 | 8770 | 930 | | | | | | | | | | | | | |
| TEST2B | 002422 | 586 | 931 | 9520 | 1063 | | | | | | | | | | | | |
| TEST3 | 003240 | 507 | 1064 | 10760 | 1160 | | | | | | | | | | | | |
| TKB | 001014 | 6120 | | | | | | | | | | | | | | | |
| TKS | 001020 | 6140 | | | | | | | | | | | | | | | |
| TPB | 001012 | 6110 | 17090 | | | | | | | | | | | | | | |
| TPS | 001016 | 6130 | 1710 | | | | | | | | | | | | | | |
| TSTNO | 001036 | 6360 | | | | | | | | | | | | | | | |
| TSTBN | 001042 | 6380 | | | | | | | | | | | | | | | |
| TST2AX | 002122 | 879 | 8850 | | | | | | | | | | | | | | |

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|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|--|--|--|--|--|--|
| WORK | 001044 | 1640* | 1772 | 1795 | | | | | | | | | | | | | | | | |
| XNAMI | 006166 | 6390 | 7390 | 750* | 1145* | 1146* | 1656* | 1658* | 1663* | | | | | | | | | | | |
| XNAMIX | 006174 | 1543 | 15490 | | | | | | | | | | | | | | | | | |
| XLINF | 002316 | 15510 | | | | | | | | | | | | | | | | | | |
| XLPX2 | 003700 | 911 | 9180 | | | | | | | | | | | | | | | | | |
| XN | 003716 | 1152 | 11500 | | | | | | | | | | | | | | | | | |
| XBLW1 | 006332 | 1077 | 11630 | | | | | | | | | | | | | | | | | |
| X81X | 004030 | 1579 | 15030 | | | | | | | | | | | | | | | | | |
| XY1A | 003402 | 1103 | 11090 | | | | | | | | | | | | | | | | | |
| X66X | 005104 | 1096 | 11020 | | | | | | | | | | | | | | | | | |
| X80X | 005346 | 1368 | 13710 | | | | | | | | | | | | | | | | | |
| ZCOUNT | 003730 | 1417 | 1419 | 14200 | | | | | | | | | | | | | | | | |
| Z80Z | 003272 | 1000* | 1002* | 1146 | 11600 | | | | | | | | | | | | | | | |
| . | 007730 | 1079 | 10020 | | | | | | | | | | | | | | | | | |
| | | 5590 | 5660 | 5690 | 5710 | 5730 | 5760 | 5800 | 5830 | 5950 | 901 | 927 | 1059 | 1062 | | | | | | |
| | | 1127 | 1159 | 1170 | 1243 | 1261 | 1307 | 1309 | 1345 | 1370 | 1400 | 1550 | 1555 | 1550 | | | | | | |
| | | 1564 | 1590 | 1627 | 1605 | 1711 | 1765 | 17600 | 1775 | 1790 | | | | | | | | | | |

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|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ERROR | 6210 | 670 | 670 | 691 | 701 | 719 | 729 | 743 | 750 | 760 | 774 | 781 | 786 | 795 | 806 |
| | 810 | 846 | 853 | 861 | 880 | 891 | 906 | 922 | 968 | 979 | 996 | 1007 | 1020 | 1031 | 1033 |
| | 1085 | 1097 | 1104 | 1114 | 1130 | 1153 | 1184 | 1202 | 1211 | 1218 | 1225 | 1233 | 1260 | 1284 | 1316 |
| | 1323 | 1330 | 1330 | 1377 | 1380 | 1396 | 1404 | 1425 | 1432 | 1443 | 1459 | 1466 | 1474 | 1494 | 1501 |
| | 1512 | 1544 | 1580 | 1779 | | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| ADD | 1014 | 1146 | 1490 | 1604 | 1634 | 1665 | 1677 | 1682 | 1696 | 1732 | 1735 | | | | |
| BEG | 901 | 911 | 913 | 927 | 954 | 985 | 987 | 1037 | 1041 | 1043 | 1045 | 1059 | 1062 | 1079 | 1159 |
| | 1176 | 1194 | 1196 | 1240 | 1243 | 1259 | 1275 | 1278 | 1295 | 1297 | 1307 | 1345 | 1348 | 1368 | 1411 |
| | 1417 | 1449 | 1451 | 1482 | 1486 | 1518 | 1520 | 1538 | 1573 | 1598 | 1643 | 1704 | 1706 | 1788 | 1798 |
| BIC | 792 | 801 | 812 | 824 | 870 | 1039 | 1734 | 1773 | 1800 | | | | | | |
| BIB | 798 | 799 | 818 | 822 | 859 | | | | | | | | | | |
| BIT | 737 | 912 | 929 | 953 | 986 | 1061 | 1078 | 1158 | 1175 | 1195 | 1242 | 1258 | 1296 | 1306 | 1347 |
| | 1367 | 1416 | 1458 | 1481 | 1485 | 1519 | 1537 | 1562 | 1572 | 1595 | 1642 | 1789 | | | |
| BMI | 677 | 698 | 788 | 728 | 757 | 788 | 852 | 1183 | 1224 | 1329 | 1431 | 1465 | 1508 | 1668 | 1662 |
| | 1676 | | | | | | | | | | | | | | |
| BNE | 738 | 759 | 915 | 938 | 975 | 989 | 1003 | 1027 | 1110 | 1120 | 1147 | 1149 | 1191 | 1198 | 1299 |
| | 1384 | 1393 | 1439 | 1453 | 1488 | 1588 | 1522 | 1525 | 1553 | 1561 | 1563 | 1586 | 1592 | 1594 | 1596 |
| | 1638 | 1633 | 1664 | 1701 | 1744 | 1785 | 1792 | 1802 | | | | | | | |
| BPL | 669 | 718 | 742 | 749 | 773 | 845 | 898 | 967 | 1019 | 1096 | 1127 | 1183 | 1217 | 1267 | 1322 |
| | 1376 | 1395 | 1424 | 1458 | 1493 | 1543 | 1558 | 1555 | 1558 | 1579 | 1584 | 1598 | 1627 | 1681 | 1685 |
| | 1711 | 1765 | 1775 | 1778 | 1798 | | | | | | | | | | |
| BR | 653 | 674 | 682 | 695 | 785 | 723 | 733 | 747 | 754 | 764 | 778 | 785 | 858 | 857 | 865 |
| | 879 | 902 | 985 | 917 | 921 | 928 | 931 | 958 | 978 | 991 | 995 | 1006 | 1038 | 1046 | 1052 |
| | 1064 | 1081 | 1084 | 1113 | 1128 | 1132 | 1137 | 1152 | 1161 | 1178 | 1201 | 1218 | 1232 | 1241 | 1261 |
| | 1283 | 1381 | 1384 | 1389 | 1311 | 1315 | 1337 | 1378 | 1387 | 1403 | 1419 | 1442 | 1455 | 1473 | 1488 |
| | 1511 | 1548 | 1564 | 1575 | 1685 | 1657 | 1788 | 1717 | 1794 | 1803 | | | | | |
| CLC | 1737 | 1739 | 1741 | | | | | | | | | | | | |
| CLR | 739 | | | | | | | | | | | | | | |
| CHP | 657 | 832 | 869 | 914 | 988 | 1048 | 1042 | 1044 | 1197 | 1298 | 1452 | 1521 | 1593 | 1791 | 1881 |
| CHPB | 1788 | 1783 | 1785 | | | | | | | | | | | | |
| COM | 1815 | | | | | | | | | | | | | | |
| DEC | 1143 | 1524 | 1743 | | | | | | | | | | | | |
| ENT | 661 | 663 | 665 | 683 | 696 | 786 | 1768 | 1762 | | | | | | | |
| HALT | 566 | 667 | 685 | 698 | 788 | 884 | 895 | 972 | 1000 | 1011 | 1024 | 1035 | 1057 | 1089 | 1181 |
| | 1118 | 1157 | 1188 | 1286 | 1215 | 1222 | 1229 | 1237 | 1272 | 1288 | 1328 | 1327 | 1334 | 1342 | 1381 |
| | 1488 | 1488 | 1429 | 1436 | 1447 | 1463 | 1478 | 1478 | 1498 | 1505 | 1516 | 1548 | 1766 | 1783 | |
| INC | 758 | 988 | 918 | 926 | 974 | 984 | 1001 | 1002 | 1016 | 1026 | 1036 | 1038 | 1058 | 1109 | 1119 |
| | 1148 | 1198 | 1193 | 1238 | 1239 | 1274 | 1276 | 1277 | 1294 | 1343 | 1344 | 1383 | 1392 | 1418 | 1438 |
| | 1448 | 1479 | 1507 | 1517 | 1552 | 1559 | 1585 | 1591 | 1629 | 1632 | 1663 | 1784 | 1787 | | |
| JMP | 582 | 585 | 586 | 587 | 588 | 589 | 598 | 591 | 592 | 593 | 594 | 825 | 834 | 896 | 938 |
| | 983 | 1068 | 1063 | 1187 | 1122 | 1168 | 1244 | 1279 | 1288 | 1346 | 1349 | 1413 | 1483 | 1526 | 1683 |
| JSR | 673 | 681 | 694 | 784 | 722 | 732 | 746 | 753 | 763 | 777 | 784 | 833 | 849 | 856 | 864 |
| | 877 | 878 | 883 | 894 | 984 | 989 | 928 | 925 | 952 | 971 | 977 | 982 | 994 | 999 | 1085 |
| | 1018 | 1023 | 1029 | 1034 | 1051 | 1056 | 1076 | 1083 | 1088 | 1188 | 1112 | 1117 | 1136 | 1141 | 1151 |
| | 1156 | 1173 | 1187 | 1288 | 1285 | 1289 | 1214 | 1221 | 1228 | 1231 | 1236 | 1253 | 1271 | 1282 | 1287 |
| | 1314 | 1319 | 1326 | 1333 | 1336 | 1341 | 1366 | 1388 | 1386 | 1391 | 1399 | 1482 | 1487 | 1428 | 1435 |
| | 1441 | 1446 | 1462 | 1469 | 1472 | 1477 | 1497 | 1584 | 1518 | 1515 | 1547 | 1599 | 1787 | 1714 | 1716 |
| | 1756 | 1769 | 1782 | | | | | | | | | | | | |
| MOV | 581 | 584 | 689 | 658 | 651 | 655 | 656 | 659 | 668 | 671 | 679 | 687 | 688 | 692 | 782 |
| | 728 | 738 | 748 | 744 | 751 | 761 | 778 | 771 | 775 | 782 | 787 | 789 | 796 | 798 | 887 |
| | 889 | 819 | 821 | 842 | 843 | 847 | 854 | 858 | 862 | 881 | 885 | 886 | 887 | 888 | 892 |
| | 897 | 898 | 899 | 983 | 987 | 916 | 918 | 919 | 923 | 936 | 937 | 955 | 956 | 957 | 959 |
| | 968 | 961 | 962 | 963 | 964 | 965 | 969 | 973 | 976 | 988 | 998 | 992 | 993 | 997 | 1084 |
| | 1088 | 1012 | 1013 | 1021 | 1025 | 1028 | 1032 | 1058 | 1054 | 1077 | 1088 | 1082 | 1086 | 1098 | 1091 |
| | 1092 | 1093 | 1094 | 1098 | 1105 | 1188 | 1111 | 1115 | 1121 | 1123 | 1124 | 1125 | 1131 | 1133 | 1134 |
| | 1135 | 1139 | 1144 | 1145 | 1158 | 1154 | 1174 | 1177 | 1179 | 1188 | 1181 | 1185 | 1189 | 1192 | 1199 |
| | 1283 | 1288 | 1212 | 1219 | 1226 | 1238 | 1234 | 1254 | 1255 | 1256 | 1257 | 1268 | 1262 | 1263 | 1264 |
| | 1265 | 1269 | 1273 | 1281 | 1285 | 1292 | 1293 | 1388 | 1382 | 1383 | 1385 | 1388 | 1318 | 1312 | 1313 |
| | 1317 | 1324 | 1331 | 1335 | 1339 | 1365 | 1369 | 1371 | 1372 | 1373 | 1374 | 1378 | 1382 | 1385 | 1389 |

| | | | | | | | | | | | | | | | |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 1397 | 1401 | 1405 | 1409 | 1412 | 1418 | 1420 | 1421 | 1422 | 1426 | 1433 | 1437 | 1440 | 1444 | 1454 |
| | 1456 | 1460 | 1467 | 1471 | 1475 | 1480 | 1487 | 1489 | 1495 | 1502 | 1506 | 1509 | 1513 | 1523 | 1536 |
| | 1539 | 1541 | 1545 | 1551 | 1556 | 1571 | 1574 | 1576 | 1577 | 1581 | 1587 | 1588 | 1597 | 1624 | 1689 |
| | 1631 | 1644 | 1645 | 1647 | 1648 | 1656 | 1658 | 1679 | 1695 | 1697 | 1729 | 1730 | 1731 | 1733 | 1770 |
| | 1771 | 1772 | 1776 | 1780 | 1786 | 1793 | 1795 | 1796 | 1799 | | | | | | |
| MOV8 | 1699 | 1709 | 1713 | 1715 | 1736 | | | | | | | | | | |
| NOP | 791 | 808 | 811 | 823 | 860 | 1600 | 1601 | 1602 | | | | | | | |
| RESET | 640 | 716 | 726 | | | | | | | | | | | | |
| ROR | 1738 | 1740 | 1742 | | | | | | | | | | | | |
| RTI | 1702 | | | | | | | | | | | | | | |
| RTS | 1620 | 1635 | 1646 | 1649 | 1666 | 1678 | 1683 | 1686 | 1712 | 1745 | 1767 | | | | |
| TST | 652 | 668 | 689 | 699 | 717 | 748 | 772 | 844 | 889 | 966 | 1018 | 1095 | 1102 | 1216 | 1266 |
| | 1321 | 1375 | 1390 | 1423 | 1457 | 1492 | 1542 | 1570 | 1659 | 1764 | 1777 | | | | |
| TST8 | 676 | 727 | 741 | 756 | 779 | 851 | 1102 | 1126 | 1223 | 1328 | 1430 | 1464 | 1499 | 1540 | 1584 |
| | 1557 | 1583 | 1589 | 1626 | 1661 | 1675 | 1680 | 1684 | 1710 | 1774 | 1797 | | | | |
| .ASCII | 1768 | | | | | | | | | | | | | | |
| .ENABL | 529 | 530 | | | | | | | | | | | | | |
| .END | 1810 | | | | | | | | | | | | | | |
| .EVEN | 1768 | | | | | | | | | | | | | | |
| .LIST | 566 | 1768 | | | | | | | | | | | | | |
| .MACR | 621 | | | | | | | | | | | | | | |
| .NLIST | 566 | 1768 | | | | | | | | | | | | | |
| .PAGE | 511 | | | | | | | | | | | | | | |
| .REPT | 1 | 566 | | | | | | | | | | | | | |

ERRORS DETECTED: 0

.DZLPAR,DZLPAB,DZLPAB.SRC/CRF/SOL
 RUN-TIME: 0 15 2 SECONDS
 CORE USED: 12K